



# MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Posted 02/14/2020  
1:10 p.m.

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

## WATER POLICY & OVERSIGHT COMMITTEE MEETING

to be held on

Wednesday, February 19, 2020

*Chair:* B. Peña  
*Vice-Chair:* C. Cook  
*Committee Members:*  
J. Carroll  
J. Foti  
A. Pappastergion  
H. Vitale  
J. Walsh  
J. Wolowicz

Location: 100 First Avenue, 2nd Floor  
Charlestown Navy Yard  
Boston, MA 02129

Time: 10:00 a.m.

## AGENDA

### **A. Information**

1. Update on Invasive Aquatic Plants Management at MWRA Source and Emergency Reservoirs
2. Report on 2019 Water Use Trends and Reservoir Status
3. Chloride Levels in Drinking Water

## **MASSACHUSETTS WATER RESOURCES AUTHORITY**

### Meeting of the

### Water Policy and Oversight Committee

January 15, 2020

A meeting of the Water Policy and Oversight Committee was held on January 15, 2020 at the Authority headquarters in Charlestown. Committee Chair Peña presided. Present from the Board were Ms. Wolowicz and Messrs. Carroll, Cook, Cotter, Foti, Pappastergion, Vitale and Walsh. Mr. Flanagan was absent. Among those present from the Authority staff were Frederick Laskey, Carolyn Francisco Murphy, David Coppes, Carolyn Fiore, Thomas Durkin, Michele Gillen, Kathleen Murtagh, John Colbert, Paul Rullo, Patricia Mallett and Kristin MacDougall. The meeting was called to order at 10:56 a.m.

### INFORMATION

Project Update: Section 22 Rehabilitation Alternatives Analysis and Environmental Permitting, Contract 7155

Staff made a presentation. (Mr. Cotter left the meeting during the presentation.)  
(ref. W A.1)

### CONTRACT AWARDS

\* Wachusett Dam Bastion Improvements, Design and Engineering Services During Construction: Kleinfelder Northeast, Inc., Contract 7333

Staff made a presentation.

The Committee recommended approval. (ref. W B.1)

The meeting adjourned at 11:06 a.m.

---

Documents used for this meeting, referenced above, can be found here:  
<http://www.mwra.com/monthly/bod/boardmaterials/2020/o-2020-01-15.pdf>

---

\* Committee recommendation approved by the Board on January 15, 2020.

### STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Update on Invasive Aquatic Plants Management at MWRA Source and Emergency Reservoirs

**COMMITTEE:** Water Policy & Oversight

INFORMATION  
 VOTE

Mark Johnson, P.E. Director, Waterworks  
John J. Gregoire, Program Manager, Reservoir Operations  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

### RECOMMENDATION:

For information only.

### BACKGROUND:

MWRA's control of aquatic invasive plants started at the Wachusett Reservoir in 2002. Since then, MWRA has diligently monitored source and emergency reservoirs for aquatic invasive plant species, and added removal and treatment efforts as conditions have changed. The program goal is to identify new infestations and respond quickly with control measures to prevent spread. Staff have documented successful responses to these programs where the repeated removal of invasive plants has led to the return of native plants. The current program focus and target plants are at the following reservoirs:

Location (west to east)	Target Plant(s)
Ware River at Shaft 8	Variable Milfoil
Wachusett Reservoir	Eurasian Milfoil, Variable Milfoil, Fanwort
Sudbury Reservoir	Fanwort, Water Chestnut
Foss Reservoir	Eurasian Milfoil, Water Chestnut
Chestnut Hill Reservoir	Eurasian Milfoil

Pioneering aquatic invasive plants can quickly out-compete native species, grow to nuisance levels, and ultimately choke off water bodies resulting in water quality problems. Plant die-off and decay consumes oxygen and loads the reservoir with organic matter. This creates a disinfectant demand and increased treatment cost. Added nutrients from this decay can also promote algal growth with the potential for associated toxins and additional water quality concerns. Lastly, aquatic invasive plants can be aesthetic nuisances and clog intake screens.

The invasive plants Eurasian milfoil, Fanwort and Variable Milfoil represent the majority of MWRA's control efforts. These plants spread naturally by roots, seeds and fragmentation, as well as by people, boats, and wildlife. Wildlife is the most challenging vector to control, particularly wading birds, which can transport fragments from other water bodies to reservoirs. They can also ingest seeds and pass them intact.

Aquatic invasive plants respond to subtle changes in environmental conditions. Nutrient inputs, mild or cold winters, wet or dry seasons, duration of reservoir ice cover or lack of ice cover, and reservoir elevations can all have a seasonal impact on invasive plants' growth. Some years have seen marked reductions in invasive plants through harvest and other control operations. In other years, control of plants has varied by species (as one is controlled, another attempts to fill in).

## DISCUSSION

Annual surveys are performed starting from the Quabbin Reservoir in the west and throughout the metropolitan emergency reservoirs in the east. Each season's findings are compared to the previous season for monitoring of shifts in plant community and as an early warning of the arrival of new aquatic invasive plants. MWRA and DCR staff also perform *ad hoc* and targeted surveys based on conditions or pressing issues. Enhanced surveillance has now become the norm to scout for any new or changing conditions, and staff have built-in contingency planning to rapidly respond to new infestations.

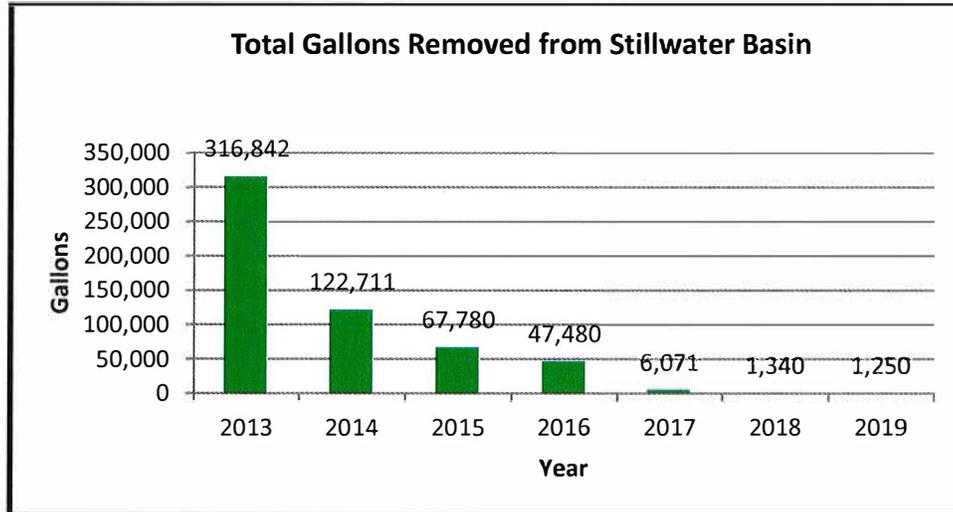
Control measures employed include Diver Assisted Suction Harvesting (DASH), hand-removal by divers and by boat, mechanical harvesting and winter drawdowns at two locations (Foss Reservoir and Chestnut Hill Reservoir) to expose and freeze the plants deep into their root systems.



Foss Reservoir at 10 ft. winter drawdown

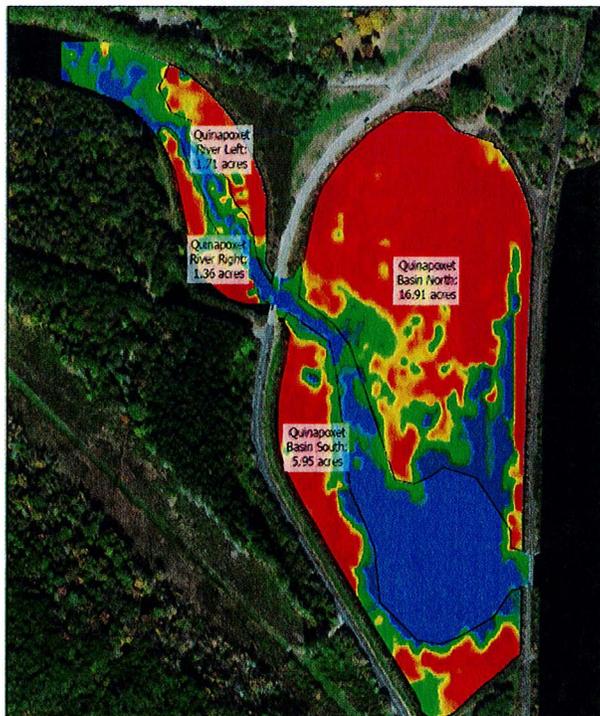
Staff expect that invasive aquatic management at MWRA reservoirs will be a necessary and continuous annual activity to protect water quality for the foreseeable future with levels of effort adjusted to changing conditions. At the Wachusett Reservoir, MWRA has performed seven years

of DASH control efforts in the Stillwater Basin resulting in marked reduction of Eurasian Milfoil and Fanwort, with documented return of native plants (see chart below).



Stillwater Basin Aquatic Invasive Plants removal 2013 -2019

This season staff will begin a higher level of effort at the Quinapoxet Basin to address dense Variable Milfoil population using DASH control measures similar to the program employed at Stillwater Basin. This will include full removal of plants in both the basin and river area upstream of the Thomas Street Bridge.



Quinapoxet Basin at Wachusett Reservoir (red indicates high plant density)

There is also a large population of Variable Milfoil upstream of Quabbin Reservoir. Floating

fragment barriers have been placed, and are maintained, as a control mechanism to prevent fragment migration downstream.



Settling Basins in remote Quabbin tributary areas

Staff are evaluating whether further control removal measures, beyond the existing fragment barriers, are feasible in these remote locations at Quabbin Reservoir. There are no current infestations of aquatic invasive plants in the main body of Quabbin Reservoir. A colony of the invasive plant Brittle Naiad was discovered in 2014 and subsequently removed under MWRA's rapid response approach.

The next annual reservoirs-wide survey contract will commence on July 1, 2020 and includes water quality sampling and water column profile measurements. A key directive in the survey contract is that if any new or expanded aquatic invasives are discovered, it is brought to the immediate attention of MWRA staff and mechanisms are in place to respond.

**BUDGET/FISCAL IMPACT:**

The FY21 proposed CEB includes \$508,350 for MWRA's invasives control program for all reservoirs comprehensive plant survey; aquatic invasives control operations, and quality assurance diver inspections.

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Report on 2019 Water Use Trends and Reservoir Status



**COMMITTEE:** Water Policy & Oversight

INFORMATION  
 VOTE

Carolyn Fiore, Deputy Chief Operating Officer  
Daniel Nvule, Senior Program Manager  
Stephen Estes-Smargiassi, Director, Planning  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

*The year 2019 was a water surplus year. The Quabbin Reservoir was at normal operating level for the entire year and spilled 47.2 billion gallons during the first half of the year. More water was spilled than was transferred to Wachusett. In spite of a growing economy, total water withdrawals were 1.7% lower than the previous year.*

**RECOMMENDATION:**

For information only. At the beginning of each year, staff provide the Board with a review of the previous year's water use data and discuss trends.

**DISCUSSION:**

Calendar Year 2019, like the year before it, was a water surplus year. Total releases and spills exceeded reservoir withdrawals by 13.5 billion gallons. Total reservoir withdrawals dropped slightly by 1.7% when compared to 2018.

Water Consumption by MWRA Communities

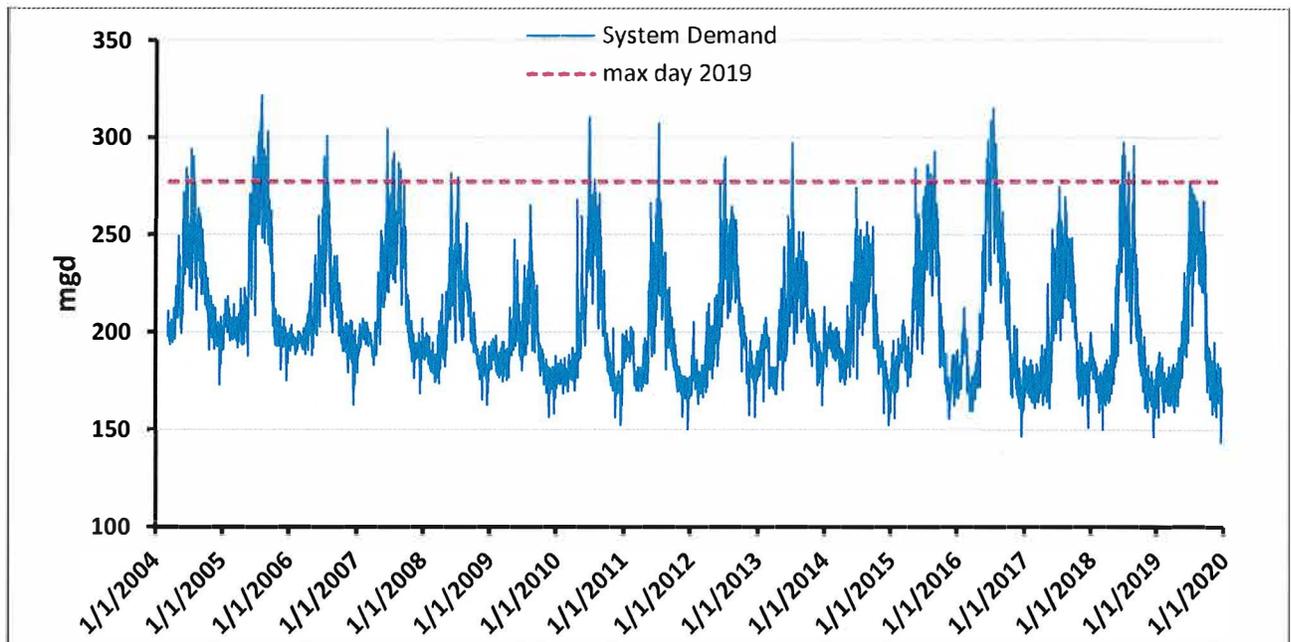
Calendar Year 2019 water consumption by all MWRA communities of 180.57 million gallons per day (mgd) was about 5.99 mgd (3.2% ) lower than 2018, as shown on Figure 1 on the next page.

Figure 1 – Total Consumption by MWRA Communities (1980 to 2019)



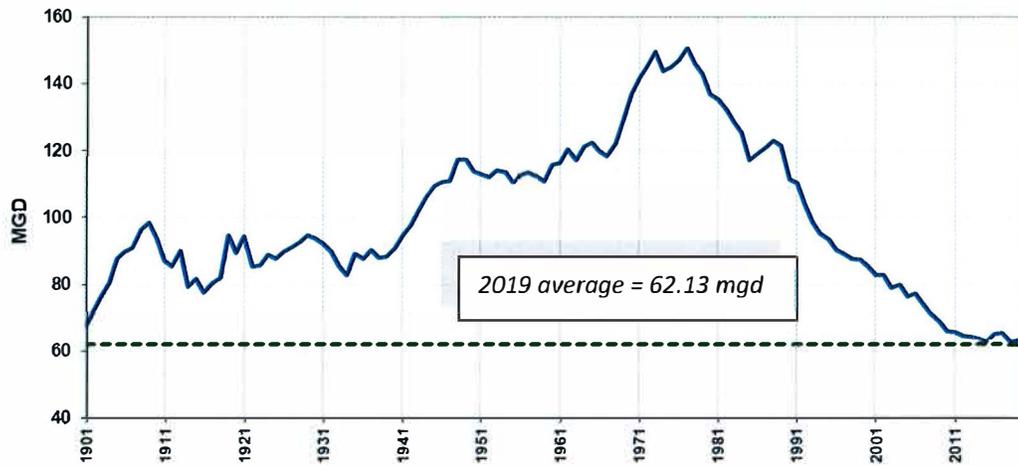
System wide, 2019 had a maximum day demand of 277.7 mgd (6.7% lower than 2018) on July 10th. At the opposite extreme, Christmas day had the lowest demand for the year at 143.7 mgd, which was the record for the lowest single day demand since the creation of the MWRA. Figure 2 below shows daily system demand.

Figure 2: Daily System Demand



Demand from MWRA’s largest customer, the Boston Water and Sewer Commission, was 62.13 mgd, which was lower than last year by 1.49 mgd (2.33%). Current Boston demand continues to be lower than demand before 1900 as shown on Figure 3 on the next page.

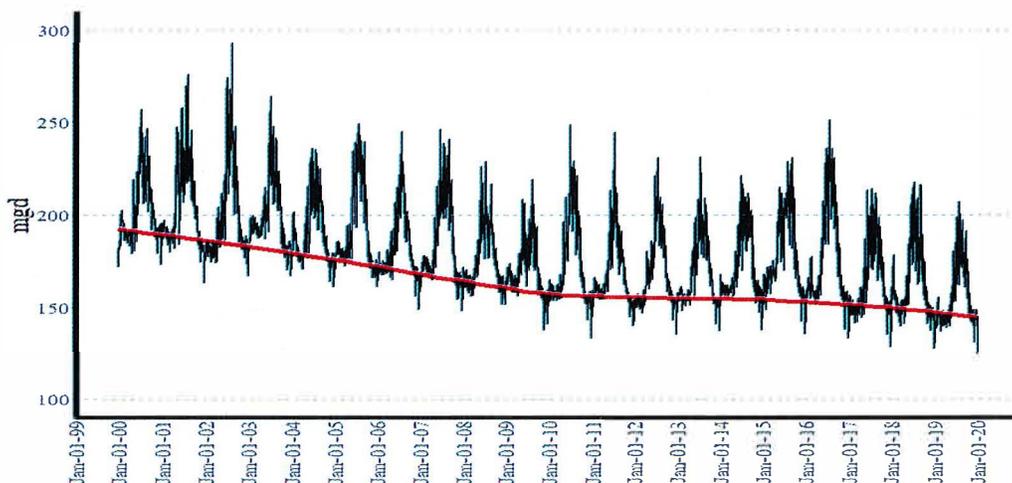
Figure 3: Boston Water Use (1900-2019)



Base or Indoor Demand

Over time, there have been substantial water use reductions in both base (or indoor) use, defined as water use from November to March, and outdoor use (or seasonal use), defined as the increase over the base demand during the irrigation season from May to September. Indoor water use, shown as the red line on Figure 4 below, has dropped substantially over the past several decades due to the improvements in the efficiency of water use in homes and businesses as water-saving technologies continue to increase market share, and consumers react to price increases as well as reduced pipeline leaks. Although decreases before the recession of 2008 ranged from around 1% to 2% per year, it appears that the rate of decrease has slowed after the recession. This is likely due to efficiency gains being counterbalanced by the improving regional economy and population growth. During the last three years, the rate of decrease has reduced to about 68% of pre-recession rates.

Figure 4: Fully-Supplied Communities Demand (1999 to 2019)<sup>1</sup>



<sup>1</sup> Certain analyses can only be done on fully-supplied communities where MWRA has information on their daily use available from MWRA’s revenue meters. MWRA receives data on monthly total use for partially-supplied communities, but not until they provide that data to DEP in their Annual Statistical Reports in March. Fully-supplied communities represent almost 90% of the total annual demand

## Seasonal or Outdoor Demand

Seasonal water use is more variable than indoor demand and driven in large part by weather during the irrigation season. Factors influencing seasonal use include the total irrigation season precipitation, the number of dry days between rainfall events, temperature, and the total amount of sunshine. During drought conditions, mandatory restrictions will reduce outdoor use. Over time, the price of water also influences seasonal use.

Figures 5 and 6 below show the variation in seasonal water use over time, and both the relatively small impact that seasonal demand has on total water use and the longer-term decline in both base and total use. Figure 5 shows a 29.2% drop in 2019 when compared to the previous year. Seasonal use in 2019 of 11.4 mgd was the lowest in the past 19 years on a volume basis. Given declining use overall, it was third lowest on a percentage basis, standing at 7.3% of total water use. Staff attribute the low seasonal use to the unusually wet spring and summer seasons last year.

Figure 5: Fully Supplied Communities' Annual Seasonal Demand  
(Labels show demand in mgd)

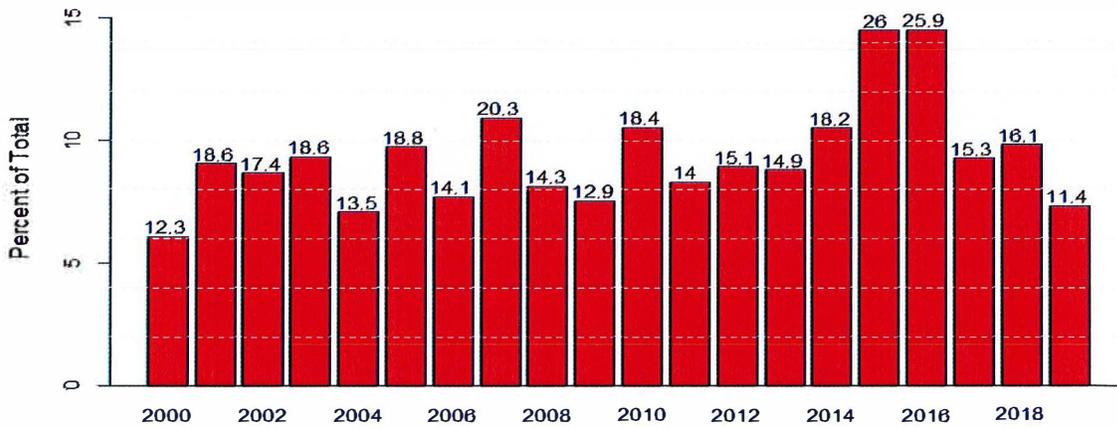
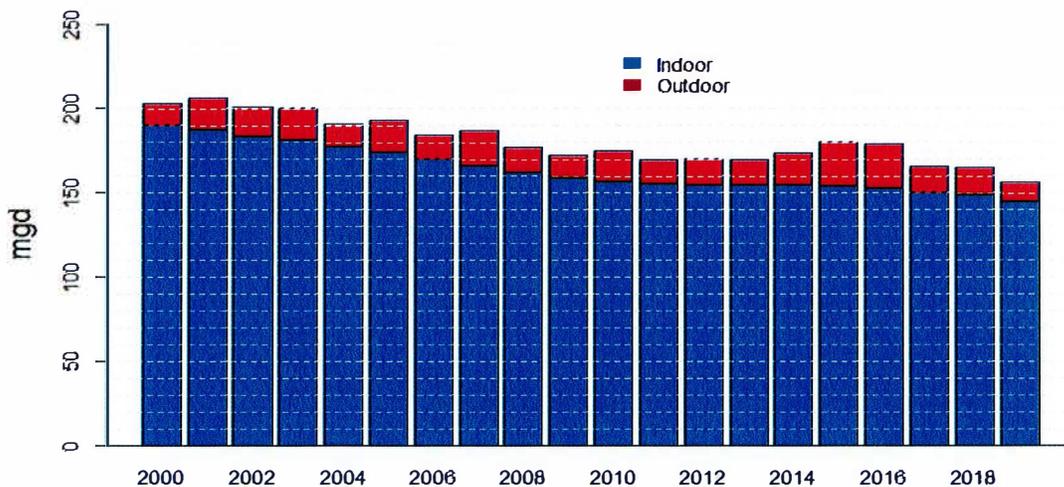


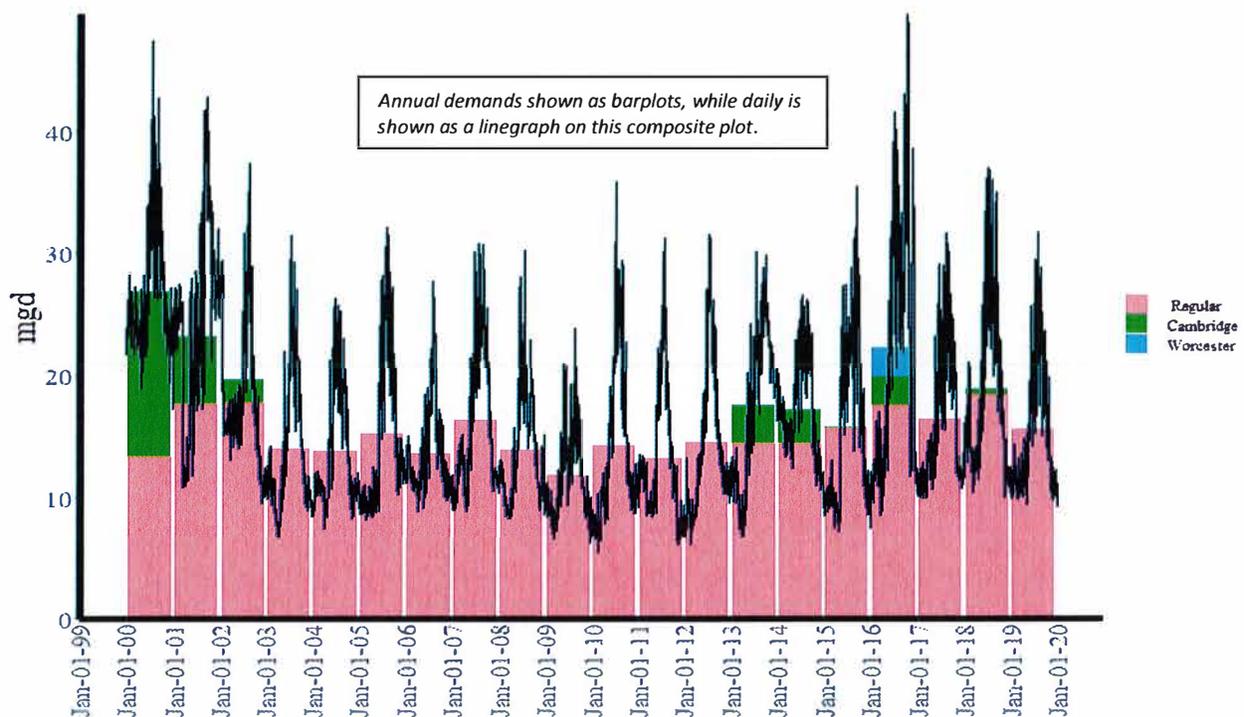
Figure 6: Fully-Supplied Communities Annual Base and Seasonal Demand



## Partially Supplied Communities

Demand for the partially supplied communities, shown on Figure 7 below, was down by 3.3 mgd (17.4%) when compared to 2018.

Figure 7: Partially Supplied Communities – MWRA Supplied Demand (Daily and Annual)



## Reservoir Withdrawals and Releases

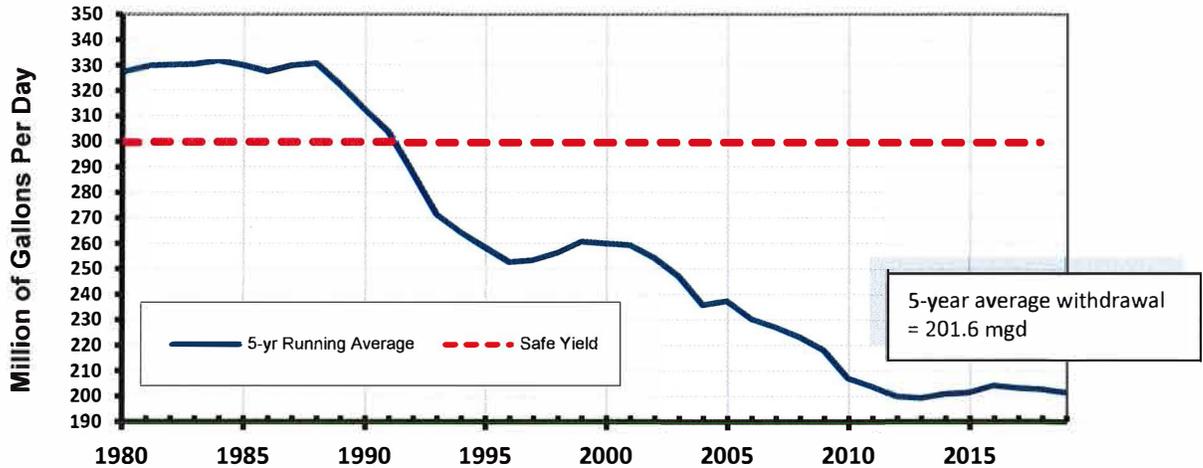
Reservoir withdrawals are the metric used to compare to the 300 mgd safe yield of the watershed/reservoir system.<sup>2</sup> Withdrawals include water sold to MWRA communities, as well as other non-revenue generating uses in the watershed and MWRA system. Total MWRA water withdrawals decreased by 1.7% in 2019, from 199.98 mgd in 2018 to 196.6 mgd.

The pipeline supplying the McLaughlin Fish Hatchery in Belchertown was in service for the entire year, with an average withdrawal of 6.18 mgd. Without that withdrawal, total reservoir withdrawals in 2019 would have been about 190.42 mgd.

Figure 8, on the next page, shows five-year averages of withdrawals from 1980 to present. The five-year averaging reduces the effects of year-to-year variability due to weather, and provides a good indication of longer-term trends. The average shows a slight decrease from 2018. Staff will monitor any changes in water use, to see if the longer-term downward trend resumes.

<sup>2</sup> The 300-mgd safe yield is based on the drought of the 1960s. Use of a less conservative 20-year recurrence drought, as allowed by DEP, would result in a safe yield as high as 350 mgd. MWRA's Water Management Act registration is for 312 mgd.

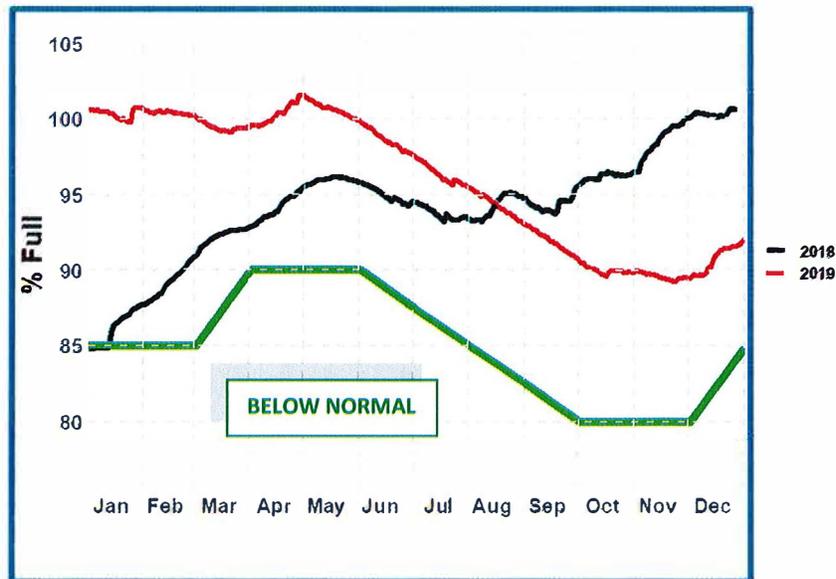
Figure 8: Total Reservoir Withdrawals – Five-Year Running Average 1980 to 2019



Reservoir Status

By the end of November 2019, all the state’s drought-monitoring regions were in normal status. Quabbin Reservoir levels have been well within the normal operating band and followed typical seasonal variation patterns. Figure 9 below shows a comparison of Quabbin volume levels between 2018 and 2019. The green line on the Figure shows the seasonal monthly benchmarks for the operating band. Levels above the line are considered ‘normal’ and below the line are considered ‘below normal.’ Further operating bands for varying degrees of drought status are significantly lower still.

Figure 9: Quabbin Reservoir Volumes for 2018 to 2019



The Quabbin Reservoir spilled for more than half the year for a total of 195 days and 47.2 billion gallons. In order to maintain water quality, 44.8 billion gallons of the higher quality Quabbin water was transferred to the Wachusett Reservoir during 2019. The transfer was equivalent to about 68% of Wachusett's capacity. To maintain the Wachusett Reservoir in its normal narrow operating band, MWRA transferred 23.5 billion gallons to the Nashua River through controlled releases and spills and 6 billion gallons to the Sudbury Reservoir.

**ATTACHMENT:**

Community Water Use Data

# Massachusetts Water Resources Authority MWRA Water Supplied (MGD)

**Reporting Period: December 2019**

ALL DATA SUBJECT TO CHANGE OR ADJUSTMENT PENDING ADDITIONAL MWRA AND COMMUNITY REVIEW

	Monthly (MGD)			YTD (MGD)			YTD System Share			Prior Year-End Totals	
	Dec		Flow Change	YTD		Flow Change	Flow Share <sup>1</sup>		% Change in YTD Flow Share	2018	
	2019	2018		2019	2018		2019	2018		Ave. Flow mgd	Flow Share <sup>1</sup>
<b>Metro-System (Fully Served)</b>											
Arlington	3,313	3,287	0.8%	3,568	3,698	-3.5%	2.1%	2.1%	-0.1%	3,698	2.1%
Belmont	1,570	1,687	-6.9%	1,928	2,045	-5.7%	1.1%	1.2%	-2.4%	2,045	1.2%
Boston (BWSC)	57,749	56,404	2.4%	62,130	63,644	-2.4%	36.4%	36.0%	1.0%	63,644	36.0%
Brookline	3,931	4,191	-5.2%	4,783	4,974	-3.8%	2.8%	2.8%	-0.5%	4,974	2.8%
Chelsea	3,154	3,033	4.0%	3,271	3,365	-2.8%	1.9%	1.9%	0.6%	3,365	1.9%
Everett	3,724	3,544	5.1%	3,778	3,777	0.0%	2.2%	2.1%	3.5%	3,777	2.1%
Framingham	4,960	5,016	-1.1%	5,602	5,756	-2.7%	3.3%	3.3%	0.7%	5,756	3.3%
Lexington <sup>2</sup>	4,403	3,771	16.8%	5,119	5,122	-0.0%	3.0%	2.9%	3.4%	5,122	2.9%
Lynnfield W.D.	0,346	0,347	-0.3%	0,485	0,546	-11.2%	0.28%	0.31%	-8.0%	0,546	0.3%
Malden	5,051	4,946	2.1%	5,060	5,146	-1.7%	3.0%	2.9%	1.8%	5,146	2.9%
Marblehead	1,293	1,230	5.1%	1,689	1,755	-3.8%	1.0%	1.0%	-0.4%	1,755	1.0%
Medford	4,184	4,061	3.0%	4,358	4,458	-2.2%	2.6%	2.5%	1.2%	4,458	2.5%
Melrose	1,753	1,924	-8.9%	1,969	2,028	-2.9%	1.2%	1.1%	0.5%	2,028	1.1%
Milton	1,898	1,855	2.3%	2,235	2,391	-6.5%	1.3%	1.4%	-3.3%	2,391	1.4%
Nahant	0,250	0,238	5.1%	0,326	0,312	4.7%	0.2%	0.2%	8.3%	0,312	0.2%
Newton	7,725	7,294	5.9%	8,581	8,668	-1.0%	5.0%	4.9%	2.5%	8,668	4.9%
Norwood	2,378	2,349	1.2%	2,692	2,701	-0.3%	1.6%	1.5%	3.2%	2,701	1.5%
Quincy	7,439	7,403	0.5%	7,864	7,981	-1.5%	4.6%	4.5%	2.0%	7,981	4.5%
Reading	1,266	1,335	-5.2%	1,522	1,615	-5.8%	0.9%	0.9%	-2.5%	1,615	0.9%
Revere	3,302	3,376	-2.2%	3,546	3,585	-1.1%	2.1%	2.0%	2.4%	3,585	2.0%
Saugus	2,646	2,487	6.4%	2,832	2,876	-1.5%	1.7%	1.6%	1.9%	2,876	1.6%
Somerville	6,085	5,291	15.0%	5,883	5,614	4.8%	3.4%	3.2%	8.5%	5,614	3.2%
Southborough	0,674	0,604	11.5%	0,936	0,923	1.4%	0.5%	0.5%	4.9%	0,923	0.5%
Stoneham	1,629	1,562	4.2%	1,820	2,057	-11.5%	1.1%	1.2%	-8.4%	2,057	1.2%
Swampscott	1,244	1,284	-3.1%	1,485	1,473	0.8%	0.9%	0.8%	4.4%	1,473	0.8%
Waltham	5,639	5,325	5.9%	6,371	6,556	-2.8%	3.7%	3.7%	0.6%	6,556	3.7%
Watertown	2,261	2,309	-2.1%	2,496	2,656	-6.0%	1.5%	1.5%	-2.8%	2,656	1.5%
Weston	0,805	0,874	-7.8%	1,519	1,645	-7.7%	0.9%	0.9%	-4.4%	1,645	0.9%
Winthrop	1,191	1,238	-3.8%	1,242	1,259	-1.4%	0.7%	0.7%	2.1%	1,259	0.7%
<b>Subtotal Metro-System (Fully Served)</b>	<b>141,862</b>	<b>138,266</b>	<b>2.6%</b>	<b>155,090</b>	<b>158,626</b>	<b>-2.2%</b>	<b>90.9%</b>	<b>89.8%</b>	<b>1.2%</b>	<b>158,626</b>	<b>89.8%</b>
<b>Metro-System (Partially Served)</b>											
Canton (P)	0,450	1,355	-66.8%	1,031	1,456	-29.1%	0.6%	0.8%	-26.7%	1,456	0.8%
Dedham-Westwood W.D. (P)	0,764	0,134	469.1%	0,658	0,124	430.9%	0.4%	0.1%	449.5%	0,124	0.1%
Leominster (P)	0,000	0,000	0.0%	0,000	0,000	0.0%	0.0%	0.0%	0.0%	0,000	0.0%
Lynn (LWSC) (P)	0,128	0,299	-57.1%	0,251	0,267	-6.1%	0.15%	0.15%	-2.8%	0,267	0.2%
Marlborough (P)	3,517	3,354	4.9%	3,928	4,003	-1.9%	2.3%	2.3%	1.6%	4,003	2.3%
Needham (P)	0,677	0,385	75.8%	0,712	0,962	-26.0%	0.42%	0.54%	-23.4%	0,962	0.5%
Northborough (P)	0,852	0,841	1.4%	0,902	0,894	0.8%	0.5%	0.5%	4.4%	0,894	0.5%
Peabody (P)	0,579	0,811	-28.6%	0,831	2,971	-72.0%	0.49%	1.68%	-71.1%	2,971	1.7%
Stoughton (P)	0,100	0,046	116.5%	0,089	0,100	-10.5%	0.05%	0.06%	-7.4%	0,100	0.06%
Wakefield (P)	1,548	1,334	16.0%	1,823	1,759	3.7%	1.07%	1.00%	7.3%	1,759	1.0%
Wellesley (P)	0,213	0,394	-45.8%	1,164	1,006	15.7%	0.7%	0.6%	19.7%	1,006	0.6%
Wilmington (P)	0,023	0,036	-36.0%	0,380	0,499	-23.8%	0.22%	0.28%	-21.1%	0,499	0.3%
Winchester (P)	0,472	0,904	-47.8%	1,164	1,180	-1.4%	0.7%	0.7%	2.1%	1,180	0.7%
Woburn (P)	1,535	1,051	46.2%	2,663	2,806	-5.1%	1.56%	1.59%	-1.8%	2,806	1.6%
<b>Subtotal Metro-System (Partially Served)</b>	<b>10,860</b>	<b>10,945</b>	<b>-0.8%</b>	<b>15,596</b>	<b>18,028</b>	<b>-13.5%</b>	<b>9.1%</b>	<b>10.2%</b>	<b>-10.6%</b>	<b>18,028</b>	<b>10.2%</b>
<b>Subtotal Metro-System (Full &amp; Partial)</b>	<b>152,723</b>	<b>149,211</b>	<b>2.4%</b>	<b>170,687</b>	<b>176,654</b>	<b>-3.4%</b>	<b>100%</b>	<b>100%</b>		<b>176,654</b>	<b>100%</b>
<b>Chicopee Valley Aqueduct</b>											
Chicopee	4,199	4,158	1.0%	5,046	4,998	1.0%	70.2%	70.3%	-0.2%	4,998	70.3%
South Hadley FD #1	0,784	0,773	1.5%	1,043	1,003	4.0%	14.5%	14.1%	2.8%	1,003	14.1%
Wilbraham	0,761	0,769	-1.0%	1,098	1,106	-0.7%	15.3%	15.6%	-1.8%	1,106	15.6%
<b>Subtotal CVA System</b>	<b>5,744</b>	<b>5,699</b>	<b>0.8%</b>	<b>7,187</b>	<b>7,108</b>	<b>1.1%</b>	<b>100%</b>	<b>100%</b>		<b>7,108</b>	<b>100%</b>
<b>Other Revenue Supply</b>											
Cambridge (P)	0,000	0,000	0.0%	0,000	0,025	-100.0%				0,025	
Clinton <sup>3</sup>	1,144	1,178	-2.9%	1,334	1,374	-2.9%				1,374	
Worcester (P)	0,000	0,000	0.0%	0,000	0,000	0.0%				0,000	
<b>Other Revenue Customers<sup>4</sup></b>	<b>1,296</b>	<b>1,524</b>	<b>-15.0%</b>	<b>1,360</b>	<b>1,392</b>	<b>-2.3%</b>				<b>1,392</b>	
<b>Subtotal Other Revenue Supply<sup>5</sup></b>	<b>2,439</b>	<b>2,702</b>	<b>-9.7%</b>	<b>2,694</b>	<b>2,792</b>	<b>-3.5%</b>				<b>2,792</b>	
<b>Total Water Supplied</b>											
Fully Supplied Metro Communities	141,862	138,266	2.6%	155,090	158,626	-2.2%				158,626	
CVA Communities	5,744	5,699	0.8%	7,187	7,108	1.1%				7,108	
Partially Supplied Communities	10,860	10,945	-0.8%	15,596	18,028	-13.5%				18,054	
Other Revenue Customers	2,439	2,702	-9.7%	2,694	2,792	-3.5%				2,766	
<b>Total Water Supplied<sup>6</sup></b>	<b>160,906</b>	<b>157,612</b>	<b>2.1%</b>	<b>180,568</b>	<b>186,553</b>	<b>-3.2%</b>				<b>186,553</b>	

1) System share for each rate revenue community is the community's share of total MWRA water use for all rate revenue communities. System share for each Chicopee Valley Aqueduct (CVA) community is each CVA community's share of total MWRA water supplied to the CVA system. Water assessments for revenue communities are calculated by allocating the total annual water rate revenue requirement based on each community's share of flow. Water assessments for CVA communities are calculated by allocating the annual CVA rate revenue requirement based on each CVA community's share of CVA flow.

2) Lexington supplies Bedford with partial MWRA water service.

3) The Town of Clinton receives up to 800 million gallons of water per year free of charge and is charged a flat wholesale rate per million gallons for water in excess of 800 million gallons per year.

4) Other Revenue Customers: D.C.R. (Parks & Pools), DCR Blue Hills Ski Area, Stone Zoo, Deer Island WWTP and Department of Youth Services.

5) Other Revenue Customers are charged a flat wholesale rate per million gallons of water supplied.

6) This report includes only water supplied for which revenue is collected in accordance with existing user agreements. It does not include water utilized for system maintenance.

(P) Community is partially supplied by MWRA.

Question regarding water supplied can be directed to Michael Greeley @ (617) 305-5814 or Lee Norton @ (617) 788-2256.

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Chloride Trends in MWRA Reservoirs: Best Management Practices to Reduce Water Quality Impacts

---

**COMMITTEE:** Water Policy & Oversight

  X   INFORMATION  
       VOTE

Betsy Reilly, Ph.D., Director, Environmental Quality  
Mandu Inyang, Ph.D. Program Manager, Chemistry  
Kimberly LeBeau, Sr. Program Manager  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

---

**RECOMMENDATION:**

For information only.

**DISCUSSION:**

Chloride concentrations have been increasing throughout the northeastern United States resulting in water quality changes in freshwater bodies, streams, and groundwater. Department of Conservation & Recreation (DCR) Division of Water Supply Protection and MWRA staff are monitoring the rising chloride levels in the Quabbin and Wachusett Reservoirs due to road salt application. Elevated chloride levels can increase corrosivity in the water distribution system and impact lead levels, in addition to affecting reservoir aquatic life.

The increase in chloride levels has brought attention to the impact that road salt has on water supplies. Road salt is applied to de-ice roads in the winter for highway safety, with nearly 20 million tons applied annually in most Northeastern and mid-western states<sup>1</sup>. Nearly all of the runoff from road salt indirectly enters into drinking water supplies through adjacent rivers, streams and aquifers. DCR estimates approximately 18,340 tons of road salt are applied annually in the Wachusett watershed to parking lots, and state and community roadways.

Massachusetts DEP recommends that public water systems annually monitor for all secondary standard (aesthetic-based) contaminants, including chloride, at their finished water taps. MWRA performs this monitoring quarterly at the Wachusett and Quabbin Reservoir source and finished water taps. Massachusetts has a secondary maximum contaminant limit (SMCL) of 250 mg/L for

---

<sup>1</sup> Kelsey J. Pieper, Min Tang, C. Nathan Jones, Stephanie Weiss, Andrew Greene, Hisyam Mohsin, Jeffrey Parks, and Marc A. Edwards, Impact of Road Salt on Drinking Water Quality and Infrastructure Corrosion in Private Wells *Environmental Science & Technology* 2018 52 (24), 14078-14087

chloride in drinking water that relates to the water aesthetics and salty taste at concentrations above this level. While MWRA finished water chloride levels are far below the SMCL, MWRA and DCR are monitoring and collaborating to reduce levels in both watersheds. Current treatment processes at the Brusch and Carroll Water treatment plants do not specifically reduce chloride levels in finished water.

Data trends show an increase in raw water chloride and specific conductance at both the Quabbin and Wachusett Reservoirs. Specific conductance is a surrogate measure for chloride, and is an easier measurement allowing for more frequent sampling. Since the 2016 drought, which was followed by a series of large precipitation events, Wachusett Reservoir raw water chloride levels increased. Quabbin Reservoir also shows small, but consistent increases compared to typical ranges recorded prior to 2016. It should be noted that Quabbin transfers help to decrease the specific conductance and chloride levels within the Wachusett Reservoir.

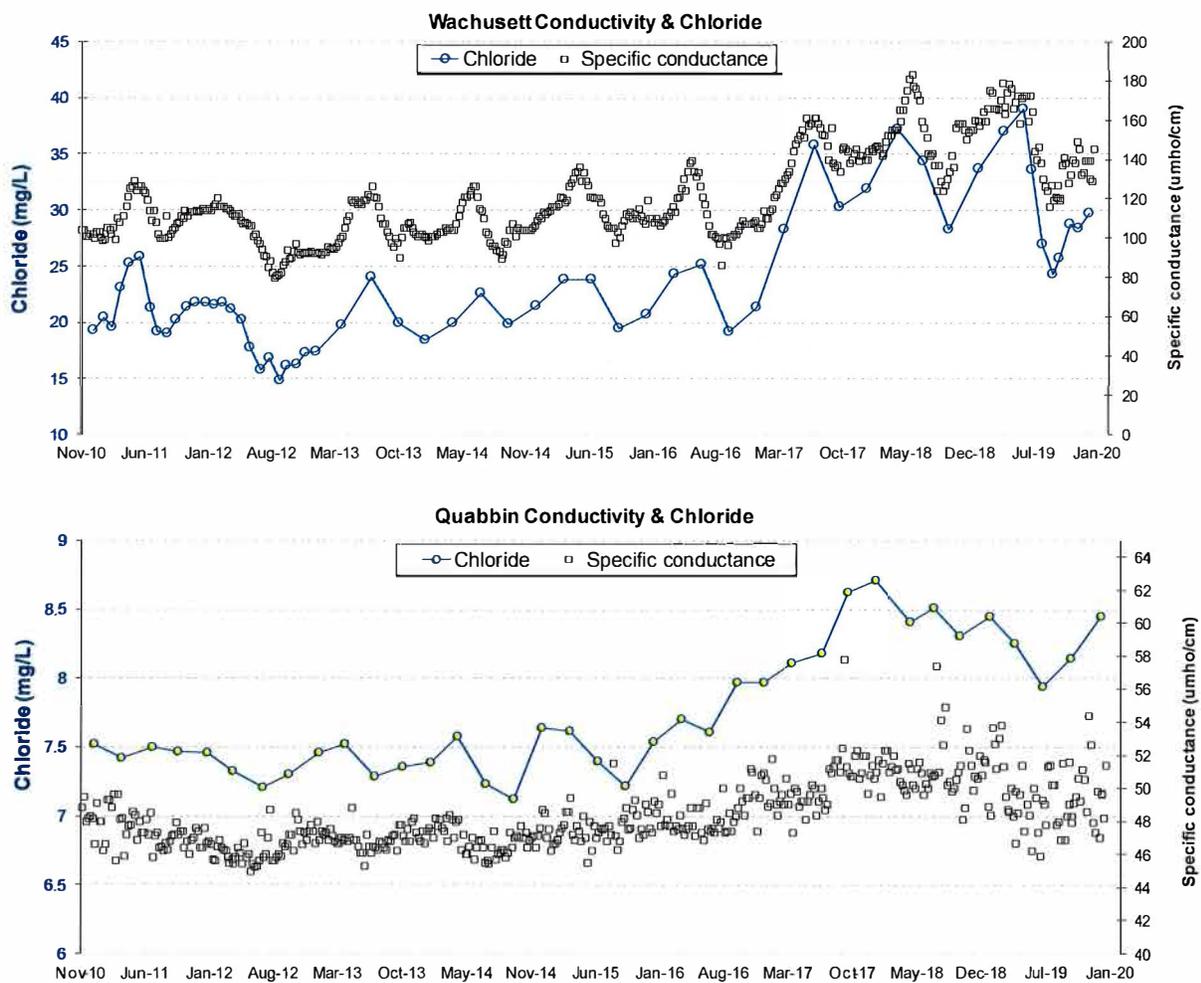


Figure 1. Chloride and specific conductance levels in MWRA’s Wachusett and Quabbin reservoirs.

DCR has also documented significant increases in specific conductance at 30 sampling stations in the Wachusett watershed. Gates Brook, a tributary in a densely developed section of West Boylston, currently accounts for the highest amounts of chloride concentrations. Seasonal increases in chloride concentrations at the Wachusett Reservoir had traditionally been observed

following winter precipitation events. More recent data show that chloride levels are also elevated during the summer, which suggests that groundwater now has elevated levels as well.

To address the elevated loadings of road salt, DCR staff performed a preliminary, but comprehensive review of snow and ice removal practices within the Wachusett Reservoir watershed communities (Boylston, West Boylston, Paxton, Holden, Princeton, Rutland, Sterling, and MassDOT highways). DCR staff requested recent and historic salt use and purchase information; salt equipment application methods; alternative de-icing products; number of employees involved in snow plowing; and community well water quality data. These findings were recently presented by DCR to the Water Supply Protection Trust.

Since proper salt application is integral to decreasing overall salt concentrations on roadways while maintaining road safety, MWRA funded a training for watershed-community DPW staff. The one-day training program, delivered by Baystate Roads at the UMass Transportation Center on November 5, 2019, discussed the proper use of salt and liquid de-icers/anti-icers, pre-wetting and pre-treating operations, and salt equipment calibration. Several DCR and MWRA staff also attended this well-received training event.

### **Next Steps**

DCR staff are working with the community drinking water supply staff to further promote local interest in reduced salt applications and reaching out to communities, like Cambridge and Wellesley, who are dealing with increased chloride levels as well. Collaborative research and modeling efforts are underway with the University of Massachusetts, Amherst to investigate watershed-based reservoir inputs of road salt and predict water quality impacts using hydrodynamic water quality modeling. DCR plans to install data loggers across the watershed to obtain real-time specific conductance data and collect more samples for chloride and specific conductance to track groundwater impacts and help focus management efforts. MWRA is looking for grant opportunities to fund replacement of inefficient salt application equipment within watershed communities.

Staff will continue to monitor chloride and specific conductance levels in the reservoirs. In addition, staff are evaluating the potential downstream impacts, looking specifically at whether they affect lead levels in the distribution system. The data will be used to inform additional actions as we work closely with DCR staff to educate the public and encourage source reduction through road salt application best management practices.



# MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

## PERSONNEL & COMPENSATION COMMITTEE MEETING

to be held on

Wednesday, February 19, 2020

*Chair:* J. Wolowicz  
*Vice-Chair:* K. Cotter  
*Committee Members:*  
J. Carroll  
P. Flanagan  
J. Foti  
A. Pappastergion  
H. Vitale  
J. Walsh

Location: 100 First Avenue, 2nd Floor  
Charlestown Navy Yard  
Boston, MA 02129

Time: Immediately following Water Committee

## AGENDA

### **A. Approvals**

1. Approval of the 2020 Affirmative Action Plan
2. PCR Amendments – February 2020
3. Appointment of Work Coordination Center Manager, Operations

## **MASSACHUSETTS WATER RESOURCES AUTHORITY**

### Meeting of the

### Personnel and Compensation Committee

January 15, 2020

A meeting of the Personnel and Compensation Committee was held on January 15, 2020 at the Authority headquarters in Charlestown. Committee Chair Wolowicz presided. Present from the Board were Messrs. Carroll, Cook, Cotter, Foti, Pappastergion, Peña, Vitale and Walsh. Mr. Flanagan was absent. Among those present from the Authority staff were Frederick Laskey, Carolyn Francisco Murphy, David Coppes, Carolyn Fiore, Kathleen Murtagh, Michele Gillen, Andrea Murphy and Kristin MacDougall. The meeting was called to order at 11:06 a.m.

### APPROVALS

#### \* PCR Amendments – January 2020

Staff made a verbal presentation. (Mr. Cotter returned to the meeting and Mr. Pappastergion left the meeting during the presentation). There were questions and answers.

The Committee recommended approval as amended. (ref. P&C A.1)

#### \* Appointment of Business Systems Analyst III, Administration

Staff made a verbal presentation. (Mr. Pappastergion returned to the meeting during the presentation.)

The Committee recommended approval. (ref. P&C A.2)

#### \* Appointment of Manager, Metering and Monitoring, Operations

Staff made a verbal presentation.

The Committee recommended approval. (ref. P&C A.3)

#### \* Appointment of Manager, Wastewater Operations

Staff made a verbal presentation.

---

\* Committee recommendation approved by the Board on January 15, 2020

The Committee recommended approval. (ref. P&C A.4)

\* Appointment of Associate General Counsel, Law Division

Staff made a verbal presentation.

The Committee recommended approval. (ref. P&C A.5)

The meeting adjourned at 11:10 a.m.

---

Documents used for this meeting, referenced above, can be found here:  
<http://www.mwra.com/monthly/bod/boardmaterials/2020/o-2020-01-15.pdf>

---

\* Committee recommendation approved by the Board on January 15, 2020.

## STAFF SUMMARY

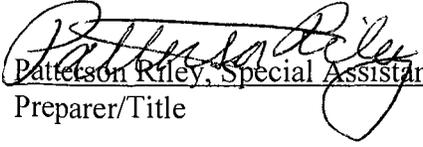
**TO:** Board of Directors  
**FROM:** Patterson Riley, Special Assistant, Affirmative Action & Compliance Unit  
**DATE:** February 19, 2020  
**SUBJECT:** Approval of the 2020 Affirmative Action Plan

---

**COMMITTEE:** Personnel & Compensation

           INFORMATION

  X   VOTE

  
Patterson Riley, Special Assistant, AACU  
Preparer/Title

---

### RECOMMENDATION:

That the Board of Directors approve the Massachusetts Water Resources Authority's Affirmative Action Plan effective for a one-year period from January 1, 2020 through December 31, 2020.

### DISCUSSION:

The Affirmative Action Plan sets out the basic parameters of MWRA's commitment to Equal Opportunity in the areas of Employment (EEO) and Minority/Women Business Enterprise (M/WBE) participation in MWRA procurements and contracted services. The Plan has been prepared pursuant to Section 7(g) of the Authority's Enabling Act, which states:

“The Authority shall develop policies and plans for affirmative action in employment, procurement, and contracting in accordance with laws and consistent with general policies and plans for the Commonwealth.”

MWRA updates its Affirmative Action Plan annually and provides information on the development, implementation and monitoring of the various plan elements in accordance with guidelines of the U.S. Department of Labor, Office of Federal Contract Compliance Programs (OFCCP). Since 2002, MWRA has utilized Affirmity a nationally known computer software package to produce the required workforce staffing summary reports for each Affirmative Action Plan. Affirmative Action and Compliance Unit staff works with staff from the MIS and Human Resources Departments to convert personnel transaction data from the MWRA's Human Resources Information System and to validate the proposed workforce goals for CY2020.

The text of the plan is attached (Attachment A). Copies of the full plan, including appendices will be available in the Board Lounge on February 19, 2020. Attachment B, “MWRA Job Group Representation,” shows the actual number of minority and female employees currently, along with the numbers of over-and under-utilized job groups. The underutilized job groups denote areas for AACU recruitment focus if positions become available. This report is included in the MWRA Orange Notebook, presented to the Board on a quarterly basis.

During the 2019 Affirmative Action Plan year, MWRA hired a total of 78 new employees, including 22 (28%) females and 28 (36%) minorities. There were 88 employees promoted during this period, including 26 (29%) females and 25 (27%) minorities. MWRA is in full compliance with all aspects and requirements of its federally approved affirmative action program and in following those strict guidelines with its Affirmative Action Plan, a promotion only occurs when the individual employee moves from a position within one job group to a new position within a different job group. For Affirmative Action Plan reporting purposes, 61 of these promotions reflect employee promotions where there has been a change in Job Group as described under "Availability Analysis." Of this total, 17 (27%) females and 16 (26%) minorities were promoted. However, as an employer, the MWRA considers an employee to be promoted at such time that the individual moves into a new position within the same job group, with an increase in pay, grade, different and new job duties. In addition, to enhance upward mobility and avail all employees of a career track where one exists, there were 27 such promotions during the 2019 Affirmative Action Plan year and of these, 9 (33%) were minorities and 9 (33%) were females.

A total of 78 terminations occurred during CY 2019. Of the total number of terminations, 20 (25%) were females and 17 (22%) were minorities. Of the total number of terminations, 91% left voluntarily, 55% were employees who retired, and 35% were employees who resigned.

In comparison, during the 2018 Affirmative Action Program year, a total of 87 terminations occurred, including 23 (26%) females and 12 (14%) minorities. Of the total number of terminations, 29% were employees who resigned and 57% were employees who retired. A review of the total number of termination statistics for calendar years 2017, 2018 and 2019 is included in Table A below.

**Table A**

<b>Termination Statistics</b>	<b>Employee Count</b>	<b>Minority</b>		<b>Female</b>	
Total Terminations CY2017	68	8	12%	18	26%
Total Terminations CY2018	87	12	14%	23	26%
Total Terminations CY2019	78	17	22%	20	26%

The race/sex composition of the workforce did not change significantly during the 2019 Affirmative Action Plan year, particularly as compared to Plan years 2017 and 2018.

The current race/sex composition of the workforce for minorities of 23.2% greater than the overall 2019 MWRA workforce staffing goal of 21.1%; and the current sex composition of the workforce for females of 23.0% is greater than the overall 2019 workforce staffing goal of 20.0%.

A review of MWRA workforce staffing statistics for calendar years 2017, 2018, and 2019 is included in Table B below:

**Table B**

<b>Calendar Year</b>	<b>Minority</b>	<b>Female</b>
12/31/17	21.8%	23.0%
12/31/18	22.1%	22.8%
12/31/19	23.2%	23.0%

The 2020 Affirmative Action Plan documents include detailed workforce data for the reporting period December 1, 2018 through November 30, 2019. The data indicates that the number of underutilized job groups for females has increased. In calendar year 2019, there were 6 job groups underutilized by women and this number has increased to 7 job groups for 2020. In calendar year 2019, the data indicate that the number of underutilized job groups for minorities has decreased. In calendar year 2019, there were 8 job groups underutilized by minorities and this number has decreased to 6 job groups for 2020.

MWRA will continue its good faith efforts to maintain minority and female workforce staffing representation and to further reduce the number of job groups underutilized by women and minorities. There may be opportunities to fill critical positions through promotions of qualified internal candidates, including women and minority employees. The Affirmative Action and Compliance Unit will continue to focus its efforts to assist senior management to fill vacancies through the promotion of qualified women and minorities in the Management, Skilled Crafts, Operator, and Professional job groups. In addition, where external recruitment efforts are necessitated by the absence of qualified internal candidates, and senior management deem that the need exists to fill critical position vacancies, AACU will work with MWRA hiring managers and Human Resources to recruit qualified minority and female candidates.

It is the policy of the MWRA to ensure the equitable participation of Minority Business Enterprises (MBEs) and Women Business Enterprises (WBEs) in the award of all contracts including contracts for construction, goods/non-professional services and professional services. As required by the Massachusetts Department of Environmental Protection via the Environmental Protection Agency, the program will also include Disadvantaged Business Enterprises (DBEs) which means an ongoing, independent small business concern which is at least 51% owned and controlled by one or more individual(s) who are both socially and economically disadvantaged and meets the U.S. Department of Transportation eligibility criteria specified under 49 CFR Part 23 and 26 and has certification issued by the federal government or the Massachusetts Supplier Diversity Office. As of January 1, 2018, the goals for all categories – Construction, Professional Services, Goods and Equipment are 4.2% for D/MBE and 4.5% for D/WBE.

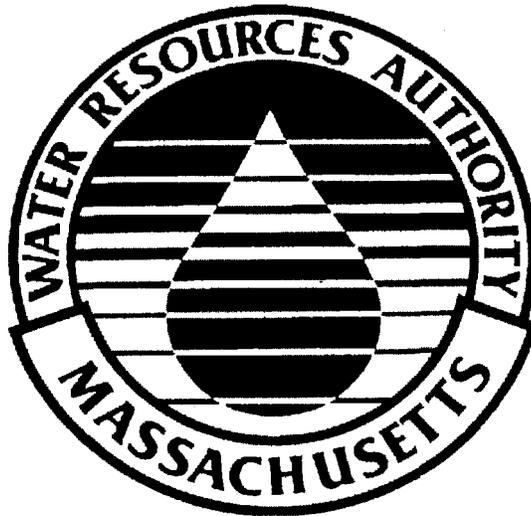
The Plan also includes information on the MBE/WBE/DBE Procurement Program. The MWRA spent \$10.6 million and \$12.5 million, respectively, with minority-and women-owned businesses in the last fiscal year. These amounts were 106% and 182% of the respective MBE and WBE targets, which reflect the achievements of the last fiscal year.

**ATTACHEMENT:**

Affirmative Action Plan



# MASSACHUSETTS WATER RESOURCES AUTHORITY



## AFFIRMATIVE ACTION PROGRAM

JANUARY 1, 2020 - DECEMBER 31, 2020

Frederick A. Laskey  
Executive Director

Patterson A. Riley  
Special Assistant  
Affirmative Action & Compliance Unit

Affirmative Action Program

Massachusetts Water Resources Authority  
Charlestown Navy Yard  
100 First Avenue  
Boston, Massachusetts 02129

AAP Completed by: Patterson A. Riley 1/21/2020  
Patterson A. Riley Date  
(Special Assistant for Affirmative Action)

Telephone Number: (617) 788-4070

Approved by: Frederick A. Laskey 1/21/2020  
Frederick A. Laskey Date  
(Executive Director)

Inclusive Dates of the AAP: January 1, 2020 - December 31, 2020

**Massachusetts Water Resources Authority  
Affirmative Action Plan**

**Table of Contents**

<b>Section</b>		<b>Page</b>
	<b><u>Introduction</u></b>	1
I	Legal Sections	
	Description of Organization	2
II	<b><u>Policy Statement</u></b>	
	Executive Director's Statement	3
	Board of Directors' Statement	4
III	<b><u>Responsibility for Implementation</u></b>	5
IV	<b><u>Equal Employment Opportunity</u></b>	
	Dissemination of the Plan	7
	Internal	
	External	
	<b><u>Development and Execution of the Plan</u></b>	8
	Development: Workforce Analysis	
	Employment Activities 12/1 -11/30	9
	Availability Analysis	
	Action-Oriented Program	
	Identification of Areas for Special Attention/Goals	
	Execution: Recruitment and Advertising	12
	Training/Career Development	13
	Consideration of Minorities and Females not Currently in the Workforce	
	Support of Community Action Programs	14
	<b><u>Sex Discrimination Guidelines</u></b>	15
	<b><u>Religion and National Origin Discrimination Guidelines</u></b>	17
	<b><u>Affirmative Action Program For Individuals With Disabilities</u></b>	18
	<b><u>Affirmative Action Program for Protected Veterans</u></b>	21
	<b><u>Internal Audit and Reporting Systems</u></b>	23
	Internal Complaint Procedure	
V	<b><u>MBE/WBE/DBE Program</u></b>	26

## **INTRODUCTION**

The Affirmative Action Plan for the Massachusetts Water Resources Authority (the “MWRA” or “Authority”), is prepared and adopted under Section 7(g) of the Enabling Act, which states:

“The Authority shall develop policies and programs for Affirmative Action in employment, procurement and contracting in accordance with law and consistent with general policies and programs of the Commonwealth.”

The AA Plan was developed to be consistent with federal and state laws and regulations:

Federal Executive Order 11246, as amended.

41 CFR Parts 60-1, 60-2, 60-20, 60-50, 60-250, 60-300, 60-741; Office of Federal Contract Compliance Programs (OFCCP): Affirmative Action Requirements.

The Rehabilitation Act of 1973, as amended.

The Vietnam-era Veterans’ Readjustment Assistance Act of 1974, as amended.

In addition, MWRA’s policies and personnel practices adhere to the nondiscrimination provisions of all applicable federal and state laws, as amended, including the following:

- Title VII of the Civil Rights Act of 1964.
- Civil Rights Act of 1991.
- Age Discrimination in Employment Act of 1967.
- Equal Pay Act of 1963.
- Americans with Disabilities Act of 1990, as amended.
- Massachusetts General Laws, Chapter 151B.
- Massachusetts Comparable Pay Act.

The AA Plan has been developed by the Affirmative Action and Compliance Unit (AACU) to cover the time period January 1, 2020 through December 31, 2020. The Plan includes a results-oriented set of procedures designed to achieve the full utilization of minorities and women in all levels of the MWRA’s workforce and to promote job opportunities for individuals with disabilities and covered veterans. The Plan has been reviewed by the MWRA Board of Directors, voted on and approved for full implementation.

The Massachusetts Legislature created the MWRA in December 1984 to manage water and sewer services for 3.0 million people and 5,500 businesses in 61 communities. While the Boston Harbor Clean-up is the best known of its projects, MWRA has also completed a modernization of the drinking water system. MWRA also maintains 400 miles of water pipes, aqueducts, and tunnels and 228 miles of sewers. Also, nearly completed are projects to control combined sewer overflows, provide adequate water delivery and meet all federal, state and local water and wastewater standards.

## **II. POLICY STATEMENT**

### **Executive Director's Statement**

Our agency serves citizens in every neighborhood, economic class and cultural group in our service area. MWRA will be in harmony with its social role only when our work environment reflects our broader social aspirations for equal opportunity, justice, personal dignity and cross-cultural respect. To that end, we must take personal responsibility for diversity in our organization and in our community.

All of us at the MWRA recognize that we must take affirmative action to prevent and to remedy any discriminatory effects of business or employment practices based on race, color, religion, sex, sexual orientation, gender identity and expression, genetic information, national origin, age, ancestry, citizenship, disability, veteran and marital status.

On behalf of the MWRA, its managers and employees, I am committed to taking those steps which ensure equitable participation in our employment opportunities by the members of any protected class group without regard to race, color, religion, sex, sexual orientation, gender identity and expression, genetic information, national origin, age, ancestry, citizenship, disability, veteran status and marital status. We are committed to achieving equal opportunity for all through fair and effective implementation of our affirmative action plan.

Frederick A. Laskey  
Executive Director

## **Board of Directors' Statement**

We, the Board of Directors of the MWRA, take great pride in our diverse and talented workforce. We recognize that our continued success depends largely on the collective strengths of our employees. Developing the right mix of skills, ideas and individuals requires an unwavering commitment to Equal Employment Opportunity and Affirmative Action. Accordingly, it is our policy to recruit, hire, and advance individuals without regard to their race, color, religion, sex, sexual orientation, gender identity and expression, genetic information, national origin, age, ancestry, citizenship, disability, veteran and marital status.

Our commitment to the principles of Affirmative Action and Equal Employment Opportunity is reflected in all of our policies and procedures from recruitment and hiring to training, compensation, benefits, transfers and promotions. This commitment is based on sound management and business practices, as well as legal requirements.

In keeping with fair employment practices, we will maintain a positive and productive work environment which calls for the highest standard of personal conduct. In accordance with this standard, any type of harassment or discrimination directed toward any employee or applicant for employment on the basis of race, color, religion, sex, sexual orientation, gender identity and expression, genetic information, national origin, age, ancestry, citizenship, disability, veteran and marital status will not be tolerated.

MWRA is committed to Equal Employment Opportunity and Affirmative Action. We expect each employee to be an active partner in this effort by supporting, in word and deed, the spirit and principles of Equal Employment Opportunity and Affirmative Action. Further, we expect that these values will govern the relationships we establish with communities we serve and others with whom we do business. Working together, we can build upon this commitment and create an environment that reflects diversity in its fullest and truest sense.

The Special Assistant, Affirmative Action and Compliance Unit, has responsibility for implementing and monitoring the Authority's Affirmative Action and Compliance Plan. Employees are encouraged to contact the Affirmative Action & Compliance Unit directly in order to obtain a copy of the Authority's Policy on Equal Employment Opportunity and Affirmative Action.

### **III. RESPONSIBILITY FOR IMPLEMENTATION**

#### **Senior Management Responsibilities**

The responsibility for achieving affirmative action goals and objectives rests with the Executive Director, the Special Assistant of Affirmative Action and Compliance Unit, the Director of Human Resources, Division/Department Directors and other managers and supervisors.

#### **Affirmative Action and Compliance Staff**

The Special Assistant, AACU is provided with sufficient authority, senior management support, and staff to execute these responsibilities, and is identified in all internal and external communications regarding the AAP. The Special Assistant may propose additional programs and activities to strengthen the MWRA's commitment to equal employment opportunity and affirmative action and to effectively address AAP/EEO matters.

The Special Assistant, AACU in conjunction with the appropriate staff, is responsible for:

- Implementing affirmative action programs.
- Developing policy statements.
- Designing and conducting audit and reporting systems to monitor protected class status for the following:
  - Recruiting
  - Hiring
  - Promotions
  - Transfers
  - Terminations
  - Demotions
- Periodically reviewing, with the Chairman of the Board of Directors and the Executive Director, the progress of senior managers in furthering the achievement of the Authority's goals.
- Serving as a liaison between MWRA and enforcement agencies.
- Acting as a liaison between MWRA and minority organizations, women's organizations and community action groups concerned with employment opportunities of minorities and women.
- Reviewing the MWRA's AAP with managers and supervisors to ensure the policy is understood and followed.

The MBE/WBE Program Manager in conjunction with the appropriate staff is responsible for:

- Administration and monitoring of the MWRA's MBE/WBE/DBE Plan.

- Assisting divisions in the implementation of the MWRA's MBE/WBE/DBE Program.
- Ensuring that the program is consistent with the MWRA's Supplementary Provision for Equal Employment Opportunity, Anti-Discrimination, and Affirmative Action.

### **Line Management Responsibilities**

Managers and supervisors will implement the program in the following ways:

- Assist in identifying problem areas, establishing goals, and developing time lines.
- Maintain open door policy for employees to discuss issues of equal opportunity and affirmative action.
- Meet with other managers, supervisors, and employees to adhere to MWRA EEO/AA policies.
- Assist in the performance of internal audits to determine compliance.
- Evaluate the performance of subordinate managers and supervisors in achieving affirmative action plan objectives.

### **Other Key Staff**

The Director, Human Resources, has developed and implemented appropriate mechanisms to ensure equal employment opportunity for all applicants and employees.

The General Counsel and the Associate General Counsel for Labor & Employment provide legal advice regarding equal employment opportunity and affirmative action as they affect the Authority.

## **IV. EQUAL EMPLOYMENT OPPORTUNITY**

### **Dissemination of the Plan**

MWRA will communicate its equal employment opportunity policies and affirmative action programs to all relevant audiences in the following manner:

#### **Internally**

Communicate to employees the existence of the Affirmative Action Plan and make it available for inspection. Prominently display EEO/AA posters throughout all business locations identifying appropriate staff to contact.

Conduct special meetings with managers, supervisors and employees to explain the intent of the equal employment opportunity policies, discuss individual responsibility for implementation and make clear the Executive Director's support of the policies.

Discuss the policies in employee orientation sessions and reference it in management training sessions.

Include the policies in the Policies and Procedures Manual.

Publicize the policy on the MWRA's internal and external websites, reports and other media.

Publish articles covering EEO programs, updates, and promotions in newsletters and other publications.

Include non-discrimination clauses in union agreements, and work to eliminate contract provisions that may have discriminating effects.

#### **Externally**

Communicate to applicants for employment the existence of the Affirmative Action Plan, and make it available for review if requested.

Incorporate the EEO clause in all purchase orders, leases and contracts.

Ensure that both minority and non-minority men and women, Veterans, and persons with disabilities are represented in recruitment advertisements.

Communicate to all recruitment sources the existence of the Affirmative Action Plan.

## Development and Execution of the Plan

### Development

#### Workforce Analysis

As of November 30, 2019, MWRA employed 1,149 people. The MWRA divides its workforce into 31 organizational units in Executive, Administration, Finance, Law, and Operations as follows:

#### Board of Directors

Executive - Office of the Executive Director	Operations - Administration
Executive - Affirmative Action	Operations - ENQUAL
Executive - Office of Emergency Preparedness Services	Operations - Facilities Management
Executive - Internal Audit	Operations - Laboratory Services
Executive - Public Affairs	Operations - Planning
Executive - Tunnel Redundancy Department	Operations - Toxic Reduction & Control
Administration - MIS	Operations - Engineering & Construction
Administration - Facilities	Operations - Wastewater Operations
Administration - Fleet Services	Operations - Water Distribution & Pumping
Administration - Human Resources	Operations - Water & Wastewater O&M
Administration - Procurement	Operations - Water Treatment & Transmission
Administration - Real Property & Environmental	Operations - Operation Support
Finance - Director's Office	
Finance - Rates & Budget	
Finance - Treasury	
Finance - Controller	
Finance - Risk Management	
Law	

The Office of Federal Contract Compliance Programs requires that non-construction contracts maintain an organizational profile or a workforce analysis to depict staffing patterns. It is a method to determine whether barriers to equal opportunity exist within an organization.

Pursuant to 41 C.F.R. § 60-2.11(a), the Workforce Analysis Report (Appendix A) lists each job title as it appears in the applicable collective bargaining agreements or payroll records, ranked from the highest paid to the lowest paid within each of the 31 organizational units.

The reports display within each organizational unit for each job title, the total number of incumbents, the total number of male and female incumbents, and the total number of male and female incumbents who are White, Black, Hispanic, Asian, American Indian, Native Hawaiian and Other, and Two or More Races. Finally, the reports also supply a wage rate code for each job title.

## Employment Activities December, 2018 - November, 2019

From December 1, 2018 through November 30, 2019, there were a total of 78 new hires at the MWRA, including 22 (28%) females and 28 (36%) minorities. The current race/sex composition of the workforce for minorities of 23.2% is greater than the overall 2019 MWRA workforce staffing goal of 21.1%; and the current race/sex composition of the workforce for females of 23.1% is greater than the overall 2019 workforce staffing goal of 20.0%.

A total of 88 promotions occurred during this reporting period, including 26 (29%) females and 24 (27%) minorities. For Affirmative Action Plan reporting purposes 61 of these promotions reflect employee promotions where there has been a change in Job Group as described under "Availability Analysis." Of this total, 17 (27%) females and 16 (26%) minorities were promoted. In addition, to enhance upward mobility and avail all employees of a career track where one exists, there were 27 such promotions during the 2019 Affirmative Action Plan Year and of these 9 (33%) were females and 9 (33%) were minorities.

A total of 78 terminations occurred within the period, and of these, 20 (25%) were females and 17 (22%) were minorities. Of the total number of terminations, 91% left voluntarily, and of those, 55% were employees who retired and 35% were employees who resigned.

### Availability Analysis

Pursuant to 41 C.F. R. 60-2.11(b), an analysis of all major Job Groups is included in the Plan (see Appendix B Job Group Analysis Report). Those jobs having similar content, wage rates and opportunities had been grouped together into 18 Job Groups:

Administrator A	Management A
Administrator B	Management B
Clerical A	Operator A
Clerical B	Operator B
Engineers A	ParaProfessional
Engineers B	Professional A
Craft A	Professional B
Craft B	Technical A
Laborers	Technical B

Moreover, the 18 Job Groups have been kept sufficiently large enough to make for meaningful statistical analyses. The grouping avoids placing job titles from different EEO-4 categories within the same Job Group, wherever possible. Alternative job groupings were reflected because they do not make substantial differences and do not mask any potential underutilization of minorities or women. This analysis of the major Job Groups on the Availability Analysis forms is shown in Appendix C.

### Action-Oriented Program for Affirmative Employment Opportunities

MWRA is committed to a strong policy of equal employment opportunity and affirmative action and this commitment is clearly expressed in its Affirmative Action Plan, which

covers all aspects of the employment process from recruiting and hiring to training and promotion.

MWRA takes affirmative action to ensure that applicants for employment and employees are treated fairly during employment, without regard to their race, color, religion, sex, national origin and other protected groups. MWRA also takes affirmative action steps and make good faith efforts to develop and implement action-oriented programs designed to remove any employment barriers, expand employment opportunities and strive to achieve established workforce staffing goals and objectives.

During the 2020 Affirmative Action Plan year and continuing, MWRA will make good faith efforts to continue to develop and implement an action-oriented program designed to increase employment opportunities, while tailoring the size of its workforce to meet its future mission and maintain organizational efficiency.

The Special Assistant of the Affirmative Action and Compliance Unit, working in conjunction with MWRA Division Directors, will take affirmative steps to establish the following joint accountability good faith efforts to direct their attention toward employee development programs and career counseling initiatives to prepare all interested employees including individuals in targeted EEO groups for consideration of future promotional opportunities, as follows:

- Assist Divisions in efforts to promote qualified employees including minorities and females to fill current or unanticipated vacancies, particularly those positions in underutilized job groups.
- Review the appropriate education, experience and skill requirements for successful job performance.
- Participate in programs, which may impact protected group members, especially in the areas of the development of training and recruitment.
- Schedule confidential meetings with employees who request information on MWRA affirmative action policies, including promotion and training.
- Encourage current employees to take advantage of the above listed training and developmental opportunities, as well as opportunities for promotion.
- Monitor and review, where appropriate, the qualifications of all employees to assure that protected group members are given full opportunities for training and promotion.
- Implement strategic recruitment strategies for underutilized positions likely to require external recruitment.
- Ensure that all promotional opportunities are posted.

Identification of Areas for Special Attention/Goals

Underutilization exists in the following job groups: Administrator B, Clerical B, Engineer A, Craft A, Craft B, Management A, Operator A, Professional A, Technical A and Technical B. Special attention is required to increase the representation of minority and/or females in these job groups by the following:

- Identify any applicable barriers to equal employment opportunity.
- Conduct training/awareness sessions with managers and continue to make them aware of the Affirmative Action Plan elements designed to ensure that the Authority policy and affirmative action program objectives are being followed.

During this affirmative action plan period, there may be 190 opportunities to fill vacant positions. These positions may be filled by new hires, promotions or transfers. For unanticipated position vacancies that occur in other job groups, good faith efforts will be made to attain the established goals for women and minorities. Based on the two-factor availability analysis, the following goals have been set. The chart listed below identifies the goals for those projected vacancies.

Goals for Projected Vacancies							
JOB GROUP ADMINISTRATIVE B	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	5	27.32	27.32	0.00	27.27	1	
JOB GROUP ENGINEER A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	9	22.44	22.02	32.93	19.51		1
JOB GROUP CRAFT A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	14	20.37	3.24	13.04	0.00	1	1
JOB GROUP CRAFT B	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	18	16.57	3.24	15.07	2.05	1	1
JOB GROUP MANAGEMENT A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	16	24.62	34.83	22.77	33.66	1	1
JOB GROUP OPERATOR A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	15	20.77	6.86	6.15	3.08	3	
JOB GROUP PROFESSIONAL A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	3	16.99	43.43	10.00	66.67	1	

JOB GROUP TECHNICAL A	# Opportunities	% Availability		% Workforce		Goal	
		Minority	Female	Minority	Female	Minority	Female
Total	9	18.07	11.06	27.45	13.73		1

## Execution

### Advertising and Recruitment

- The Special Assistant, AACU, annually submits an ad specifically targeted at a publication that has a high minority and female readership.
- The Director, Human Resources ensures that reasonable recruiting and advertising dollars are being targeted to reach minority and female candidates and conducts an analysis to determine the effectiveness of the employment advertisements.
- Recruiters send vacancy announcements to over 30 public and private recruitment sources. The sources included state employment offices, community organizations, interest groups, and other sources.
- Recruiters distribute literature, attend career fairs, and maintain contact with referral sources to assure a steady flow of qualified protected class applicants.

### Selection

- Human Resources and Affirmative Action staff review existing promotion, transfer, training and selection procedures to ensure equal opportunity.
- Human Resources, Affirmative Action, and Division staff develop selection criteria that do not discriminate or tend to screen out women, minorities, covered veterans and/or individuals with disabilities.
- Human Resources and Affirmative Action staff monitor the selection process to ensure equal opportunity and the absence of adverse impact on protected class applicants.
- Human Resources and Affirmative Action staff review application forms to ensure non-discrimination.
- Managers and Supervisors ensure that employees in protected classes receive equal consideration in all selections.

### Promotion, Transfer, Layoff and Recall

Promotions and transfer policies are designed to provide equal opportunity to all employees regardless of race, color, religion, sex, sexual orientation, gender identity and expression, national origin, age, ancestry, citizenship, disability, veteran and marital status. All employees who demonstrate management potential are encouraged to seek advancement into supervisory or other managerial positions. All employees are encouraged to take advantage of the benefits and financial support provided to them for professional

development and continuing education, which may enhance their promotional opportunities.

### Compensation

The principle of equal pay for equal work for all employees is a reality. All employees, including females and minorities, receive compensation in accordance with the same standards. Opportunities for overtime work or otherwise earning increased compensation, when available, is afforded to qualified employees without discrimination based on race, color, religion, sex, sexual orientation, gender identity and expression, genetic information, national origin, age, ancestry, citizenship, disability, veteran and marital status. MWRA does not reduce the amount of compensation offered because of any disability income, pension or other benefit the applicant or employee receives from another source.

### Facilities

MWRA maintains all of its facilities on a non-segregated basis. MWRA maintains appropriate facilities for both sexes and handicapped individuals unless the construction of such facilities would create an undue burden on the Authority, its facilities or its operations.

### Training/Career Development

MWRA assures that training programs and seminars are offered to all employees, including members of protected classes on the basis of appropriate and realistic need. All eligible employees are encouraged to participate in the Authority's tuition reimbursement and tuition remission benefit for continued education, career development and job advancement. Training programs are monitored to assure equal opportunity for protected class employees in all training opportunities.

Training needs are re-evaluated annually to determine the areas of highest priority. Emphasis is on programs to increase productivity and meet job requirements.

Human Resources and Division staff have conducted cross-functional training, to facilitate promotional opportunities and reassignments. This training often requires new skills, licenses and/or certifications.

During calendar year 2020, the Authority will continue to offer, as needed, a series of 6 classes which make up the training component of the Unit 2 and Unit 3 Productivity Improvement Program (PIP) and a series of 12 classes which make up the Unit 1 Administrative Certificate Program (ACP). In calendar year 2020, MWRA will continue to provide wastewater and water license preparatory courses to enhance new skills and development, as well as appropriate licenses and certifications to staff. While PIP and ACP classes are required for employees in designated job titles, classes are available for general enrollment by individuals developing their qualifications for future job openings.

### Consideration of Minorities and Females not Currently in the Workforce

MWRA recruits minorities and women, not currently in our workforce, who have the qualifications and requisite skill for employment. All employees engaged in recruiting are committed to the development of sources of minorities and females from organizations, institutions, community agencies, training schools and colleges.

### Support for Community Action Programs

#### School Education Program

The MWRA offers School Education Program presentations for grades K-12. The MWRA School Education Program has provided meaningful educational experiences to a number of students of the MWRA service community, including those in the urban communities of the metropolitan area.

Subjects range from the Quabbin Reservoir and the water distribution system to Deer Island and the transformation of wastewater into effluent. One of the School Education Program's goals and objectives is to increase outreach to the schools in the communities that reflect the diverse population of the MWRA service area. The School Education Program has been instrumental in informing students, and by extension, the general public of these communities, of the operation and work of the MWRA.

## **Sex Discrimination Guidelines**

MWRA does not discriminate against any applicant or employee on the basis of sex in hiring, recruiting, promoting, transferring, layoff, termination, compensation or in selecting employees for training or other related programs.

### Recruiting and Advertising

Job advertisements placed by the MWRA in newspapers and other online media for employment do not express a sex preference.

### Job Policies and Practices

- Written personnel policies for affirmative action expressly indicate that there shall be no discrimination against employees on account of sex.
- Employees of both sexes have equal opportunity to any available position which the individuals are qualified to perform.
- MWRA does not make any distinction based upon sex in employment opportunities, wages, hours or other conditions of employment. MWRA contribution for insurance, pension, welfare programs and other fringe benefits is the same for men and women, resulting in equal benefits.
- MWRA does not support distinctions between married and unmarried persons of one sex that are not made between married and unmarried persons of the other sex.
- MWRA provides appropriate and comparable physical facilities to both sexes.
- MWRA does not deny a female employee the right to any job which she is qualified to perform.
- MWRA does not penalize women in their conditions of employment because they require time away from work on account of child bearing.
- MWRA does not specify differences for male or female employees on the basis of sex in either involuntary or optional retirement age.

### Wages

- MWRA's wage schedules do not relate to and are not based on the sex of its employees.
- MWRA does not discriminatorily restrict one sex to certain job classifications.

## **Sexual Harassment**

Acts of harassment by employees are prohibited employment practices under Title VII of the Civil Rights Act of 1964, Massachusetts General Laws, Chapter 151(B) and MWRA policy and are subject to sanctions and disciplinary measures.

It is the goal of the MWRA to promote a workplace that is free from sexual harassment. Sexual harassment means sexual advances, requests for sexual favors, and verbal or physical conduct of a sexual nature when:

- Submission to or rejection of such advances, requests or conduct is made explicitly or implicitly a term or condition of employment or as a basis for employment decisions; or
- Such advances, requests or conduct have the purpose or effect of unreasonably interfering with an individual's work performance by creating an intimidating, hostile, humiliating or sexually offensive work environment.

MWRA's Harassment Prevention Policy, policy HR.21, updated January 3, 2017, sets forth procedures for employees to follow and notify management of any sexual harassment violations. All MWRA employees received harassment training in 2017.

MWRA personnel investigate complaints of sexual harassment in a prompt, thorough and confidential manner, and recommend appropriate discipline up to and including termination for offenders. Employees should feel confident that retaliation against an individual who has complained about sexual harassment and retaliation against individuals for cooperating with an investigation of a sexual harassment complaint is unlawful and will not be tolerated by this organization.

## **Religion and National Origin Discrimination Guidelines**

MWRA's affirmative action policy prohibits discrimination against employees or applicants for employment on the basis of religion or national origin.

MWRA makes every effort to accommodate the religious observances and practices of employees and prospective employees who regularly observe Friday evening or some other day of the week as their day of religious observance, and/or who observe certain religious holidays during the year and who are conscientiously opposed to performing work or engaging in similar activity on such days when such accommodations can be made without undue hardship on the operation of the Authority's business.

In determining the extent of its obligations under this section, MWRA considers the following factors:

- Business necessity;
- Financial cost and expenses; and
- Resultant personnel problems.

To assure non-discrimination based on religion or national origin, MWRA is engaged in the following activities:

- Internal communications;
- Development of internal procedures described previously;
- Regular notification to employees of EEO policy regarding religion or national origin;
- Utilization of external recruitment sources, including those educational institutions with substantial enrollments of students from various religious and ethnic groups;
- Utilization of religious and ethnic media for institutional and employment advertising.



# **Affirmative Action Program for Individuals with Disabilities**

## **Policy Statement**

The MWRA is committed to take affirmative action to assure equal employment opportunity for qualified individuals with disabilities.

### Definition of Qualified Individual with Disability

A “qualified individual with a disability” is a person who:

- Has a physical or mental impairment that substantially limits a “major life activity”,
- Has a record of such an impairment, or
- Is regarded as having such an impairment and
- Is capable of performing the essential functions of the job with or without reasonable accommodation to his or her disability.

### Pregnancy and Childbirth

Disabilities caused or contributed to by pregnancy, childbirth or other related medical conditions, will be treated the same as disabilities caused or contributed to by other medical conditions.

### Definition of Reasonable Accommodation

A “reasonable accommodation” for a qualified individual with a disability may include, but is not limited to,

- Making existing facilities readily accessible;
- Job restructuring; part-time or modified work schedules; reassignment to a vacant position; modification of equipment or devices; or other similar accommodations.

Note: An accommodation must be reasonable and is not required if it would impose an “undue hardship” on the MWRA.

### Request for Reasonable Accommodations

MWRA commits to making reasonable accommodations to the limitations of qualified individuals with disabilities and qualified disabled veterans, unless such an accommodation would impose on undue hardship on the MWRA’s business.

An employee with a disability may make a request for reasonable accommodations at any time to their supervisor or directly to the Affirmative Action and Compliance Unit or the Director of Human Resources. The Special Assistant of Affirmative Action & Compliance or his or her designee shall be notified of all reasonable accommodation requests by supervisors or managers and shall ensure that reasonable accommodation records are kept separate from individual employee files.

### Communication of Policy

- The Executive Director or his designee will communicate to Division and Department Directors and other managers the MWRA's policy statement concerning employment of qualified individuals with disabilities.
- Where the MWRA conducts employment activities, posters will be prominently displayed setting forth such information regarding the employment of individuals with disabilities as may be required by government agencies.
- The MWRA will ensure that a list of schools, private and state placement agencies and community and social service organizations receive job listings which are externally posted and advertised by the Authority and that the list is reviewed annually.
- The MWRA will continue to notify relevant organizations as well as appropriate public employment agencies and unions, of MWRA's commitment to equal employment opportunity and affirmative action for individuals with disabilities, including veterans.
- A clause concerning the commitment to equal employment opportunity and affirmative action for individuals with disabilities will continue to be included in contracts and purchase orders of \$2,500 or more.
- The MWRA will continue to notify labor unions and (sub) contractors of the commitment to equal employment opportunity and affirmative action for individuals with disabilities and will seek their cooperation and assistance.

### Voluntary Disclosure

An individual may voluntarily self-identify himself/herself as an individual with disabilities by completing the Affirmative Action Data Form, at any time.

Information submitted will be kept confidential, except that (i) supervisors and managers may be informed regarding restrictions on the work or duties of individuals with disabilities, and regarding necessary accommodations; (ii) first aid and safety personnel may be informed, when and to the extent appropriate, if the individual has a condition that might require emergency treatment; and (iii) Government officials engaged in enforcing laws administered by OFCCP, or enforcing the Americans with Disabilities Act, as amended, may be informed.

### Review of Selection Process

All human resources processes shall be reviewed to determine whether present procedures assure careful, thorough and systematic consideration of the job qualifications of disabled applicants and employees for job vacancies filled either by hiring or promotion, and for all training opportunities offered or available.

### Consideration of Qualifications

Records are kept by the Human Resources Department identifying those vacancies, including promotions, for which known disabled persons has been considered. Should any known disabled person be rejected for employment, promotion, or training, a record is made and kept of the reason. If such reason is medically related, the record is treated as a confidential medical record.

Where applicants or employees are selected for hire, promotion, or training, MWRA will undertake any reasonable accommodation which makes it possible to place a disabled person on the job. Records are maintained to describe the accommodation; such records are treated as confidential medical records.

### Miscellaneous

- All MWRA job descriptions reflect the essential qualifications and requirements of each job.
- When an opportunity for hiring or promotion occurs, the MWRA will review the applicable job descriptions to ensure that the qualifications are job related and consistent with business necessity and the safe performance of the job.

## **Affirmative Action Program for Protected Veterans**

### **Policy Statement**

The Authority is committed to take affirmative action to assure equal employment opportunity in every respect for disabled veterans, Armed Forces service medal veterans, recently separated veterans, or other veterans who served during a war, or in a campaign or expedition for which a badge has been authorized (“protected veterans”).

### **Communication of Policy**

- The Executive Director or his designee will communicate to Division and Department Directors and other managers the Authority’s policy statement concerning employment of qualified protected veterans.
- The MWRA will ensure that a list of established veteran’s organizations and public and private recruitment services, included in Appendix D of this Plan, including the appropriate local employment service offices, will receive copies of all positions, which are externally posted and advertised by the MWRA, and that this list will be reviewed annually and MWRA will continue to notify veteran’s service organizations as well as appropriate public employment agencies of the commitment to equal employment opportunity and affirmative action for protected veterans.
- A clause concerning the commitment to equal employment opportunity and affirmative action for protected veterans will continue to be included in contracts and purchase orders of \$10,000 or more.
- The MWRA will continue to notify labor unions and contractors of the commitment to equal employment opportunity and affirmative action for protected veterans and will seek their cooperation and assistance.
- The MWRA will use the outreach measures it uses for others covered by MWRA’s Affirmative Action Program to recruit and employ veterans also covered by this program.
- The MWRA will submit to the Office of the Assistant Secretary of Veterans Employment and Training no later than March 31<sup>st</sup> of each year, a form titled Federal Contract Veterans Employment Report, which shall contain a list of new employees, and those individuals who have self-identified as protected veterans hired during the period covered by the Report.

## Voluntary Disclosure

- Subsequent to making a job offer, but prior to commencing duties, a prospective employee will be offered the opportunity to self-identify as a special disabled veteran, disabled veteran, a veteran of the Vietnam Era or other protected veteran. The MWRA will consider only that portion of the veteran's military record that is relevant to the job for which the veteran is being considered. After beginning employment, an employee may voluntarily self-identify him/herself at any time as a protected veteran.
- Information submitted will be kept confidential, except that (i) supervisors and managers may be informed regarding restrictions on the work or duties of disabled veterans, and regarding necessary accommodations; (ii) first aid and safety personnel may be informed, when and to the extent appropriate, if a veteran has a condition that might require emergency treatment; and (iii) Government officials engaged in enforcing laws administered by OFCCP, or enforcing the Americans with Disabilities Act, as amended, may be informed.

## Review of Selection Process

All human resources processes shall be reviewed to determine whether present procedures assure careful, thorough and systematic consideration of the job qualifications of protected veteran applicants and employees for job vacancies filled either by hiring or promotion, and for all training opportunities offered or available.

## Consideration of Qualifications

In determining the qualifications of a covered veteran, MWRA will consider only that portion of the military record, including discharge papers, relevant to the specific job qualifications for which the veteran is being considered.

Records are kept by the Human Resources Department identifying those vacancies, including promotions, for which known disabled persons and protected veterans have been considered. Should any known disabled person or protected veteran be rejected for employment, promotion, or training, a record is made and kept of the reason. If such reason is medically related, the record is treated as a confidential medical record.

Where applicants or employees are selected for hire, promotion, or training, MWRA will undertake any reasonable accommodation which makes it possible to place a disabled person or veteran on the job, that is not an undue hardship. Records are maintained to describe the accommodation; such records are treated as confidential medical records.

## Miscellaneous

- All MWRA job descriptions reflect the essential qualifications and requirements of each job.
- When an opportunity for hiring or promotion occurs, the MWRA will review the applicable job descriptions to ensure that the qualifications are job related and consistent with business necessity and the safe performance of the job.

- MWRA has established a hiring benchmark for veterans of 8% for the 2020 Affirmative Action Plan year.
- The MWRA will not reduce the amount of compensation to veterans by the amount the veteran receives from disability income, pension or other benefits related to his or her status as a veteran.

## **Internal Auditing and Reporting Systems**

Internal auditing and reporting for Affirmative Action is managed through the use of monthly, quarterly, and annual reports generated by AACU and shared with management. Reports reflecting workforce compensation, promotions, transfers and terminations are reviewed to ensure that the policy of non-discrimination and equal employment opportunity is carried out. State and local government information reports (EEO-4) are prepared and submitted in accordance with regulation and written instructions.

## **Internal Complaint Procedure**

The internal complaint procedure provides the opportunity for any individual (employee or applicant) who believes that she or he has been harassed, discriminated against or unfairly treated by the MWRA to file a complaint using the procedures set forth below.

### Filing a Complaint

- The individual alleging discrimination should file a written and signed complaint with the Special Assistant of Affirmative Action and Compliance Unit (form available in AACU), or the Director of Human Resources. Detailed and specific allegations must be provided along with an indication of the action(s) or resolution the individual is seeking.
- The complaint must be filed in as timely a fashion as possible.

### No Retaliation

Employees and applicants shall not be subject to harassment, intimidation, threats, coercion or discrimination because they have engaged in or may engage in the following activities:

- Filing a complaint;
- Assisting or participating in an investigation, compliance evaluation, hearing, or any other activity related to the administration of the affirmative action provisions of the Federal, state or local law requiring equal opportunity for women, minorities, individuals with disabilities or protected veterans;
- Opposing any act or practice made unlawful by any Federal, state or local law requiring equal opportunity for women, minorities, individuals with disabilities or protected veterans; or

- Exercising any other right protected by any Federal, state or local law requiring equal opportunity for women, minorities, individuals with disabilities or protected veterans.

### Procedure

- The Special Assistant of Affirmative Action and Compliance Unit and/or Director of Human Resources, will be responsible for accepting complaints of discrimination in writing.
- Upon receiving a complaint of discrimination, a complaint investigator will be assigned, who shall attempt to determine through preliminary fact finding if a formal investigation is warranted.
- Upon determination that an investigation is warranted, a date will be scheduled for an in-depth interview with the complainant and other relevant parties. The complaint investigator shall attempt to bring about a satisfactory resolution with the complainant and appropriate management and make recommendations accordingly.
- Any agreement or resolution may be in writing and if in writing, copies provided to all appropriate parties.
- The complaint resolution process shall be concluded in an expeditious manner. It is the MWRA's intention to resolve all complaints internally and every effort will be made to maintain confidentiality to the extent practicable.
- The complaint investigator will advise the complainant of his or her administrative rights and the right to file a formal charge with a state or federal agency and the time limits imposed on the exercise of these rights.

## Rejection or Cancellation of the Complaint

The MWRA will indicate when a complaint has been rejected for further processing.

In the event an individual files an external complaint, the MWRA's legal counsel will handle all communications. All investigations shall be conducted in a confidential manner to the extent practicable.

In addition to the above, you may file a formal complaint with the government agencies listed below. Using MWRA's complaint process does not prohibit you from filing a complaint with these agencies.

Massachusetts Commission Against  
Discrimination (MCAD)  
One Ashburton Place, 6<sup>th</sup> Floor  
Boston, MA 02108

Massachusetts Office of Diversity and Equal  
Opportunity  
One Ashburton Place - Rm. 213  
Boston, MA 02108

Springfield Office  
MCAD  
436 Dwight Street - Rm. 220  
Springfield, MA 01103

U.S. Equal Employment Opportunity  
Commission  
JFK Federal Building  
475 Government Center  
Boston, MA 02203

Worcester Office  
MCAD  
455 Main Street - Rm. 101  
Worcester, MA 01608

U.S. Department of Labor  
Office of Federal Contract  
Compliance Programs  
JFK Federal Building - Rm. E235  
Boston, MA 02203

New Bedford Office  
MCAD  
800 Purchase Street - Rm. 501  
New Bedford, MA 02740

## **V. MBE/WBE/DBE Program**

### **Policy Statement**

It is the policy of the Massachusetts Water Resources Authority (Authority) to ensure the equitable participation of Minority Business Enterprises (MBEs) and Women Business Enterprises (WBEs) and Disadvantaged Business Enterprise (DBEs) in the award of all contracts including contracts for construction, goods/non-professional services (supplies and equipment) and professional services (design selection and consultants).

### **Definitions**

- Minority Business Enterprise (MBE) means an ongoing and independent business enterprise which is owned and controlled by one or more minority persons and meets the Massachusetts Supplier Diversity Office (SDO) criteria specified under 425 CMR 2.03 (d) (and, if applicable, one or more of the provisions of 425 CMR 2.06).
- Women Business Enterprise (WBE) means an ongoing and independent business enterprise which is owned and controlled by one or more women and meets SDO certification criteria specified under 425 CMR 2.03 (d) (and, if applicable, one or more of the provisions of 425 CMR 2.06).
- Disadvantaged Business Enterprise (DBE) means an ongoing, independent small business concern which is at least 51% owned and controlled by one or more individual(s) who are both socially and economically disadvantaged and meets the U.S. DOT eligibility criteria specified under 49 CFR Part 23 and 26 and has certification issued by the federal government or the SDO.

### **Outreach**

The Authority communicates with appropriate advocacy groups and representatives such as SDO, Massachusetts Minority Contractors, and National Association of Minority and Women Owned Law Firms, as well as others, to develop new sources of supply, discuss the M/W/DBE Program and develop initiatives designed to enhance the Plan's effectiveness.

### **Monitoring and Reporting**

The Affirmative Action and Compliance Unit will maintain such records, data and information as may be required to document compliance with Authority policies and procedures, and applicable federal, state and local laws and regulations.

### MassDEP Procurement Goals

MassDEP has undertaken an Availability Analysis with Clean Water Trust in 2016 and the first half of 2017 to develop new DBE goals. As of January 1, 2018, the goals for all categories – Construction, Professional Services, Goods and Equipment are 4.2% for D/MBE and 4.5% for D/WBE.

#### **Procurement Categories**

	Construction Goals	Professional Goals
D/MBE	4.2%	4.5%
D/WBE	4.2%	4.5%

In FY19, EPA-assisted contracts totaled 4% for construction, with the balance related to engineering, environmental consulting and other services. On this basis, MassDEP has utilized the above goals for both construction and professional services. The specific sub-industries such as water and wastewater engineering, etc. accounted for most of the dollars of these prime contracts and subcontracts.

### MWRA Procurement Goals

Based upon the Authority's 2002 Availability Study, the MBE and WBE procurement goals are as follows:

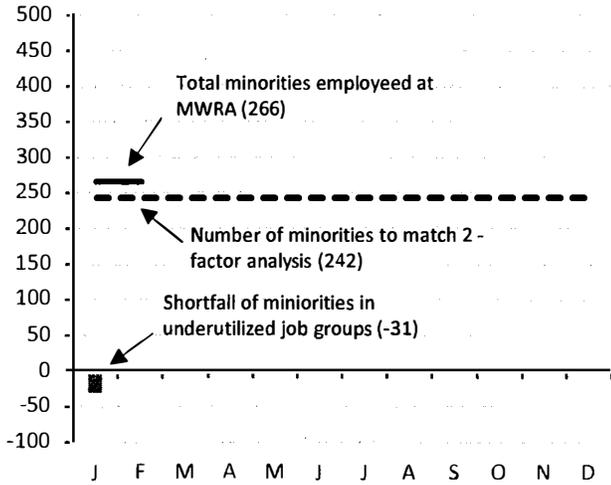
#### **Procurement Categories**

	Construction Goals	Professional Goals	NonProfessional Goals
MBE	7.24%	7.18%	5.61%
WBE	3.60%	5.77%	4.88%

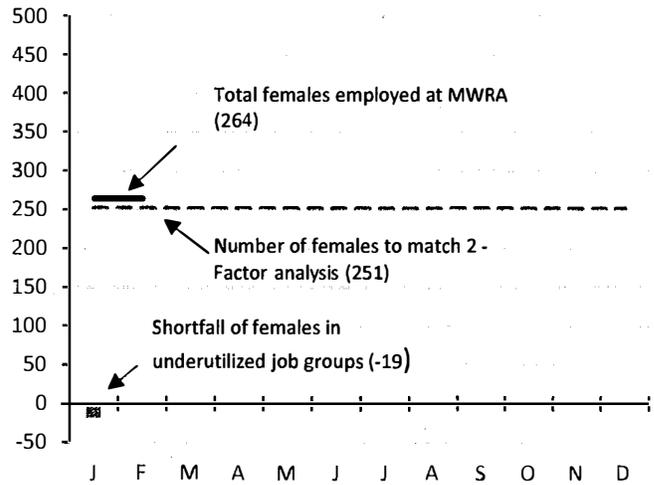
For FY19 the MWRA spent \$10.6 million and \$12.5 million respectively with minority and women owned business. These amounts were 106% and 182% of the respective MBE and WBE targets.

**Attachment B**  
**MWRA Job Group Representation**  
**CY20**

**Minority - Affirmative Action Plan Goals**



**Female - Affirmative Action Plan Goals**



**Underutilized Job Groups – Workforce Representation**

Job Group	Total Employees as of 1/1/2020	Actual Minorities as of 1/1/2020	Achievement Level	Minority Over or Under utilized	Actual Females As of 1/1/2020	Achievement Level	Female Over or Under utilized
Administrative A	23	3	3	0	11	6	5
Administrative B	22	0	6	-6	6	6	0
Clerical A	27	11	5	6	24	20	4
Clerical B	25	9	7	2	5	7	-2
Engineer A	81	26	18	8	16	18	-2
Engineer B	63	22	16	6	16	10	6
Craft A	117	15	24	-9	0	4	-4
Craft B	146	22	24	-2	3	5	-2
Laborers	68	22	16	6	4	3	1
Management A	100	23	25	-2	34	35	-1
Management B	43	9	6	3	9	10	-1
Operators A	65	4	14	-10	2	4	-2
Operators B	66	18	10	8	3	1	2
Professional A	29	3	5	-2	19	13	6
Professional B	163	47	40	7	79	72	7
Para Professional	53	16	13	3	26	30	-4
Technical A	52	14	9	5	7	6	1
Technical B	6	2	1	1	0	1	-1
<b>Total</b>	<b>1149</b>	<b>266</b>	<b>242</b>	<b>55/-31</b>	<b>264</b>	<b>251</b>	<b>32/-19</b>

## STAFF SUMMARY

**TO:** Board of Director  
**FROM:** Frederick A Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** February PCR Amendments



**COMMITTEE:** Personnel and Compensation

  
Andrea Murphy, Director of Human Resources  
Preparer/Title

     INFORMATION

  X   VOTE

  
Michele S. Gillen  
Director, Administration

### RECOMMENDATION:

To approve amendments to the Position Control Register (PCR) included in the attached chart.

### DISCUSSION:

The Position Control Register lists all positions of the Authority, filled and vacant. It is updated as changes occur and it is published at the end of each month. Any changes to positions during the year are proposed as amendments to the PCR. All amendments to the PCR must be approved by the Personnel Committee of the Board of Directors. All amendments resulting in an upgrade of a position by more than one grade level, and/or an amendment which creates a position increasing annual cost by \$10,000 or more, must be approved by the Board of Directors after review by the Personnel and Compensation Committee.

### February PCR Amendments

There are eight PCR Amendments this month.

The amendments are:

#### Organizational Changes

1. Title change to one vacant position in the Administration Division, MIS department from Senior Systems Analyst Unit 6 Grade 10, to Systems Analyst Programmer II, Unit 6 Grade 10, to more accurately reflect the responsibilities of the position.
2. Title change to one vacant position in the Administration Division, MIS department from Senior Systems Analyst Unit 6 Grade 10, to IT Asset Management Analyst, Unit 6 Grade 10, to more accurately reflect the responsibilities of the position.
3. Title change to one vacant position in the Administration Division, MIS department from Systems Analyst Programmer II Unit 6 Grade 10, to Report Writer, Unit 6 Grade 10, to more accurately reflect the responsibilities of the position.

4. Title and grade change to one vacant position in the Operations Division, Planning department from Project Manager, Planning Unit 9 Grade 25, to Project Engineer, Unit 9 Grade 21, to meet staffing needs of the Community Support Program.
5. Title change to one vacant position in the Operations Division, Environmental Quality department from Administrative Manager Unit 6 Grade 9, to Systems Analyst/Programmer I, Unit 6 Grade 9, to meet staffing needs in the Environmental Quality Water Data Management Unit.
6. Title and grade change to one vacant position in the Operations Division, Engineering department from Senior Engineer Unit 9 Grade 23, to Senior Draftsperson, Unit 9 Grade 19, to meet staffing needs in the Engineering Department.
7. Title and grade change to one vacant position in the Operations Division, Deer Island Maintenance department from Building and Grounds Supervisor Unit 2 Grade 17, to Unit Supervisor, Unit 2 Grade 19, to meet staffing needs in the Deer Island Maintenance Department.
8. Creation of a new position in the Operations Division, TRAC department of a Senior Field Inspector, Unit 9, Grade 23 to meet increased inspection needs due to rising development activity.

The first six amendments require approval by the Personnel and Compensation Committee. The last two amendments require Board approval after review by the Personnel and Compensation Committee.

**BUDGET/FISCAL IMPACT:**

The annualized budget impact of these PCR amendments will be a maximum cost of \$73,499. Staff will ensure that the cost increase associated with these PCR amendments will not result in spending over the approved FY20 Wages and Salaries budget.

**ATTACHMENTS:**

Old Job Descriptions  
New Job Descriptions

MASSACHUSETTS WATER RESOURCES AUTHORITY  
POSITION CONTROL REGISTER AMENDMENTS  
FISCAL YEAR 2020

PCR AMENDMENTS REQUIRING PERSONNEL & COMPENSATION COMMITTEE APPROVAL - February 19, 2020															
Number	Current PCR #	V/F	Type	Current Title	UN	GR	Amended Title	UN	GR	Current/Budget Salary	Estimated New Salary		Estimated Annual \$ Impact		Reason For Amendment
P4	Administration MIS 8610011	V	T	Senior Systems Analyst	6	10	Systems Analyst Programmer II	6	10	\$96,898	\$63,324	\$96,898	-\$33,574	\$0	Title change to more accurately reflect the responsibilities of the position.
P5	Administration MIS 8610081	V	T	Senior Systems Analyst	6	10	IT Asset Management Analyst	6	10	\$96,898	\$63,324	\$96,898	-\$33,574	\$0	Title change to more accurately reflect the responsibilities of the position.
P6	Administration MIS 8610084	V	T	Systems Analyst Programmer II	6	10	Report Writer	6	10	\$96,898	\$63,324	\$96,898	-\$33,574	\$0	Title change to more accurately reflect the responsibilities of the position.
P7	Operations Planning 1510014	V	T, G	Project Manager	9	25	Project Engineer	9	21	\$110,569	\$66,333	\$92,263	-\$44,236	-\$18,306	To meet staffing needs of the Community Support Program.
P8	Operations Environmental Quality 2915009	V	T	Administrative Manager	6	9	Systems Analyst/Programmer I	6	9	\$88,036	\$57,534	\$88,036	-\$30,502	\$0	To meet staffing needs in the Environmental Quality Water Data Management Unit.
P9	Operations Engineering 5525026	V	T, G	Senior Engineer	9	23	Senior Draftsperson	9	19	\$101,241	\$60,366	\$83,905	-\$40,875	-\$17,336	To meet staffing needs in the Engineering Department.
<b>PERSONNEL &amp; COMPENSATION COMMITTEE TOTAL=</b>					<b>6</b>						<b>TOTAL:</b>		<b>-\$182,761</b>	<b>-\$35,642</b>	

PCR AMENDMENTS REQUIRING BOARD APPROVAL - February 19, 2020															
Number	Current PCR #	V/F	Type	Current Title	UN	GR	Amended Title	UN	GR	Current/Budget Salary	Estimated New Salary		Estimated Annual \$ Impact		Reason For Amendment
B15	Operations Deer Island Maint 2988007	V	T, G	Building & Grounds Supervisor	2	17	Unit Supervisor	2	19	\$80,253	\$61,155	\$88,154	-\$19,098	\$7,901	To meet staffing needs in the Deer Island Maintenance Department.
B16	Operations TRAC TBD	N/A	N/A	N/A			Senior Field Inspector	9	23	\$0	\$72,962	\$101,240	\$72,962	\$101,240	To meet increased inspection needs due to rising development activity.
<b>BOARD TOTAL =</b>					<b>2</b>						<b>TOTAL ESTIMATED COSTS:</b>		<b>\$53,864</b>	<b>-\$109,141</b>	
<b>GRAND TOTAL =</b>					<b>8</b>						<b>TOTAL ESTIMATED COSTS:</b>		<b>-\$128,897</b>	<b>-\$73,499</b>	

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Senior Systems Analyst  
**DIVISION:** Administration & Finance  
**DEPARTMENT:** Management Information System (MIS)

**BASIC PURPOSE:**

Senior level programming, systems project management, application maintenance and support on assigned systems. Directs the MWRA's users in defining business needs for the purpose of developing and maintaining applications used by Water and Sewerage users.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Data Resource Manager.

**SUPERVISION EXERCISED:**

Exercises supervision of assigned vendor resources.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Performs needs analyses with users and translates their needs into information flow diagrams and technical specifications.
- Manages the programming development for new systems as well as modifications to existing systems; directs technical teams in developing, designing, programming, testing and installation of user applications.
- Monitors the implementation of standards for all aspects of system development and acceptance testing; oversees the adherence to system development standards by technical consultants.
- Oversees the development and implementation of assigned application(s) to ensure the satisfaction of user needs. Coordinates implementation with users, MIS and contractors.
- Identifies and defines application development opportunities which leverage the installed systems base and future user requirements.

- In conjunction with appropriate staff, establishes, guidelines, standards and procedures for user and technical systems documentation/training, project activities, tracking of resource usage, application quality and transfer of computerized product to the users.
- Performs feasibility studies, analyzes the impact of requested/proposed changes in system, operations, and personnel.
- Maintains state-of -the art knowledge of system design methodology, design tools, standard languages, 4GL languages and operating requirements.
- Utilizes computer-aided software engineering (CASE) tools in documenting and translating user business needs into technical systems specifications and performing structural and logical analysis.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A four (4) year college program in management science, engineering management, computer science or related fields; and
- (B) Four (4) to seven (7) years experience with programming support of Oracle systems, including at least two (2) years in project leader capacity within the business/systems analysis area; or
- (C) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of business and systems analysis techniques within the engineering discipline.
- (B) Proficiency with the following required: ORACLE 7 Universal Server, SQL and PL/SQL, ORACLE Designer 2000, Developer 2000, and Discoverer 2000 products and tools.
- (C) Proficiency with the following preferred: ORACLE 7 SQL\*Net, Open VMS, Digital Alpha OSF or UNIX, MIS-Windows 3.x,95, and NT.
- (D) Knowledge in the following preferred: Information and business process modeling, prototyping and reverse engineering, database administration and security management,

data warehousing.

- (E) Demonstrated experience in project management techniques and the ability to establish effective relationships with users.
- (F) Excellent analytical, interpersonal, written and oral communication skills are required.

**SPECIAL REQUIREMENTS:**

None.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including word processing and other software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

**December, 2000**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Systems Analyst/Programmer II  
**DIVISION:** Administration  
**DEPARTMENT:** Management Information System (MIS)

**BASIC PURPOSE:**

This position is responsible for analyzing, designing, developing, testing, implementing and maintaining software applications. This includes Graphic User Interfaces, complex business logic and data access layer code, specifically for the analysis, development, and deployment of reports, dashboards, and queries from multiple complex data sources to provide analytical reporting solutions to the business community. This position is also responsible for post-implementation support including incident, performance, capacity, continuity, and problem management activities.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Program Manager. Tech Services. On specific IT projects may be supervised by a team lead or project manager.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

**Application Development**

- Reviews application design prior to buy or build decision to ensure service levels can be met and recommends any performance enhancements prior to implementation.
- Codes, configures, implements, maintains and supports, new and upgrades to software applications (in-house and third party software) and interfaces to ensure processes and functionality of the applications comply with the organization's requirements, processes and standards.

- Develops and maintains technical documentation for applications as follows:
  - Design Model - Description of the system design. Comprised of a variety of work products, potentially including a deployment model, an object model, a physical data model (PDM), a security threat model, a system overview document, and a user interface model.
  - Source Code – The program code for the system.
  - Regression Test Suite - Collection of test cases, and the code to run them in the appropriate order. The regression test suite will include a wide range of tests, including acceptance tests, unit tests, system tests, etc.
  - Installation Scripts - Code for installing the system into pre- and post-production environments.
  - Release Notes - Summarize the things to know pertaining to the current release of the system.
  - Operations Procedure - Procedures and supporting information to operate the system once it is in production including continuity and disaster recovery procedures.
  - Support Reference- Used by support staff, such as trouble shooting guides, contact information for the development team, which enables them to support end users
  
- Develops a release package for all systems changes when transitioning to the production environments.

### **Post-Implementation Support**

- Supports the resolution of incidents and problems with software application functionality.
- Researches and corrects problems with the system applications code during production processing in an efficient and timely manner ensuring system recovery and integrity.
- Is available to execute and carry out IT Continuity and Disaster Recovery Plans.

### **Mentoring & Professionalism**

- Maintains professional interaction with the application development staff, user and extended IT community (i.e. project teams) to ensure adequate system functionality, promote team participation and encourage user confidence in the Application Development Staff's quality of service.
- Provides assistance to Systems Analysts/Programmer I personnel ensuring that all technical design work, coding and testing are done in a manner that meets or exceeds design and testing requirements and standards.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

**Education and Experience:**

- (A) A Bachelor's degree in management science, engineering management, computer science or related field; and
- (B) Three (3) years to five (5) years experience supporting enterprise-wide applications with an N-tier architecture; or
- (C) Any equivalent combination of education or experience.

**Necessary Knowledge, Skills and Abilities:**

- (A) Knowledge of programming languages, troubleshooting techniques, database structures, triggers and procedures, application server platforms, middleware and operating systems.
- (B) Expertise in the following is highly desirable: MS, .Net, J2EE, ORACLE, SQL Server, Stored Procedures, Tomcat, Eclipse IDE, and SAP Business Intelligence Administration.
- (C) Ability to write complex SQL statements including multi-table joins, outer joins, pivot result sets, and hierarchical queries.
- (C) Analytical and interpersonal skills.
- (D) Written and oral communication skills.

**SPECIAL REQUIREMENTS:**

- Information Technology Infrastructure Library (ITIL) Foundation Certification is required or the ability to obtain within 12 months.
- Formal training or certification in programming methodologies and System Development Life Cycle methodologies is required or ability to obtain within 12 months.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including word processing and other software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

**February 2020**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Senior Systems Analyst  
**DIVISION:** Administration & Finance  
**DEPARTMENT:** Management Information System (MIS)

**BASIC PURPOSE:**

Senior level programming, systems project management, application maintenance and support on assigned systems. Directs the MWRA's users in defining business needs for the purpose of developing and maintaining applications used by Water and Sewerage users.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Data Resource Manager.

**SUPERVISION EXERCISED:**

Exercises supervision of assigned vendor resources.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Performs needs analyses with users and translates their needs into information flow diagrams and technical specifications.
- Manages the programming development for new systems as well as modifications to existing systems; directs technical teams in developing, designing, programming, testing and installation of user applications.
- Monitors the implementation of standards for all aspects of system development and acceptance testing; oversees the adherence to system development standards by technical consultants.
- Oversees the development and implementation of assigned application(s) to ensure the satisfaction of user needs. Coordinates implementation with users, MIS and contractors.
- Identifies and defines application development opportunities which leverage the installed systems base and future user requirements.

- In conjunction with appropriate staff, establishes, guidelines, standards and procedures for user and technical systems documentation/training, project activities, tracking of resource usage, application quality and transfer of computerized product to the users.
- Performs feasibility studies, analyzes the impact of requested/proposed changes in system, operations, and personnel.
- Maintains state-of -the art knowledge of system design methodology, design tools, standard languages, 4GL languages and operating requirements.
- Utilizes computer-aided software engineering (CASE) tools in documenting and translating user business needs into technical systems specifications and performing structural and logical analysis.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A four (4) year college program in management science, engineering management, computer science or related fields; and
- (B) Four (4) to seven (7) years experience with programming support of Oracle systems, including at least two (2) years in project leader capacity within the business/systems analysis area; or
- (C) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of business and systems analysis techniques within the engineering discipline.
- (B) Proficiency with the following required: ORACLE 7 Universal Server, SQL and PL/SQL, ORACLE Designer 2000, Developer 2000, and Discoverer 2000 products and tools.
- (C) Proficiency with the following preferred: ORACLE 7 SQL\*Net, Open VMS, Digital Alpha OSF or UNIX, MIS-Windows 3.x,95, and NT.
- (D) Knowledge in the following preferred: Information and business process modeling, prototyping and reverse engineering, database administration and security management,

data warehousing.

- (E) Demonstrated experience in project management techniques and the ability to establish effective relationships with users.
- (F) Excellent analytical, interpersonal, written and oral communication skills are required.

**SPECIAL REQUIREMENTS:**

None.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including word processing and other software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

**December, 2000**

**MWRA  
POSITION DESCRIPTION**

**NEW**

**POSITION:** IT Asset Management Analyst

**DIVISION:** Administration

**DEPARTMENT:** Management Information Systems (MIS)

**BASIC PURPOSE:**

Performs day-to-day activities required to manage and maintain the accuracy of IT asset inventory records including providing support for auditing, reporting, and logging of IT Assets to ensure the integrity of MWRA's IT Asset Repository and Configuration Management System. Assists with the management of IT assets throughout their lifecycle from receipt through disposal.

**SUPERVISION RECEIVED:**

Works under the general supervision of the IT Asset and Configuration Manager, MIS Operations. May be supervised by a team lead or project manager on specific IT projects.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Maintains the integrity of IT asset data within the Asset Management system through direct action or through coordination with other areas.
- Assists with the reconciliation of asset records between the Asset Management system and other relevant data sources.
- Assists with the investigation and resolution of exceptions, data accuracy issues and anomalies.
- Conducts physical inventory of IT Assets per established schedule and cycle.
- Assists with the coordination of IT hardware disposal process.
- Coordinates asset transfers from the warehouse to MIS.

- Conducts spot asset inventory audits as required to ensure data integrity and process quality.
- Assists with the validation, testing, and adoption of new hardware and software standards.
- Follows all documented IT asset management policies and procedures.

**SECONDARY DUTIES:**

Perform related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A Bachelor's degree in Information Technology, Business Management or related field;  
and
- (B) Demonstrated knowledge of inventory management processes acquired through at least four (4) to six (6) years experience in business, IT, property management, or inventory control; or
- (C) Any equivalent combination of education and/or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Working knowledge of ITIL preferred.
- (B) Proven ability to communicate effectively in writing and verbally with staff and management at all levels of the organization.
- (C) Understanding of license models, software delivery, metrics and hardware lifecycle management.
- (D) Ability to effectively diagnose and reconcile physical inventory and system inventory counts.

(E) Knowledge of the following:

1. Inventory management operations software, preferably Maximo/ICD.
2. Desktop Productivity Software: Current Microsoft Office Suite.
3. XenMobile, Computrace and Ivanti device management consoles
4. IT Hardware assets such as desktops, laptops, tablets and iOS devices.
5. Operating System Environment: Windows 7 & 10

**SPECIAL REQUIREMENTS:**

- ITIL Foundations Certification version 3 or the ability to obtain within 1 year.
- One of the following ITAM (IT Asset Management) certifications: CSAM (Certified Software Asset Management), CHAMP (Hardware Asset Management Professional), or CMAM (Certified Mobility Asset Management) or the ability to obtain within 1 year.
- A valid Massachusetts Class D driver's license.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, copy, fax machines, multi-function devices (MFDs) and personal computers including word processing and other software.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to stand and talk or hear. The employee is occasionally required to walk; sit; climb or balance; stoop, kneel, crouch, or crawl; taste or smell.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

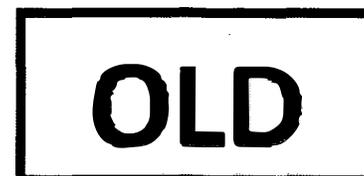
The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration. The employee is occasionally exposed to risk of electrical shock.

The noise level in the work environment is a moderately loud office setting.

**February 2020**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Systems Analyst/Programmer II  
**DIVISION:** Administration  
**DEPARTMENT:** Management Information System (MIS)

**BASIC PURPOSE:**

This position is responsible for analyzing, designing, developing, testing, implementing and maintaining software applications. This includes Graphic User Interfaces, complex business logic and data access layer code, specifically for the analysis, development, and deployment of reports, dashboards, and queries from multiple complex data sources to provide analytical reporting solutions to the business community. This position is also responsible for post implementation support including incident, performance, capacity, continuity, and problem management activities.

**SUPERVISION RECEIVED:**

Works under the general supervision of the group supervisor. On specific IT projects may be supervised by a team lead or project manager.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

**Application Development**

- Reviews application design prior to buy or build decision to ensure service levels can be met and recommend any performance enhancements prior to implementation.
- Codes, configures, implements, maintains and supports, new and upgrades to software applications (in-house and third party software) and interfaces to ensure processes and functionality of the applications comply with the organization's requirements, processes and standards.
- Develops and maintains technical documentation for applications as follows:

- Design Model - Description of the system design. Comprised of a variety of work products, potentially including a deployment model, an object model, a physical data model (PDM), a security threat model, a system overview document, and a user interface model.
  - Source Code – The program code for the system.
  - Regression Test Suite - Collection of test cases, and the code to run them in the appropriate order. The regression test suite will include a wide range of tests, including acceptance tests, unit tests, system tests, etc.
  - Installation Scripts - Code for installing the system into pre- and post-production environments.
  - Release Notes - Summarize the things to know pertaining to the current release of the system.
  - Operations Procedure - Procedures and supporting information to operate the system once it is in production including continuity and disaster recovery procedures.
  - Support Reference- Used by support staff, such as trouble shooting guides, contact information for the development team, which enables them to support end users
- Responsible for developing a release package for all systems changes when transitioning to the production environments.

### **Post Implementation Support**

- Supports the resolution of incidents and problems with software application functionality.
- Researches and corrects problems with the system applications code during production processing in an efficient and timely manner ensuring system recovery and integrity.
- Is available to execute and carry out IT Continuity and Disaster Recovery Plans

### **Mentoring & Professionalism**

- Maintains professional interaction with the application development staff, user and extended IT community (i.e. project teams) to ensure adequate system functionality, promote team participation and encourage user confidence in the Application Development Staff's quality of service.
- Provides assistance to Systems Analysts/Programmer I personnel ensuring that all technical design work, coding and testing are done in a manner that meets or exceeds design and testing requirements and standards.

### **SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

**Education and Experience:**

- (A) A four (4) year college program in management science, engineering management, computer science or related fields
- (B) Minimum three (3) years experience supporting enterprise applications with an N-tier architecture.
- (C) Three (3) years experience developing Crystal Reports.
- (D) One (1) year experience developing BIRT reports
- (E) Any equivalent combination of education or experience.

**Necessary Knowledge, Skills and Abilities:**

- (A) Knowledge of programming languages, troubleshooting techniques, database structures, triggers and procedures, application server platforms, middleware and operating systems.
- (B) Expertise in the following is highly desirable: ORACLE, SQL Server, Stored Procedures, Tomcat, Eclipse IDE, SAP Business Intelligence Administration, Maximo.
- (C) Ability to write complex SQL statements including multi-table joins, outer joins, pivot result sets, and hierarchical queries.
- (C) Analytical and interpersonal skills.
- (D) Written and oral communication skills.

**SPECIAL REQUIREMENTS:**

- Information Technology Infrastructure Library (ITIL) Foundation Certification is required or the ability to obtain within 6 months.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including word processing and other software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

**August 2015**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Report Writer  
**DIVISION:** Administration  
**DEPARTMENT:** Management Information Systems (MIS)

**BASIC PURPOSE:**

This position is responsible for developing and managing the entire lifecycle of MWRA's reports managed by the MIS Department. Reports cover both administrative and operational systems such as Enterprise Asset/Maintenance Management (EAM), Enterprise Resource Planning (ERP), Helpdesk Ticketing, and other data intensive applications. The primary responsibility is report development, however work on requirements gathering, report definition documentation, version control, and release management is equally important. This position is also responsible for post-implementation support including incident, performance, capacity, continuity, and problem management activities.

**SUPERVISION RECEIVED:**

Works under the general supervision of the group supervisor. On specific IT projects, may be supervised by a team lead or project manager.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

**Report Development**

- Develops and modifies reports using SAP Business Objects Crystal Reports, Business Intelligence and Reporting Tools (BIRT), and other data presentation tools.
- Performs data analysis to verify report results against information source and user expectations.
- Creates complex SQL queries, views, and stored procedures to create desired data structures.
- Uses sub-reports to include related information not available in primary data set.
- Creates and modifies business layers to allow users easy access to data on the reporting portal.
- Creates and modifies data sources for relational databases, web services, active directory, file systems, MS Outlook, etc.
- Ensures proper use of titles, headers, footers, charts, tables, graphics, and figures.
- Performs unit, integration, functional, and regression testing.

**Requirements Gathering, Documentation, and Version Control**

- Gathers and documents requirements from report sponsor.
- Provides proof of concept analytical analysis on proposed dataset to report sponsor for verification.
- Suggests alternatives to sponsor where consolidation can be used.
- Prepares and updates report definition documents.

- Maintains report version repository.
- Estimates and records development time for report creation or modification.

### **Release Management**

- Prepares and submits documentation to Change Advisory Board (CAB).
- Administers report on Business Intelligence portal for Run On-Demand, Scheduling, and Email distribution.
- Manages report portal distributional lists, folders, and user access.
- Coordinates report deployments with sponsors, MIS staff, and CAB.
- Develops a release package for all systems changes when transitioning to production environments.

### **Post-Implementation Support**

- Supports the resolution of incidents and problems with software application functionality.
- Researches and corrects problems with the system applications code during production processing in an efficient and timely manner ensuring system recovery and integrity
- Executes and carries out IT continuity and disaster recovery plans as needed.
- Monitors portal for report execution and distribution failures.

### **Mentoring & Professionalism**

- Maintains professional interaction with the application development staff, user and extended IT community (i.e. project teams) to ensure adequate system functionality, promote team participation, and encourage user confidence in MIS quality of service.

### **SECONDARY DUTIES:**

- Performs related duties as required.
- Serve as backup to developers.

### **MINIMUM QUALIFICATIONS:**

#### **Education and Experience:**

- A Bachelor's degree in management science, engineering management, computer science or related field; and
- Three (3) years' experience developing Crystal Reports; and
- Two (2) years' experience supporting enterprise applications with an N-tier architecture; and
- One (1) year experience developing BIRT reports; and
- A minimum of one year experience with an Asset/Maintenance Management system such as Maximo; or
- Any equivalent combination of education or experience.

#### **Necessary Knowledge, Skills and Abilities:**

- Expertise in Crystal Reports development skills required. Business Intelligence and Reporting Tools (BIRT) skills are preferred.
- Ability to write complex SQL statements including multi-table joins, outer joins, pivot result sets, and hierarchical queries from an enterprise relational database (e.g. Oracle or SQL Server).
- Strong knowledge of database tables, views, triggers, stored procedures, and other structures
- Experience using Web Services and knowledge of database storage procedures.
- Experience and understanding of Software Development Life cycle.

- Knowledge of programming languages such as .Net, Python or R, troubleshooting techniques, application server platforms, middleware, and operating systems.
- Expertise in the following is preferred: ORACLE, SQL Server, Tomcat, Eclipse IDE, SAP Business Intelligence Administration, and Maximo.
- Analytical skills and detail oriented.
- Excellent written and oral communication skills.

**SPECIAL REQUIREMENTS:**

Information Technology Infrastructure Library (ITIL) Foundation v3 Certification is required or the ability to obtain within twelve months.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including word processing and other software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

February 2020

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Project Manager

**DIVISION:** Operations

**DEPARTMENT:** Planning

**BASIC PURPOSE:**

Assists the Planning Department in a wide array of duties related to the management of the Community Support Program. Assists in the development of policies and in the implementation of programs that support community water and sewer infrastructure rehabilitation, improve distribution system water quality, reduce water system demand, and reduce regional wastewater flow.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Senior Program Manager.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Manages and develop policies and procedures for projects funded under the Local Water System Assistance Program, the Community Leak Detection and Repair Program and the Infiltration/Inflow (I/I) Local Financial Assistance Program.
- Represents the MWRA in meetings with member community representatives and community's consultants to provide technical assistance regarding engineering and planning activities including but not limited to: water demand management, best management practices for water distribution system operation and maintenance, leak detection and repair, unidirectional flushing, water quality testing, storage tank rehabilitation, best management practices for sewer system operation and maintenance, estimation of community water use and wastewater flow components, I/I reduction, SSO elimination/mitigation, and sewer system rehabilitation.
- Provides technical assistance on water quality hotline, purchase and distribution of water conservation literature and devices, consumer confidence report, sewer rehabilitation projects, development of methodologies for metering community flows, and hydraulic modeling.

- Manages all phases of consultant/contractor selection process and supervision of professional engineering consultant contracts.
- Assists in the development of policies for water demand management, regional infiltration and inflow (I/I) reduction and sanitary sewer overflow (SSO) elimination/mitigation.
- Prepares reports for NPDES Permit on demand management, regional infiltration and inflow (I/I) reduction and sanitary sewer overflow (SSO) elimination/mitigation.
- Manages, performs, and reviews professional engineering work of substantial difficulty and importance, requiring exercise of independent judgement and ability to inspect community water and wastewater construction projects funded by MWRA to monitor progress. Reviews and approves engineering reports and water/sewer design plans and specifications submitted for MWRA financial assistance funding.
  - Assists in development and management of the MWRA Capital Improvement Program and Current Expense Budget, including the development of recommendations for prioritization of projects for meeting spending caps and methods to maximize the efficient use of resources.
  - Performs special projects as directed in response to external and internal requests. Strong analytical, financial, and writing skills are critical to this function.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A four (4) year college program in civil engineering, environmental engineering, or a related field; and
- (B) Knowledge of water and wastewater systems as normally attained through four (4) to seven (7) years of experience; or
- (C) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Familiarity with capital budgeting concepts and practices.
- (B) Understanding of contract management principles and practices.

- (C) Knowledge of professional service contracts, including budget development and auditing preferred.
- (D) Familiarity with personal computers and working knowledge of standard MWRA office automation products such as Microsoft Word and Excel is required.
- (E) Demonstrated ability to work effectively as part of a project team.
- (F) Excellent interpersonal, oral and written communication skills.

**SPECIAL REQUIREMENTS:**

A valid Massachusetts Class D Motor Vehicle Operator's License.

**TOOLS AND EQUIPMENT USED:**

Office machines including multiple-line telephone, personal computer, including word processing and other software, photocopier, and fax machine.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, including office equipment, or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to stand and walk.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, and the ability to adjust.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

The employee regularly works in an office environment. The noise level in the work environment is moderately quiet in office settings.

**October 2018**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Project Engineer, Planning

**DIVISION:** Operations

**DEPARTMENT:** Planning

**BASIC PURPOSE:**

Under the guidance of senior staff, assists in the implementation of programs that support community water and sewer infrastructure rehabilitation, improve distribution system water quality, reduce water system demand, and reduce regional wastewater flow. Performs engineering analyses and prepares engineering documents and project reports.

**SUPERVISION RECEIVED:**

Works under the direct supervision of Project Managers and other Senior Staff in Planning.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Using engineering knowledge, performs engineering analysis and prepares engineering reports to support community projects funded under the Local Water System Assistance Program, the Community Leak Detection and Repair Program and the Infiltration/Inflow (I/I) Local Financial Assistance Program.
- With guidance from senior staff in providing technical assistance on water and sewer system operation, maintenance, and rehabilitation, leak detection and repair, water quality hotline, purchase and distribution of water conservation literature and devices, consumer confidence report, development of methodologies for metering community flows, estimation of wastewater flow components, and hydraulic modeling.
- Participates in consultant/contractor selection process and helps oversee professional engineering consultant contracts by monitoring project progress and reviewing submittals, contracts, amendments, and invoices.
- Drafts reports for senior staff on NPDES Permit on demand management, regional infiltration and inflow (I/I) reduction and sanitary sewer overflow (SSO) elimination/mitigation.

- Performs, reviews, and inspects professional engineering work related to community water and wastewater construction projects funded by MWRA to monitor progress., Reviews engineering reports and water/sewer design plans and specifications submitted for MWRA financial assistance funding and provides findings to senior staff for their action.
- Supports senior managers in project permitting and project coordination with other departments, communities, public interest groups, and government agencies. May attend public meetings and performs special projects as directed by senior staff.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A Bachelor's degree in civil engineering, environmental engineering, or a related field; and
- (B) Knowledge of water and wastewater systems as normally attained through two (2) to four (4) years of engineering experience; or
- (C) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Familiarity with federal, state and regional environmental regulations related to water and wastewater systems and facilities is preferred.
- (B) Understanding of contract management principles and practices.
- (C) Knowledge of professional service contracts and auditing preferred.
- (D) Familiarity with personal computers and working knowledge of standard MWRA office automation products such as Microsoft Office Suite.
- (E) Demonstrated ability to work effectively as part of a project team.
- (F) Excellent interpersonal, oral and written communication skills.

**SPECIAL REQUIREMENTS:**

A valid Massachusetts Class D Motor Vehicle Operator's License.

**TOOLS AND EQUIPMENT USED:**

Office machines including multiple-line telephone, personal computer, including word processing and other software, photocopier, and fax machine.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, including office equipment, or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to stand and walk.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, and the ability to adjust.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

The employee regularly works in an office environment. The employee intermittently works in the field at a construction site and is exposed to outdoor weather conditions. The noise level in the work environment is moderately quiet in office settings and is usually loud in field settings.

**February 2020**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Administrative Manager

**DIVISION:** Operations, Administration and Finance

**DEPARTMENT:** Environmental Quality, Technical Services/DI, Directors Office/DI, Human Resources, Engineering and Construction

**BASIC PURPOSE:**

Manages all financial and administrative processes including budget and financial analysis and planning, contract administration, accounting, accounts payables, procurement, personnel, and payroll. Assists with development, production, and distribution of documents and publications. Coordinates specific department programs. Provides a range of possible duties, but will not necessarily perform all the duties listed below.

**SUPERVISION RECEIVED:**

Works under the general supervision of the departmental Director, Manager, Program Manager, Project Manager or Manager, Contract Administration.

**SUPERVISION EXERCISED:**

Exercises supervision over administrative support personnel in the department on projects and processes.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Manages the preparation of annual budgets (CEB and CIP) and APPOs. Provides information and assistance to the section managers in budget preparation and trains managers in new policies and procedures.
- Coordinates the activities of administrative support personnel in the performance of a range of department and division wide tasks. Such coordination includes technical support, coaching and training. Provides coordination of support staff that includes prioritizing work assignment and coordinating the assignment of support staff to special projects, as appropriate.
- Assists in the management of the contract administration process for major contracts. Duties include tracking data, analyzing costs, developing systems, reviewing invoices, preparing and tracking accruals, coordinating with the Procurement department, providing assistance on processing amendments and change orders and issuing status reports.

- Manages accounting processes for department including accounts payable, reporting and accruals.
- Manages personnel and payroll function for department with projected staffing of employees. Duties include overseeing PMRS and hiring processes, personnel tracking, payroll administration and implementation of union contract provisions.
- Generates or oversees production of administrative reports required by MWRA divisions, external agencies and the Advisory Board.
- Manages the production of reports and public relations documents. Duties may include technical writing or graphics preparation.
- Coordinates the Sick Leave Oversight Program. Serves as liaison between Human Resources and Operations in regards to sick leave. Prepares and distributes sick leave usage reports for Operations Managers. Reviews completed sick leave reports prepared by Operations Managers. Works in close coordination with Human Resources to monitor the use of sick time by employees on documentation requirements (e.g., determining whether the employee provided satisfactory medical documentation, and coordinating any necessary follow-up).
- Audits written time submissions from operational staff assigned to all shifts in order to ensure that staff are applying time appropriate to use such as leave time, meal breaks, compensatory time, overtime and stand-by.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A four (4) year college program in accounting, business administration, public administration or related field; and
- (B) Understanding of budget, personnel, procurement, accounting, contract, permits or grant administration principles and other administrative areas as acquired by five (5) to seven (7) years in finance and administration of which a minimum of one (1) year must be in a supervisory capacity; or
- (C) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Familiarity with the use of computerized information systems is required.
- (B) Proficient in MS Office Suite including Word, and Excel required.
- (C) Experience in Public Sector recommended.
- (D) In depth knowledge of the Chapter 30 and Chapter 149 State Bidding Laws as well as extensive knowledge of MWRA procurement with respect to administration such as Service Supply, Professional, Non-Professional and Construction contracts required for position at Deer Island.
- (E) Excellent interpersonal, verbal and written communications skills required.

**SPECIAL REQUIREMENTS:**

None.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computer including word processing and other software, copy and fax machine.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk; stand; climb or balance; stoop, kneel, crouch, or crawl; taste or smell.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision, depth perception, peripheral vision and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee regularly works in an office environment. The noise level in the work environment is moderately quiet.

**November 2013**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Systems Analyst/Programmer I  
**DIVISION:** Operations  
**DEPARTMENT:** Environmental Quality - Water Quality

**BASIC PURPOSE:**

The Systems Analyst/Programmer I is responsible for analyzing, designing, developing, testing, implementing and maintaining software applications. This position is responsible for the support and interaction with the department staff to improve daily processing and user development in the understanding of the applications software. The Systems Analyst/Programmer I will manage environmental databases and prepare, maintain, and publish water quality reports required by regulations or for internal/external use.

**SUPERVISION RECEIVED:**

Works under the general supervision of a Program Manager, Data Management.

**SUPERVISION EXERCISED:**

None

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Identifies, analyzes, designs, maintains, supports, and upgrades software applications (in-house and third party software) to ensure processes and functionality of the applications comply with the organization's processes and regulations.
- Maintains system application guidelines, schedules, and data structures.
- Researches, plans, develops, tests, and implements external interfaces between existing and new system applications and platforms to produce seamless integration that complies with processing and business requirements.
- Analyzes, plans, tests, and implements system application upgrades and new releases as required by the software vendor and company requirements to maintain software compliance and company regulations.
- Supports the user community in the resolution of problems with the software applications functionality.

- Develops and maintains documentation of applications that describes the processing and maintains the support of the applications. Provides training for department users on applications.
- Creates reports, analyze data and review reports for validity and correctness of the data. Develops and implements programming for automated routine and ad hoc report generation.
- Maintains professional interaction with the applications staff and user community to ensure adequate system functionality, promote team participation and encourage user confidence in the applications staff quality service.
- Researches and corrects problems with the system applications during production processing in an efficient and timely manner ensuring system recovery and integrity.
- Develops and maintains department internal web page.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

**Education and Experience:**

- (A) A Bachelor's degree in management science, engineering management, finance, computer science or related field; and
- (B) One (1) to three (3) years experience supporting applications; or
- (C) Any equivalent combination of education or experience.

**Necessary Knowledge, Skills and Abilities:**

- (A) Knowledge of computer programming and systems analysis techniques within the information science discipline.
- (B) Programming experience in the following is desirable: Python, R, SQL or other programming language

**SPECIAL REQUIREMENTS:**

None.

**TOOLS AND EQUIPMENT USED:**

Office equipment as normally associated with the use of telephone, personal computers including programming software, copy and fax machines.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to walk and stand.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision and color vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee occasionally works in various field settings and in an office environment. The employee regularly works near moving mechanical parts, and is occasionally exposed to risk of vibration.

The noise level in the work environment is very loud in field settings, moderately loud at other work locations and moderately quiet at office settings.

**February 2020**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Senior Engineer, CADD

**DIVISION:** Sewerage

**DEPARTMENT:** Deer Island Treatment Plant (DITP)

**BASIC PURPOSE:**

Coordinates all Deer Island Treatment Plant CADD related work by developing standards, scheduling the flow of work, checking the quality of work, and performing CADD file maintenance.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Program Manager technical.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Prepares drawings and other designs-related documents according to MWRA/BHP CADD procedures, design standards and existing conditions, using both computerized and manual systems.
- Coordinates the work of other CADD engineers by scheduling flow of work, checking quality of work, and performing CADD file maintenance.
- Develops and implements procedures for as-build process and MWRA CADD Systems.
- Participants in customizing the CADD system and development of standards, including preparation of standard symbols and details.
- Assists in the installation, implementation and updating of the standard and customized CADD systems, for both in-house and consultant prepared design projects.
- Oversees the of work of professional engineering consultants, outside contractors and vendors and DITP staff for conformance to MWRA CADD standard.

- Applies full range of CADD commands to manipulate, modify or otherwise edit existing drawings and utilize software to display final drawing on screen to verify their completeness, clarity and accuracy.
- Applies commands to produce hard copies using peripheral equipment. Manages the supply inventory and assures operability of CADD related peripheral equipment.
- Develops and maintains libraries of all manuals and software pertinent to the CADD system. Manages the supply inventory of the CADD Program.
- Conducts tests and evaluations on equipment, supplies, techniques and procedures in order to determine if equipment or methods will meet specifications and expectations.

**SECONDARY DUTIES:**

- Performs other CADD-related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A bachelors of science degree; and
- (B) Six (6) to ten (10) years of related CADD and manual drafting experience; or
- (C) Any equivalent combination of education experience.

Necessary Knowledge, Skills and Abilities:

- (A) Ability to plan, organize, and schedule work assignments of several CADD Engineers/Operators.
- (B) Familiarity copying and archiving electronic drawing files. Basic knowledge of electronic Documents Management systems, word processors, electronic spreadsheets, databases.
- (C) Experience in the peripheral devices associated with CADD drafting i.e. digitizers, plotters, scanners, workstations and different backup systems. Ability to install, configure and troubleshooting of different CADD-related peripheral devices.

- (D) Ability to read blueprints specifications, vendor drawings and engineer sketches.
- (E) Ability to follow oral and written instructions.

**SPECIAL REQUIREMENTS:**

None.

**TOOLS AND EQUIPMENT USED:**

Office machines as normally associated with the use of telephone, personal computer, including word processing and other software, copy and fax machine.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, including office equipment, or controls and reach with hands and arms. The employee frequently is required to sit and talk or hear. The employee is occasionally required to stand and walk.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

The employee regularly works in an office environment. The noise level in the work environment is a moderately quiet office setting.

**August, 1999**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Senior Draftsperson  
**DIVISION:** Operations  
**DEPARTMENT:** Engineering & Construction

**BASIC PURPOSE:**

Provides drafting support services in the Engineering and Construction Department. Performs drafting work requiring the application of AutoCAD, Civil 3D, Revit and Building Information Modeling (BIM) and ensures drawings and files are updated and filed according to Authority standard practices.

**SUPERVISION RECEIVED:**

Works under the general supervision of the CADD Drafting Manager.

**SUPERVISION EXERCISED:**

None.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Prepares complex drawings and working plans for engineering projects using AutoCAD, Civil 3D, Revit, BIM as well as other AutoCad software packages.
- Makes finished layouts, detail engineering drawings, building information modeling, presentations and signage, from field data, general layouts, sketches and specifications developed by Engineering and other Authority staff.
- Makes required calculations in connection with development of drawings and models.
- Prepares maps, property plans and descriptions and 3D model-based designs from field data. Plots topographic and profile information.
- Develops charts and graphs of engineering data and findings of engineering studies.
- Participates in field investigations in order to prepare drawings and models of existing facilities.
- Layout pipeline, facility, system, equipment and component drawings and models of Authority infrastructure.
- Scan, number, review, update, plot and archive revised in-house and consultant project

drawings and models.

- Coordinates with consultants, designers, technicians and other personnel to incorporate concepts and information into drawing packages.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) Associate's degree in Engineering or related technical field; and
- (B) Thorough knowledge of drafting and working knowledge of AutoCAD, Civil 3D, Revit, BIM, Raster Design and civil engineering practices as normally acquired through two (2) years of professional experience, preferably in a consulting engineering field; or
- (C) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Demonstrated proficiency in AutoCAD, Civil 3D, Revit and BIM.
- (B) Ability to follow instructions and diagrams to create or modify drawings using MWRA drafting standards.
- (C) Ability to create and modify Revit families to specific project needs.
- (D) Ability to carry out written and oral instructions effectively and work as part of a project team.
- (C) Ability to plan, organize and execute work assignments with a high order of speed, neatness, order and clarity.
- (D) Excellent interpersonal, oral and written communication skills.

**SPECIAL REQUIREMENTS:**

A valid Class D Massachusetts Motor Vehicle Operators License.

**TOOLS AND EQUIPMENT USED:**

Office machines as normally associated with the use of telephone, personal computer including word processing and other software, copy and machines.

**PHYSICAL DEMANDS:**

The physical demands described are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to sit and talk or hear. The employee is frequently required to use hands to finger, handle or operate objects, including office equipment, controls and reach with hands and arms. The employee is frequently required to stand and walk both in the office and at various operational and construction work sites

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision, depth perception, peripheral vision and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those employee encounters while performing the essential functions of this job. There are no specific environmental conditions noted.

The noise level in the work environment is usually loud in a field setting and moderately quiet in an office setting.

**February 2020**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Building and Grounds Supervisor

**DIVISION:** Operations

**DEPARTMENT:** Maintenance/Deer Island

**BASIC PURPOSE:**

Performs a variety of maintenance and repair tasks to roads, grounds, buildings, structures and associated appurtenances.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Facilities Manager.

**SUPERVISION EXERCISED:**

Primarily responsible for supervision of Building & Grounds Workers and other unskilled labor, as assigned.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Supervises, inspects and assists with the set-up and cleaning of process tanks, galleries, drains, culverts and structures as required.
- Supervises, inspects and assists with the clean-up of process spills and upsets as required.
- Supervises, inspects and assists with the cleaning of roadways, walkways, and repair of fencing and gates as necessary.
- Supervises, inspects and assists with the removal of snow and ice from roadways, walkways, buildings and structures as necessary.
- Inspects the appearance of the plant grounds and supervises and assists with the cutting, trimming and/or weeding grass, shrubs, trees and ornamental beds.
- Supervises and assists with the excavation and/or refills of ditches and holes. Breaks, removes and repairs concrete as required.

- Inspects and supervises the disposal of trash and other waste materials.
- Operates machinery, vehicles, material handling equipment, snow removal equipment, and tools as necessary to perform assigned work such as (but not limited to) tractors, mowers, cement mixers, cleaning machinery, etc.
- Operates motor vehicles such as vans and pick up trucks to transport materials and equipment to work sites, pick up and deliver materials, etc.
- Supervises and assists with washing and cleaning vehicles, tools and equipment.
- Supervises and assists with moving material and supplies.
- Supervises and assists with loading and unloading vehicles, carts, trailers, etc., as required.
- Performs work in a safe and professional manner.
- Reports and documents work being performed.
- Plans the daily assignments for assigned staff and distributes work accordingly. Establishes deadlines and priorities on the basis of the maintenance schedule or emergencies.
- Follows established safety, operating, and emergency response procedures and policies established by MWRA.
- Prepares daily and weekly job status and time utilization to track execution of written work plan. Details include, but are not limited to: crew time productivity, material utilization and costs, equipment utilization and costs.
- Utilizes personal computer, data terminals and specialized MAXIMO/Lawson software application packages to perform related duties, included but not limited to: work planning and scheduling, inventory maintenance, purchase order placement/tracking, work order reporting; time, utilization, and written work plan completion.
- Oversees, measures and where appropriate, improves assigned work crew productivity.
- Supervises assigned crews including taking disciplinary actions (issuing verbal warnings and initiating written warnings) when necessary, conducting performance reviews, and preparing regular reports, as required, on work accomplished and crew productivity.
- Trained in Confined Space Entry, CPR and First Aid, and be capable of entering, setting up, installing, disassembling confined space equipment and ability to work in a confined space.

- Performs clean-up and housekeeping tasks for work area to maintain a clean environment within designated area.
- Inspects plant equipment and processes of designated area regularly to determine efficiency of operation, cleanliness, maintenance requirements and adherence to safety and environmental restrictions. Periodically conduct safety inspections.
- Monitors work-in-progress and provides final check that work is completed in accordance with specifications for the job, applicable vendors specifications, trade standards, etc., and that final clean-up is satisfactory. Personally, conducts audits of completed tasks.
- Assists Planner/Scheduler in determining appropriate preventive maintenance and corrective maintenance priorities, schedules and estimated levels of effort to ensure that equipment performance is maximized.
- Supervises other trades in the performance of their work, as required, or as assigned.
- Creates efficient work schedules and monitors staff performance in order to minimize travel time and staff downtime, and maximizes staff productivity. Keeps time utilization records and continuously strives for productivity improvements.
- Identifies and monitors unit's tools, parts and material requirements and works with Planner/Scheduler to insure timely procurement and maintenance of adequate inventory levels.
- Assists maintenance crews with troubleshooting assigned work orders, and provides instruction on difficult work operations.
- Performs light maintenance independently or as part of a team. Light maintenance shall include but not limited to:
  - Operates forklift or other light equipment not requiring a special license.
  - Inspects and troubleshoots various systems and equipment
  - Installs and retrofits/new equipment related to plant systems.
  - Modifies and/or aligns existing equipment to specifications.
  - With proper training sets up ladders, staging and rigging and utilizes hoists, jacks, dollies, lifts, etc. for proper access to job and to remove and install equipment.
  - Operates portable pumping, ventilation and other equipment necessary to support and

accomplish assigned tasks.

- Greases and lubricates, replaces oil reserves, minor packing adjustments and opens hatches.
- Installs safety rails.
- Conducts routine testing, lockout/tagout, operation (startup/shutdown) and adjustment of process equipment.
- Provides training to employees on a regular basis.

**SECONDARY DUTIES:**

- Performs related duties as required.
- Promotes and participates in productivity improvement plan.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) Basic reading, writing, mathematical, scientific and oral communication skills as normally attained through a high school education or the equivalent; and
- (B) Requires two (2) to four (4) years supervisory experience, preferably in a large industrial or commercial facility;
- (C) Satisfactory completion of training program in accordance with the productivity improvement program as established at MWRA;
- (D) A working knowledge of the occupational hazards and safety practices common to the trade.
- (E) The ability to plan, organize, direct, train and assign duties to subordinates, as obtained through successful completion of supervisory training program or an approved institution.
- (F) Demonstrated verbal and written communication skills
- (G) Any equivalent combination of education/training and experience.

Necessary Knowledge, Skills and Abilities:

- (A) A working knowledge of the methods and tools required to perform building and grounds maintenance functions, to include the operation of a wide variety of machinery, vehicles, material handling equipment, hand and power tools and specialized machinery for roads, grounds, galleries, structures and facilities care.
- (B) Ability to follow written and oral instructions.
- (C) Skill in the operation of the listed tools and equipment. Ability to demonstrate basic computer literacy including the preparation of spreadsheets, word-processing documents, and e-mail.
- (D) Ability to supervise staff effectively and to establish and maintain effective working relationships with subordinates, superiors and associates.
- (E) Ability to keep manual and computer-based records and write reports.

**SPECIAL REQUIREMENTS:**

- A Valid Massachusetts Class D Vehicle Operators License.
- Complete competency based training program related to **ESSENTIAL DUTIES AND RESPONSIBILITIES** as outlined above and successfully demonstrates required competencies.

**TOOLS AND EQUIPMENT USED:**

Motor vehicle, power and hand tools, mobile radio, telephone, and beeper.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools, or controls and reach with hands and arms. The employee is frequently required to stoop, kneel, crouch, or crawl. The employee occasionally is required to stand, walk, talk or hear, sit, climb, or balance.

The employee must frequently lift and/or move up to 25 pounds and occasionally lift and/or move more than 100 pounds. Specific vision abilities required by this job include close vision, distance, and peripheral vision, depth perception, and the ability to adjust focus.

## **WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee regularly works in outside weather conditions. The employee regularly works near moving mechanical parts and is occasionally exposed to wet and/or humid conditions and vibration. The employee occasionally works in precarious places and is occasionally exposed to fumes or airborne particles, toxic or caustic chemicals, and risk of electrical shock.

The noise level in the work environment is very loud in field settings, and moderately loud at other work locations.

**August 2001**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Unit Supervisor

**DIVISION:** Operations

**DEPARTMENT:**

**BASIC PURPOSE:**

Supervises daily operations and activities of assigned staff.

**SUPERVISION RECEIVED:**

Works under the general supervision of an Area Manager.

**SUPERVISION EXERCISED:**

Exercises close supervision of the assigned skilled and unskilled staff.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Supervises staff in the performance of a variety of maintenance and operations functions.
- Determines the daily assignments for assigned staff and distributes work accordingly.  
Establishes deadlines and priorities on the basis of the maintenance schedule or emergencies.
- Follows process control procedures for an assigned area, utilizing available area computer data to monitor operations.
- Ensures operating and maintenance records and logs are properly maintained.
- Communicates with all Supervisors and Managers regarding operational, maintenance and process control conditions.
- Monitors supplies of process chemicals and reorders as necessary and assists employees with procurement of tools, parts and materials.
- Works with engineers in the Technical Information Center to develop and improve designs for assigned work orders; reports modifications made to equipment.
- Works with operations Area Supervisors to coordinate shutdown and start-up of process equipment.

- Works with appropriate management staff to develop new and improved operating practices and procedures and to coordinate efforts regarding troubleshooting and variances.
- Reviews assigned employee performance per MWRA procedures.
- Performs work in compliance with Operations Integrated Contingency Plan.
- Prepares daily and weekly job status and time utilization to track execution of written work plan. Details include, but are not limited to: crew time productivity, material utilization and costs, equipment utilization and costs.
- Oversees, measures and where appropriate, improves assigned work crew productivity.
- Supervises assigned crews including taking disciplinary actions (issuing verbal warnings and initiating written warnings) when necessary, conducting performance reviews, and preparing regular reports, as required, on work accomplished and crew productivity.
- Works from manufacturer's manuals and specifications, blueprints, schematics and verbal instructions to install, repair, troubleshoot, inspect, check & maintain mechanical, electrical-mechanical & hydraulic systems including HVAC mechanical components not carrying refrigerant.
- Performs preventative, predictive and corrective maintenance on systems & equipment including piping not covered by the plumbing and gas fitting codes & HVAC mechanical components not carrying refrigerant.
- Performs, documents and reports results in the Maximo database of inspections and work performed.
- Assists other trades in the performance of their work, as required, or as assigned.
- Inspects plant equipment and processes of designated area regularly to determine efficiency of operation, cleanliness, maintenance requirements and adherence to safety and environmental restrictions. Periodically conduct safety inspections.
- Monitors work-in-progress and provides final check that work is completed in accordance with specifications for the job, applicable vendors specifications, trade standards, etc., and that final clean-up is satisfactory. Personally, conducts audits of completed tasks.
- Follows established safety, operating, and emergency response procedures and policies established by MWRA.
- Assists Planner/Scheduler in determining appropriate preventive maintenance and corrective

maintenance priorities, schedules and estimated levels of effort to ensure that equipment performance is maximized.

- Creates efficient work schedules and monitors staff performance in order to minimize travel time and staff downtime, and maximizes staff productivity. Keeps time utilization records and continuously strives for productivity improvements.
- Identifies and monitors unit's tools, parts and material requirements and works with Planner/Scheduler to insure timely procurement and maintenance of adequate inventory levels.
- Assists maintenance crews with troubleshooting assigned work orders, and provides instruction on difficult work operations.
- Supervises and assist in the setting up of staging and rigging for access on the job installation and removal of equipment.
- Provides training to employees on a regular basis.
- Performs light maintenance independently or as part of a team. Light maintenance shall include but not limited to:
  - Operates forklift or other light equipment not requiring a special license.
  - Generates inspection lists and maintenance reporting through the Computerized Maintenance Management System.
  - Inspects and troubleshoots various systems and equipment
  - Installs and retrofits/new equipment related to plant systems.
  - Modifies and/or aligns existing equipment to specifications.
  - With proper training sets up ladders, staging and rigging and utilizes hoists, jacks, dollies, lifts, etc. for proper access to job and to remove and install equipment.
  - Operates portable pumping, ventilation and other equipment necessary to support and accomplish assigned tasks.
  - Greases and lubricates, replaces oil reserves, makes minor packing adjustments and opens hatches.
  - Installs safety rails, changes light bulbs and replaces HVAC filters.

- Removes snow from immediate work area in order to perform tasks.
- Conducts routine testing, lockout/tagout, operation (startup/shutdown) and adjustment of process equipment.
- Performs necessary cleanup and housekeeping for work area and other light maintenance tasks.

**SECONDARY DUTIES:**

- Assists employees with preparation of injury/illness reports, safety and maintenance work orders, and assures that they keep high quality, accurate related documents and records.
- Assists in maintaining harmonious labor management relations through proper application of collective bargaining agreement provisions and established personnel policies.
- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A high school diploma or GED; and
- (B) Requires four (4) to six (6) years of related supervisory experience supervising Plumbers/Pipefitters, Electricians, Machinists, I&C specialists or M&O Specialists; or in an equivalent position, for proficiency in the following areas:
- A working knowledge of the methods, procedures and work rules relating to preventive maintenance, repair, and proper inspection of mechanical, electro-mechanical, pneumatic or hydraulic equipment
  - The ability to troubleshoot problems in the maintenance and repair of equipment serviced by M&O Specialists.
  - Successful completion of the MWRA sponsored supervisory training program and receipt of the training certificate may be substituted for supervisory experience.
- (C) Satisfactory completion of competency-based training program in accordance with the productivity improvement program as established at MWRA; or
- (D) Any equivalent combination of experience or education.

Necessary Knowledge, Skills and Abilities:

- (A) Basic reading, writing, mathematical, scientific and oral communication skills.
- (B) Ability to plan, organize, direct, train and assign duties to subordinates, as obtained through successful completion of supervisory training or an approved institution.
- (C) A working knowledge of the occupational hazards and safety practices common to the trade, and the satisfactory completion of MWRA safety training in the use of hoists, rigging, and material handling equipment.
- (D) Working knowledge of the methods, procedures and work rules relating to machine shop operations in a large industrial facility.
- (E) Ability to troubleshoot problem areas relative to complex machinist work assignments.
- (F) Utilizes personal computer, data terminals and specialized MAXIMO/Lawson software application packages to perform related duties, included but not limited to: work planning and scheduling, inventory maintenance, purchase order placement/tracking, work order reporting; time, utilization, and written work plan completion.
- (G) Ability to supervise staff effectively and to establish and maintain effective working relationships with subordinates, superiors and associates.
- (H) Ability to attain knowledge & work procedures required to perform maintenance tasks required by Reliability Centered Maintenance or similar Maintenance Management Program.
- (I) Ability to keep manual and computer-based records and write reports.
- (J) Trained in confined space entry. Capable of entering, setting up, installing and disassembling confined space equipment. Ability to work in a confined space.
- (K) Trained in CPR and First Aid.

**SPECIAL REQUIREMENTS:**

- A Valid Class D Vehicle Operators License.
- Must possess an electrical, plumbing or HVAC Technician's license or a Mechanical Certification from an agreed upon program or a certificate from a college or technical school in machining/metalworking or fabrication/welding (not required for Unit Supervisor, Instrumentation)
- For 29880143 DI only - Department of Public Safety Hoisting Engineer's License, 1B and 2A

or the ability to obtain within one year.

- Complete competency based training program related to **ESSENTIAL DUTIES AND RESPONSIBILITIES** as outlined above and successfully demonstrates required competencies.

### **TOOLS AND EQUIPMENT USED:**

Hand tools, mobile radio, telephone, beeper, personal computer including word processing and other software, copy and fax machine.

### **PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools, or controls and reach with hands and arms. The employee occasionally is required to sit, stand and walk. The employee is frequently required to climb or balance; stoop, kneel, crouch, or crawl; taste or smell.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 25 pounds. Specific vision abilities required by this job include close vision, distance, color vision, peripheral vision, depth perception, and the ability to adjust focus.

### **WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee regularly works in an office environment. The employee occasionally works in outside weather conditions. The employee occasionally works near moving mechanical parts and is occasionally exposed to wet and/or humid conditions and vibration. The employee occasionally works in high, precarious places and is occasionally exposed to fumes or airborne particles, toxic or caustic chemicals, and risk of electrical shock.

The noise level in the work environment is usually loud in field settings, and moderately quiet in office settings.

**January 2019**

**MWRA  
POSITION DESCRIPTION**



**POSITION:** Senior Field Inspector, Water and Wastewater  
**DIVISION:** Operations  
**DEPARTMENT:** TRAC

**BASIC PURPOSE:**

Provides inspection services on construction contracts performed by outside agencies affecting the Authority's wastewater transport system and water distribution system. Performs 8M Permitting and Dig Safe inspection and markout activities. Supervises and assigns work to field inspectors for water and wastewater infrastructure.

**SUPERVISION RECEIVED:**

Works under the general supervision of the TRAC Project Managers and the Senior Program Manager, Field Operations & Permitting.

**SUPERVISION EXERCISED:**

Directly supervises and assigns work to field inspector(s) and support staff.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Coordinates with field inspectors and Project Managers to ensure that conditions of applicable 8(M) and other permits are enforced.
- Supervises and assigns work to field inspector(s) for the 8M and Dig Safe programs. Trains field inspectors on use of MWRA databases and other tools such as GIS.
- Participates in permitting discussions with outside parties as requested by the TRAC Project Managers.
- Reviews designs and construction of projects of medium complexity and assists senior engineering personnel on major projects for completion and conformance to specifications.
- Surveys and calculates specifications along with using other engineering methodology to determine areas of reconnaissance locations and layouts in the field. Surveys existing water

and wastewater appurtenances to update record drawings and detail records.

- Inspects the work of contractors to ensure conformance to plans, specifications and standards. Maintains record of labor, costs of changes and extra work.
- Inspects materials for conformance to specifications, maintain records of progress, completed work and document changes and additional work.
- Develops and documents Standard Operating Procedures for 8M inspections and Dig Safe and 8M markouts.
- Participates in Dig Safe inspection and markout activities both during work hours and while on-call. Performs markout of MWRA water mains and sewers.
- Tracks all inspections conducted under the 8M and Dig Safe programs. Maintains records and documentation of all work performed. Documents daily work completed within work order system including all field notes from job site. Records completed work, maintaining records of the cost of changes and additional work.
- Investigates dry weather wastewater discharges and various wet weather overflows. Supports wet weather operations as needed.
- Follows all MWRA safety policies and procedures to ensure a safe work environment.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) Knowledge of engineering principles and practices as normally attained through a Bachelor's degree in sanitary engineering, civil engineering or a related field; and
- (B) Thorough understanding of the operation of water and wastewater infrastructure as attained through five (5) years of related professional experience of which two (2) years should be in a supervisory capacity; or
- (C) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Demonstrated proficiency in the use of field location techniques such as GPS.
- (B) Ability to read blueprints, detail records and record drawings.
- (C) Ability to communicate detailed instructions accurately.
- (D) Ability to develop and maintain productive working relationships with outside parties and to work effectively as part of a team.
- (E) Detail oriented and must be able to maintain accurate records of work performed and level of effort expended.
- (F) Knowledge of computers with experience in Microsoft Office Suite, computer-based drafting and design systems, MAXIMO, and GIS.
- (G) Advanced computer skills in the areas of spreadsheets and databases.
- (H) Excellent interpersonal, oral and written communication skills.

**SPECIAL REQUIREMENTS:**

Mandatory On Call work for after-hours inspection services in a rotation with other inspection staff.

Participates in emergency response to any/all MWRA emergencies as necessary.

A valid Massachusetts Class D Motor Vehicle Operators License is required.

A valid Grade 1 Water Distribution Operator-in-Training License and a Collections System 1 Certification is preferred.

**TOOLS AND EQUIPMENT USED:**

Power and hand tools, telephone, personal computer, copy and fax machine.

**PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to use hands to finger, handle, feel or operate objects, tools, or controls and reach with hands and arms. The employee frequently is required to sit, stand and walk. The employee is occasionally required to talk or hear; climb or balance; stoop, kneel, crouch, or crawl.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance, color vision, peripheral vision, depth perception, and the ability to adjust focus.

**WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. While performing the duties of this job, the employee regularly works in outside weather conditions.

The employee regularly works near moving mechanical parts and is occasionally exposed to wet and/or humid conditions and vibration. The employee occasionally works in precarious places and is occasionally exposed to fumes or airborne particles, toxic or caustic chemicals, and risk of electrical shock.

The noise level in the work environment is very loud in field settings and moderately loud at other work locations.

**February 2020**

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Appointment of Work Coordination Center Manager, Operations

---

**COMMITTEE:** Personnel & Compensation

INFORMATION  
 VOTE

Andrea Murphy, Director, Human Resources  
Charles B. Ryan, Director, Wastewater O & M  
Stephen D. Cullen, Director, Wastewater  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

---

### RECOMMENDATION:

To approve the appointment of Mr. Martin Anaya to the position of Work Coordination Center Manager, (Unit 6, Grade 12), at an annual salary of \$ 101,651.85, commencing on a date to be determined by the Executive Director.

### DISCUSSION:

The position of Work Coordination Center Manager became vacant upon the recent promotion of the incumbent. The Work Coordination Center Manager is responsible for planning and scheduling all preventive, predictive, and corrective maintenance work for the water and wastewater facilities and pipelines in Metropolitan Maintenance and Western Operations. Due to its size and complexity, there is also a separate Work Coordination Center Manager for Deer Island. This position supervises Planning and Scheduling Coordinators to ensure consistent and efficient work planning is done using MWRA's computerized maintenance management software, MAXIMO. In addition to generating maintenance work orders, MAXIMO is utilized to document all parts and labor for all work completed, so that asset maintenance costs can be determined and tracked. This information is collected and analyzed to guide asset replacement planning, and is reported in management tools, such as the Yellow and Orange Notebooks.

### Selection Process

The position of Work Coordination Center Manager was posted internally and six candidates applied for the position. Three candidates were determined to be qualified and were referred for an interview. One candidate withdrew their application and the remaining two candidates were interviewed. The Director, Wastewater Operations and Maintenance, the Director, Metropolitan Operations, the Manager Maintenance, and the Program Manager, Meter Maintenance conducted the interviews. Upon completion of the interviews, Mr. Anaya was determined to be the best

candidate for the position based upon his experience, knowledge, skills and education.

Mr. Anaya has been employed at MWRA for the past 10 years. In that time he has acquired a broad range of experience in wastewater collections and water distribution system operations and maintenance. He first performed maintenance functions for the Water Pipeline Maintenance Program, and then spent five years as a Plumber/Pipefitter in the Metropolitan Equipment Maintenance Program, where he excelled in completing large projects at CSOs, pump stations, and headworks facilities. In 2017, Mr. Anaya was promoted to Planning and Scheduling Coordinator in the Work Coordination Unit in Chelsea. He was first assigned to support the Wastewater Pipeline Maintenance program, and later the Equipment Maintenance plumbing, mechanic, and machine shops. He was a key team member in the recent MAXIMO upgrade and instrumental in providing training to staff in the different trades groups on how to use it. He has been responsible for writing specifications for material purchases and for preparing reports for maintenance programs. Prior to working at the MWRA, Mr. Anaya worked for seven years at Pacer/Anixter as a Quality Assurance Manager and then as a Plant Manager supervising 54 plant employees.

Mr. Anaya has an excellent understanding of maintenance workflow and utilizing MAXIMO to electronically monitor maintenance activities. He has demonstrated an understanding of the importance of monitoring and tracking metrics, such as backlog, kitting, and compliance; key components of leading a productive, motivated maintenance department. He also has demonstrated the ability to effectively interact and communicate with staff at all levels of the agency and has earned the respect of his managers and peers. Mr. Anaya's managerial background, Maximo expertise, diverse maintenance work experiences, and in depth knowledge of the metropolitan water and wastewater system make him well qualified for this position.

**BUDGET/FISCAL IMPACT:**

There are sufficient funds for this position in the FY20 current expense budget.

**ATTACHMENT:**

Resume of Martin Anaya  
Position Description  
Work Coordination Center Organizational Chart

**MWRA  
POSITION DESCRIPTION**

**POSITION:** Work Coordination Center Manager

**PCR#:** 5440013

**DIVISION:** Operations

**DEPARTMENT:** Field Operations

**BASIC PURPOSE:**

Manages the Work Coordination group and oversees the various activities including planning, scheduling materials acquisition and dispatch for the maintenance programs within the Field Operations Department. Coordinates with other managers to ensure effective and economical use of materials and staff. Oversees all aspects of data quality of the Field Operation Department's maintenance database.

**SUPERVISION RECEIVED:**

Works under the general supervision of the Manager, Metropolitan Maintenance.

**SUPERVISION EXERCISED:**

Direct supervision of data quality, materials acquisition and dispatch personnel. Matrix supervision of Planning/Scheduling Coordinators.

**ESSENTIAL DUTIES AND RESPONSIBILITIES:**

- Manages staff involved in the planning, scheduling, inspection and work order system for all preventive, corrective, contract and emergency maintenance work.
- Oversees the development and distribution of maintenance management reports.
- Manages the receipt and analysis of all work request and work orders. Coordinates with other Field Operations Department managers to establish work order priorities.
- Collects, analyzes and reports on all bench marking data related to the wastewater and water-maintenance industry. Utilizes benchmark data to streamline maintenance practices.
- Ensures that all work requests and work orders are received and processed efficiently.

- Performs quality assurance/quality control (QA/QC) functions including inspection reporting work order backlog monitoring, productivity and cost analysis and customer service surveying.
- Works with the MIS to update and maintain the application software and databases used by the Work Coordination group.
- Tracks work projects of large scope or long duration involving multiple trades, outside contractors and specialty materials delivery.
- Develops and implements, in coordination with warehouse personnel, a comprehensive “kitting” plan for all maintenance work orders.
- Represents Work Coordination group on maintenance related project teams such as the Facilities Asset Management Program.
- Develops, in conjunction with other Field Operations department manager, comprehensive work practices that ensure proper data integrity.
- Works with vendors and outside consultants in establishing maintenance plans for new and existing equipment. Participates in RCM II analyses and other planning to determine maintenance frequencies as required.
- Works with the Field Operations department managers to implement “team-building” and “cross-functional” training programs for maintenance staff.
- Reviews assigned employees performance per MWRA procedures.
- Resolves personnel and work rule issues through procedures outlined by MWRA union contracts and policy and procedure guidelines.
- Administers the application of collective bargaining provisions and personnel policies in the workplace. Serves as a Step-One grievance-hearing officer.

**SECONDARY DUTIES:**

- Performs related duties as required.

**MINIMUM QUALIFICATIONS:**

Education and Experience:

- (A) A four (4) year college degree in engineering, business administration, and planning or

related field. Masters in science or an advanced degree in a related field preferred; and

- (B) Eight (8) years experience in project management related to the operation and maintenance of a wastewater collection system, water distribution system or large industrial facility; and
- (C) Two (2) to four (4) years of supervisory experience; or
- (D) Any equivalent combination of experience or education.

Necessary Knowledge, Skills and Abilities:

- (A) Organizational and systems management skills.
- (B) A proven ability to organize effective training classes for maintenance field staff and managers.
- (C) Knowledge of maintenance software packages, data management techniques and data QA/QC procedures.
- (D) Knowledge of wastewater collection and water distribution operations. Knowledge of related process control theory, practices and principles.
- (E) Strong communication and interpersonal skills necessary to interact at all levels of the organization are required.
- (F) Detailed knowledge of Microsoft Access, Excel and Maximo or similar maintenance software packages.

**SPECIAL REQUIREMENTS:**

A valid Massachusetts Class D Vehicle Operators License.

A valid Grade 3 Distribution Operator in Training License or Grade 4 Wastewater Treatment Plant Operator in Training License or the ability to obtain one of these licenses within one year.

**TOOLS AND EQUIPMENT USED:**

Office machines as normally associated with the use of telephone, personal computer including word processing and other software, copy and fax machine.

### **PHYSICAL DEMANDS:**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to sit, talk or hear. The employee is regularly required to use hands to finger, handle, feel or operate objects, including office equipment or controls and reach with hands and arms. The employee frequently is required to stand and walk.

There are no requirements that weight be lifted or force be exerted in the performance of this job. Specific vision abilities required by this job include close vision and the ability to adjust focus.

### **WORK ENVIRONMENT:**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

While performing the duties of this job, the employee regularly works in an office environment but will also require site visits to a variety of field locations. The noise level may be loud in field settings, moderately loud in pumping stations and moderately quiet in office settings.

## Martin Anaya

**Objective** To assist in the enhancement of the employer's productivity

**Experience** 2019 – Present **MWRA** Chelsea, MA

**Acting Work Coordination Center Manager**

- Manage staff involved in the planning, scheduling, inspection and work order system for all preventative, corrective, contract and emergency maintenance work
- Develop and implement, in coordination with warehouse personnel, a comprehensive "kitting" plan for all maintenance work order
- Work with the MIS department to update and maintain the application software and databases used by the Work Coordination group
- Work with vendors and outside consultants in establishing maintenance plans for new and existing equipment.
- Assure accurate Maximo data entry
- Ensures that all work requests and work orders are received and processed efficiently.

2017 - 2019

**Planner / Scheduler**

- Process Service Requests into Work Orders (apply accurate and relevant job plans to assist the Work Order)
- Assist the Program Manager in distributing Work Orders to the appropriate trade or maintenance personnel (daily dispatch)
- Procure all materials and tools relevant needed to complete each Work Order. This includes calling vendors, receiving quotes, acquiring NIGP numbers, generating purchase requests, following up with vendor upon P.O. issuance.
- Create new job plans relevant to the work requested. This includes all safety protocol.
- Create Preventative Maintenance orders for materials requiring periodic inspection that assure optimum performance throughout the lifetime of expected operation.
- Review finished work orders for accuracy prior to completing them.

2012 - 2017

**Plumber / Pipefitter**

- Plan, install, modify and repair pressurized pipe for chemical, steam and pneumatic systems
- Install and / or repair pumps
- Performs preventative or corrective maintenance on pipes, valves, pumps and other related equipment
- Plan, install, modify and repair or non-pressurized pipe (waste and clean water drainage)

- Possess and maintain a Massachusetts Plumbing License through continuing education.

2011 – 2012

**Construction Pipelayer – Water Pipeline Department**

- Installed and repaired water mains and valves ranging from 6 to 72 inches
- Responded and repaired emergencies (water mains, leaks)
- Set up shoring for dig sites
- Back-filled dig sites (dumping, compacting and asphalt)
- Performed other various tasks such as curb installation, various valve replacement from pump stations, minor landscaping (tree and plant relocation, snow removal, mulching, etc.)

2010 – 2011

**OMC Laborer – Water Pipeline Department**

- Set up work sites (traffic signs, cones, road plates, etc.)
- Assist tradesmen in the installation of water valves, pipelines (from 6 to 72 inches) and pre-cast chambers.
- Operated 6- and 10-wheel dump trucks, powered tools (cut off saw, chainsaw, jack hammer, pumps, etc.)
- Performed manual tasks such as digging, installation or temporary fences, mulching, adding loam and seeding previous dug up sites.
- Snow removal (snowplow)

2006 – 2010

**Roto-Rooter**

Stoughton, MA

**Plumber / Drain Technician – Residential Plumbing**

- Repair and replace plumbing fixtures (toilets, faucets, valves, water supplies, water heaters, drains etc.)
- Clean / unclog all drains (main lines, kitchen, bathroom and storm)
- Water jetting, cleaned industrial sewers, (street and parking lots)

2004 – 2006

**Re-Bath**

Pembroke, MA

**Bath Installer**

- Re-surfaced and replaced tubs and shower surround walls
- Minor construction: floor and wall re-building for re-surfacing preparation

1996 – 2004

**Pacer Anixter Inc.**

Woburn, MA

**Plant Manager (2003-2004)**

- Managed approximately 54 employees
- Controlled cost expense
- Enhanced warehouse productivity

- Oversaw our Quality, Value Added and Shipping departments

**Quality Assurance Manager (1997-2003)**

- Managed 4 Quality Assurance Inspectors
- Conducted internal audits
- Maintained ISO standards
- Handled customer complaints relevant to quality
- Completed customer corrective actions reports
- Oversaw final inspection
- Controlled and created all facility work instructions and procedures

<b>Education</b>	North Shore Community College (2019 – Present)	Business Management
	Park University (1993 – 1994)	Business Management
	U.S. Army (1989 – 1991)	Construction Equip Repairer
	Salem High School (1989)	Graduate

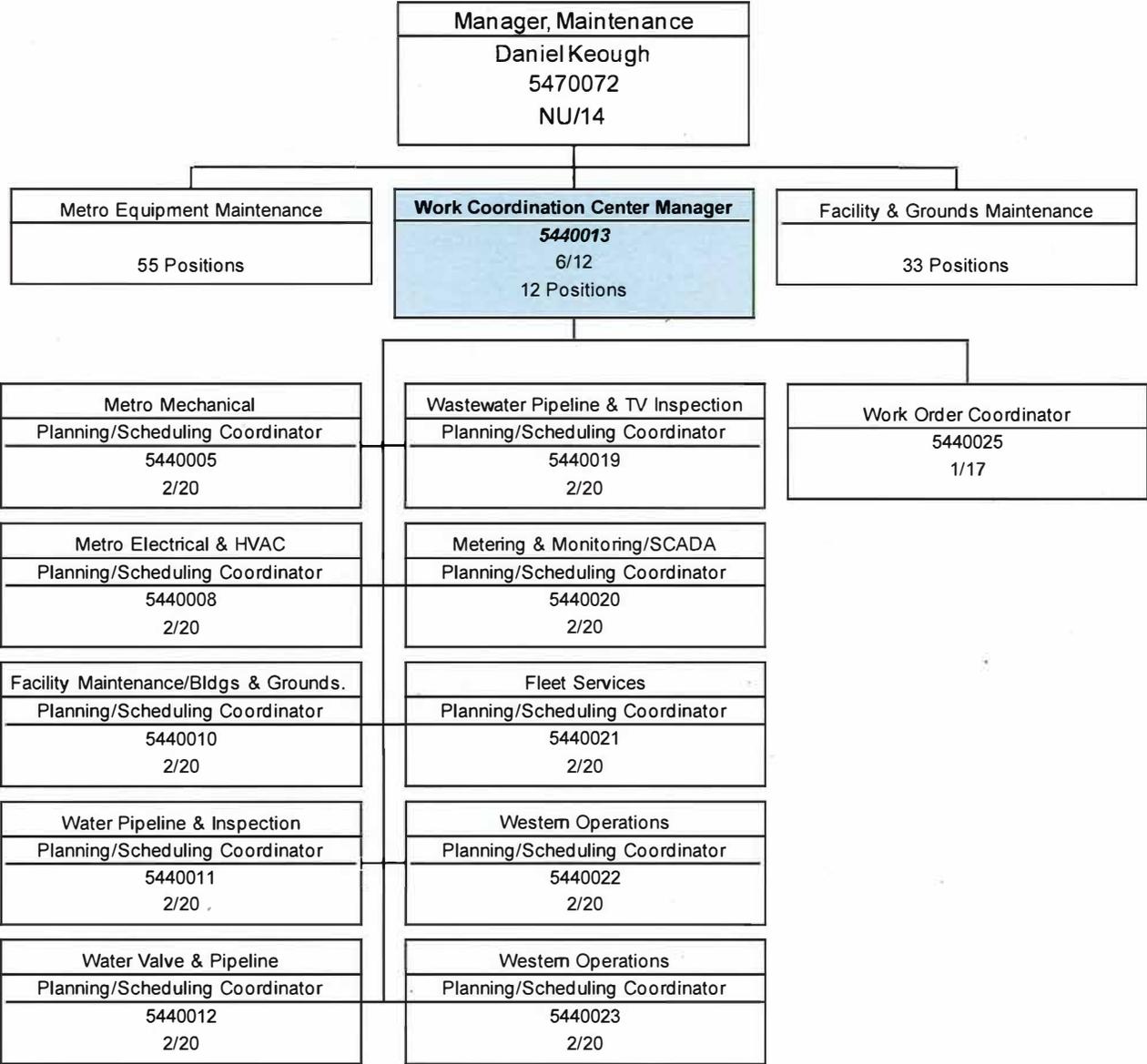
**Certifications and Licenses**

Massachusetts CDL License  
 Massachusetts Plumbing License  
**MWRA** Supervisor Development Program  
 EPA Certified Backflow Preventer Tester  
 Cross Connection Control Surveyor Certified  
 OSHA 40 Hour Hazwoper Certified  
 Rigger/Signal Person Certified

**References**   Furnished upon request

# Work Coordination Center

February 2020





# MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

## **ADMINISTRATION, FINANCE & AUDIT COMMITTEE MEETING**

to be held on

Wednesday, February 19, 2020

*Chair:* H. Vitale  
*Vice-Chair:* J. Foti  
*Committee Members:*  
J. Carroll  
C. Cook  
K. Cotter  
A. Pappastergion  
B. Peña  
J. Walsh

Location: 100 First Avenue, 2nd Floor  
Charlestown Navy Yard  
Boston, MA 02129

Time: Immediately following P&C Committee

## **AGENDA**

### **A. Information**

1. FY2020 Second Quarter Orange Notebook
2. Delegated Authority Report – January 2020
3. FY2020 Mid-Year Capital Project Spending Report
4. FY2020 Financial Update and Summary as of January 2020
5. Preliminary FY2021 Water and Sewer Assessments

### **B. Approvals**

1. Transmittal of the FY2021 Proposed Current Expense Budget to the MWRA Advisory Board
2. Appointment of Proxy for Fore River Railroad Corporation

### **C. Contract Awards**

1. Actuarial Services Related to Compliance with GASB No. 74 and 75: The Segal Company, Inc., Contract F254
2. Fuel Storage and Day Tank Systems Replacement at the Gillis and Lexington Street Pumping Stations and Hayes Pump Station: NRC East Environmental Services, Inc., Contract 7554
3. Security Equipment Maintenance and Repair Services: Viscom Systems, Inc., Contract EXE-043

**MASSACHUSETTS WATER RESOURCES AUTHORITY**

Meeting of the

Administration, Finance and Audit Committee

January 15, 2020

A meeting of the Administration, Finance and Audit Committee was held on January 15, 2020 at the Authority headquarters in Charlestown. Committee Chair Vitale presided. Present from the Board were Ms. Wolowicz and Messrs. Carroll, Cook, Cotter, Foti, Pappastergion, Peña and Walsh. Mr. Flanagan was absent. Among those present from the Authority staff were Frederick Laskey, Carolyn Francisco Murphy, David Coppes, Carolyn Fiore, Thomas Durkin, Michele Gillen, Kathleen Murtagh, Douglas Rice, Paula Weadick, Michael Cole, James Coyne, Ethan Wenger, Robert Wong, Stephen Cullen and Kristin MacDougall. Vandana Rao, EEA, and Joseph Favaloro, MWRA Advisory Board, were also in attendance. The meeting was called to order at 11:10 a.m.

INFORMATION

Delegated Authority Report – November and December 2019

There were questions and answers. (ref. AF&A A.1)

FY2020 Financial Update and Summary as of December 2019

Staff made a verbal presentation. (Ms. Wolowicz briefly left and returned to the meeting during the presentation.) There was discussion and questions and answers. (Messrs. Cook and Foti briefly left and returned to the meeting during the discussion.)

It was moved that the Executive Director draft a letter on behalf of the Board of Directors to the Secretary of Administration and Finance to request that DCR's Division of Water Supply Protection be exempted from any staffing cap applicable to the DCR. The motion was seconded and a roll call vote was taken in which the members were recorded as follows:

<u>Yes</u>	<u>No</u>	<u>Abstain</u>
Carroll		
Cook		

---

\* Committee recommendation approved by the Board on January 15, 2020

<u>Yes</u>	<u>No</u>	<u>Abstain</u>
Cotter		
		Foti
Pappastergion		
Peña		
Vitale		
Walsh		
Wolowicz		

Chair Theoharides and Mr. Flanagan were not present at the meeting. (ref. AF&A A.2)

APPROVALS

Transmittal of the Proposed FY2021 Capital Improvement Program to the MWRA Advisory Board

Staff made a presentation. (Mr. Peña left the meeting, and Messrs. Foti and Pappastergion briefly left and returned to the meeting during the presentation.) There were questions and answers.

The Committee recommended approval. (ref. AF&A B.1)

CONTRACT AWARDS

\* Bond Counsel Services: Greenberg Traurig LLP, MWRA Contract F253

Staff made a verbal presentation. There was discussion and questions and answers.

The Committee recommended approval. (ref. AF&A C.1)

\* Deer Island Demand Response Services: Consultant Direct Energy Business Marketing, LLC, Contract S590

Staff made a verbal presentation. (Mr. Peña returned to the meeting during the presentation.) There were questions and answers.

The Committee recommended approval. (ref. AF&A C.2)

\* Janitorial Services at the Chelsea Facility: Star Building Services, Inc., Bid WRA-4776

---

\* Committee recommendation approved by the Board on January 15, 2020

Staff made a verbal presentation. (Mr. Pappastergion briefly left and returned to the meeting during the presentation.) There was brief discussion and questions and answers.

The Committee recommended approval. (ref. AF&A C.3)

The meeting adjourned at 12:20 p.m.

---

Documents used for this meeting, referenced above, can be found here:  
<http://www.mwra.com/monthly/bod/boardmaterials/2020/o-2020-01-15.pdf>

---

\* Committee recommendation approved by the Board on January 15, 2020

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** FY20 Second Quarter Orange Notebook



---

**COMMITTEE:** Administration, Finance & Audit

INFORMATION  
 VOTE

Carolyn M. Fiore, Deputy Chief Operating Officer  
Stephen Estes-Smargiassi, Director, Planning & Sustainability  
Preparer/Title



---

David W. Coppes, P.E.  
Chief Operating Officer

---

### RECOMMENDATION:

For information only. The Quarterly Report on Key Indicators of MWRA Performance (the Orange Notebook) is prepared at the close of each quarter of the fiscal year.

### DISCUSSION:

The Orange Notebook presents performance indicators for operational, financial, workforce, and customer service parameters tracked by MWRA management each month. Noteworthy outcomes for the second quarter are highlighted below.

#### Disinfection Byproducts Levels

Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s) are by-products of disinfection treatment with chlorine. These disinfection byproducts (DBPs) are of concern due to their potential adverse health effects at high levels. EPA has established regulatory limits for each based on locational running annual averages, calculated quarterly at each individual sampling location.

Results for the MetroWest and metropolitan Boston system served by the Carroll Water Treatment Plant with ozone and UV as primary disinfection and chloramine as the residual disinfectant continue to be well below the applicable standards. The highest values are typically no higher than 20 to 30 percent of the standards. (See page 25, upper two charts.)

As discussed last quarter, recent results in the Chicopee Valley Aqueduct system, treated with UV and free chlorine, have been elevated above typical levels due to changes in Quabbin water quality as the reservoir refilled after the drought. Levels in the fourth quarter sampling were substantially lower than those in the third quarter, as the level of UV254 (a measure of the reactive natural organic matter in the water) returned to more normal levels and the algae bloom ceased. (See page 20 for the UV data, and page 25 for the DBP data.). However, as the standard is based on averaging four quarters of data at each location, the locational running annual average values will take several quarters to return to typical levels. The highest value in Chicopee was right at, but did not exceed, the standard; levels

in South Hadley and Wilbraham were lower. MWRA staff again assisted Chicopee staff in evaluating and reporting required information to the DEP, and have been in regular communication about balancing MWRA and community disinfection rates and DBP levels. Data on DBP levels at MWRA's process monitoring location and reservoir water quality data in early 2020 are at levels that are more typical for this time of year.

### Clinton Wastewater Treatment Plant

During the prior two quarters, staff reported that the plant was exceeding its NPDES permit-required 12-month rolling average flow limit. With conditions continuing to be dryer than they had been a year earlier, the annual average flow has continued to decrease. Plant flows were below the permit limit each month this quarter, and maintained a downward trend. Phosphorus levels in plant effluent were below permit limits each month. (See page 28.)

### Maintenance Kitting

Kitting is the practice of listing and staging all the materials necessary for a particular work order in advance. This decreases the time needed to actually get to a job site and get work underway. In an effort to improve efficiency, staff have carefully evaluated groups of work orders with the field supervisors and identified additional parts and materials typically used in completing those work orders. For example, the specific lubricants and cleaning material needed for particular assignments are now listed on the work orders, including the precise stock numbers, saving a step for the maintenance employee and allowing for increased "wrench time".

The FY20 goal was to achieve at least 30 percent of work orders with preassembled kits; in November and December staff achieved around 60 percent. Staff will continue to review progress on this metric, and will evaluate the goal for FY21. (See page 9.)

### Workplace Safety

The Recordable Injury and Illness Rate and the Lost Time Injury and Illness Rate continue to trend higher due to strictly adhering to Federal OSHA recordkeeping regulations, as shown on the chart on Page 43. As referenced in the 3<sup>rd</sup> Quarter FY19 staff summary, these charts are beginning to stabilize as new data replaces the older data. Additional information on Workplace Safety and OSHA recordkeeping will be presented at the Board Meeting. (See Page 43)

MASSACHUSETTS WATER RESOURCES AUTHORITY

# Board of Directors Report

on

## Key Indicators of MWRA Performance

for

Second Quarter FY2020

Q1	Q2	Q3	Q4



Frederick A. Laskey, Executive Director  
David Coppes, Chief Operating Officer  
February 19, 2020

# Board of Directors Report on Key Indicators of MWRA Performance

## 2nd Quarter FY20

### Table of Contents

#### Operations and Maintenance

DITP Operations-	1
Total Power Use/Self-Generation	
Plant Flow & Precipitation	
Total Cost of Electricity/Pricing	
DITP Operations-	2
DI Sodium Hypochlorite Use	
Disinfection Dosage	
Secondary Blending Events	
DI Operations & Maintenance Report	3
Residuals Processing	4
Sludge Detention Time in Digesters &	
Total Solids Destruction	
Digester Gas Production & % Utilized	
Sludge Pumped from Deer Island	
Monthly Average % Capture of Processed Sludge	
Molybdenum in Sludge Fertilizer Pellets	
DITP Maintenance	5
Operations Division–Metering & Leak Detection	6
Water Distribution System–Valves	7
Wastewater Pipeline/Structures	8
FOD Metro Facility & Equipment Maintenance	9
Renewable Electricity Generation-1	10
Renewable Electricity Generation-2	11
Toxic Reduction and Control	12
Field Operations– Narrative Topics	13
Laboratory Services	15

#### Construction Programs

Projects in Construction	16
CSO Control Update	18
CIP Expenditures	19

#### Drinking Water Quality and Supply

Source Water – Microbial Results	20
Source Water – Turbidity, pH and Alkalinity	21
Treated Water – Disinfection Effectiveness	22
Source Water – Algae, Complaints	23
Bacteria and Chlorine Residual Results	24
Disinfection By-Products, UV 254	25
Water Supply/Source Water Management	26

#### Wastewater Quality

NPDES Permit Compliance	
-Deer Island TP	27
-Clinton TP	28

#### Community Flows and Programs

Total Water Use Core Communities	29
Community Wastewater Flows	30
Community Support Programs	
-Infiltration/Inflow Local Financial Assist. Progr.	31
-Water-Local Pipeline & System Assist. Progr.	32
-Lead Service Line Replacement Loan Progr.	33
-Community Water System Leak Detection and Conservation Outreach	34

#### Business Services

Procurement	35
Materials Management	36
MIS Program	37
Legal Matters	38
Internal and Contract Audits	41

#### Other Management

Workforce Management	42
Workplace Safety Program	43
Job Group Representation	44
MBE/WBE Expenditures	45
CEB Expenses	46
Cost of Debt	47
Investment Income	48

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

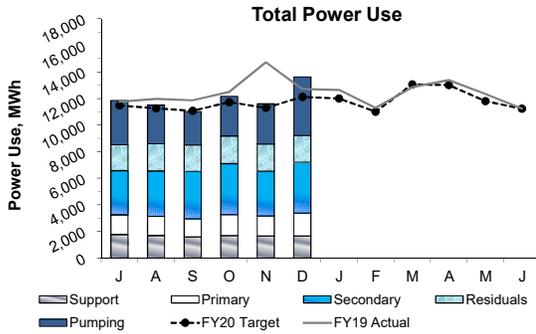
Frederick A. Laskey, Executive Director  
David Coppes, Chief Operating Officer  
February 19, 2020

# OPERATIONS AND MAINTENANCE

# Deer Island Operations

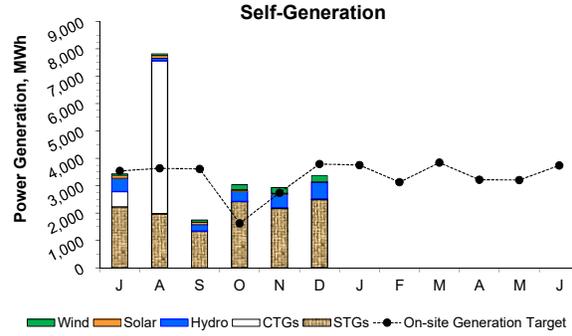
2nd Quarter - FY20

Page 1 of 4

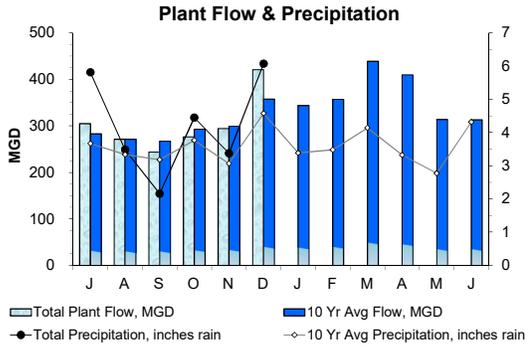


Total power usage in the 2nd Quarter was 6.4% above target as the Total Plant Flow was 15.7% above target with the 4 year average plant flow. As expected, power usage for raw wastewater pumping was above target by 13.6% due to the higher plant flow. Power usage for secondary treatment processes was 9.5% above target as a result of higher plant flow and also as both cold box systems were operated simultaneously for a portion of December to replenish the liquid oxygen consumed due to an equipment problem early in the month.

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

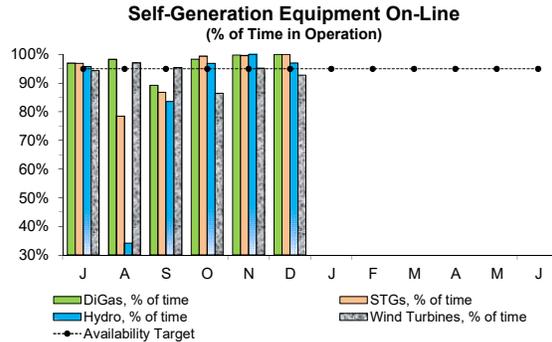


Power generated on-site during the 2nd Quarter was 14.4% above target. The CTGs were only operated for an ISO New England demand response winter audit test on December 4 and briefly throughout the quarter for maintenance/checkout purposes. As a result, CTG generation fell below target by 93.0% as CTG operation during storm events was not needed but was included in the budget projections. Power generation by the STGs was 31.6% above target as the target estimate included a Thermal Power Plant shutdown for maintenance which was completed earlier than expected during the 1st Quarter. Hydro Turbine generation was 28.5% above target as the repaired Hydro Turbine #1 was placed back in operation in October. Generation from the Solar Panels was 14.4% below target, while Wind Turbine generation was 9.1% above target.

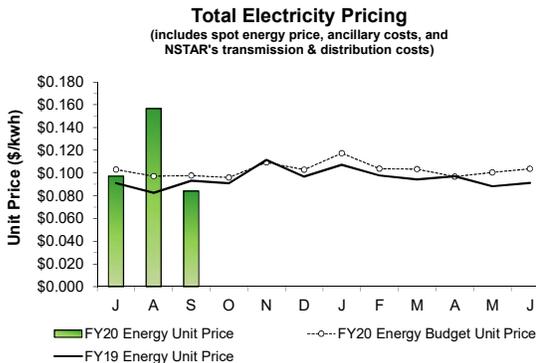


Total Plant Flow for the 2nd Quarter was 4.5% above target with the budgeted 10 year average plant flow (330.4 MGD actual vs. 316.3 MGD expected) as precipitation was 21.8% above target (13.89 inches actual vs. 11.40 inches expected). Total Plant Flow was 15.7% higher than the 4 year average plant flow 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.

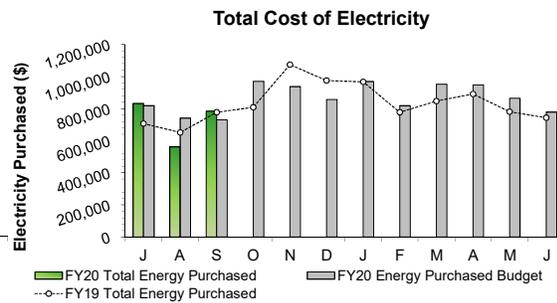


The DiGas system, STGs, and the Hydro Turbines met or exceeded the 95% availability target for the 2nd Quarter. The Wind Turbines fell below the 95% availability target following an issue with a control valve on the hydraulic pitch system on Turbine #2 in October and a low hydraulic lube oil issue that prevented Turbine #1 from operating for three (3) days in December.



Under the current energy supply contract, a block portion of DI's energy is a fixed rate and the variable load above the block is purchased in real time. The actual Total Energy Unit Price in September (the most current invoice available) was 13.9% below target with budgetary estimates. The actual total energy unit prices in October, November, and December are not yet available as the complete invoices have not been received. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

Note: Only the actual energy prices are reported. Therefore, the dataset lags by three (3) months due to the timing of invoice receipt and review.



The Electricity cost data for Electricity Purchased in October, November, and December are not yet available. Year-to-date Total Cost of Electricity is \$109,982 (4.8%) lower than budgeted through September. While the Total Energy Unit Price was 13.4% higher than target, the Total Electricity Purchased was 6.8% lower than target due to the 19 day utility power cable outage in August to allow the utility to complete the final installation work for the new cross-harbor electrical cable.

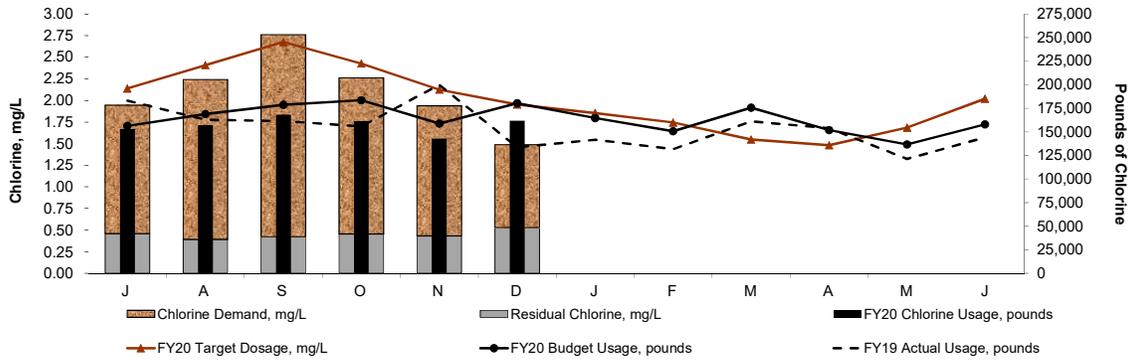
Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by three (3) months due to the timing of invoice receipt and review.

# Deer Island Operations

2nd Quarter - FY20

Page 2 of 4

## Deer Island Sodium Hypochlorite Use



The disinfection dosing rate in the 2nd Quarter was 13.0% below target with budgetary estimates. Actual sodium hypochlorite usage in pounds of chlorine was also 10.8% 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 0.47 mg/L this quarter with an average dosing rate of 1.90 mg/L (as chlorine demand was 1.42 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	3	3	0	99.0%	11.13
N	1	1	0	99.6%	4.81
D	2	2	0	99.4%	17.99
J					
F					
M					
A					
M					
J					
<b>Total</b>	<b>13</b>	<b>13</b>	<b>0</b>	<b>99.4%</b>	<b>54.28</b>

99.3% of all flows were treated at full secondary during the 2nd Quarter. There were six (6) secondary blending events due to high plant flow resulting from heavy rain and snow melt. These blending events resulted in a total of 33.93 hours of blending and 203.98 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 2nd Quarter.

## Deer Island Operations & Maintenance Report

### Environmental/Pumping:

The plant achieved an instantaneous peak flow rate of 1,050.7 MGD mid-day on December 14. This peak flow occurred during a storm event that brought 1.35 inches of precipitation to the metropolitan Boston area. Plant flow was impacted by both rainfall from the storm event and by snow melt. Overall, Total Plant Flow in the 2nd Quarter was 4.5% above target with the 10 year average plant flow estimate for the quarter.

The lower motor bearings for North Main Pump Station (NMPS) raw wastewater pump #1 was replaced by a contractor in October. The pump was not available for operation from October 28 to November 1 to allow for the bearings replacement work. The contractor worked 12 hours a days to complete this task which had been anticipated to take 10 days to complete but was accomplished in less than five (5) days. The pump was immediately test operated on November 1 and remained in operation for the next seven (7) days without issue. This work did not impact pumping capacity as seven (7) pumps are required to maintain maximum pumping capacity at the NMPS and nine (9) pumps were available during this period.

Raw wastewater pump #9 at the NMPS was taken out of service on December 12 to allow a contractor to refurbish the pump and to recoat the pump's volute. The goal of this pump refurbishment is to return the pump to like-new condition and in so doing; increase energy efficiency, reliability, and extend the pump's useful life. The Eversource approved energy-efficiency incentive for this project is \$58,955 and is based on energy savings from the current state of the pump to the proposed increase in efficiency once the pump is refurbished. The pump refurbishment work was completed in December and the pump was returned to service in January under the direction of the manufacturer's representative.

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 NMPS. The upgrade for WTF Pump #5 began on June 10, 2019 and was completed by August 21. Performance testing of the upgraded Pump #5 and necessary tuning adjustments to the pump system continued through the remainder of December. Final acceptance is pending resolution of an ongoing vibration issue. To date, work has been completed on three (3) of the six (6) pumps (#6, #2, and #5), with Pump #5 pending final acceptance.

# Deer Island Operations

2nd Quarter - FY20

Page 3 of 4

## Deer Island Operations & Maintenance Report (continued)

### Environmental/Pumping (continued):

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 six (6) shutdowns of the remote headworks facilities in October and November to allow the contractor to perform inspections of Shaft C on Deer Island and the effluent channels at the Ward Street Headworks and the Columbus Park Headworks Facilities as part of this Remote Headworks and Deer Island Shafts Study project. The Columbus Park and Ward Street Headworks Facilities were isolated on six (6) separate occasions for approximately four (4) to (6) hours during each shutdown with each facility isolation starting at 1:00AM when the diurnal flows are at the lowest levels.

### Secondary Treatment:

Annual turnaround maintenance was performed on Train #1 in the Cryogenic Oxygen Facility during the last two (2) weeks of October. This turnaround maintenance is performed on roughly half of the components and systems in the Cryogenic Oxygen Facility. During this turnaround maintenance, the contractor calibrated all the instrumentation on Cold Box unit #1 as well as, a number of other components of the oxygen plant. The same turnaround maintenance was completed on Train #2 in the spring (April).

### Residuals Treatment:

The rehabilitation of Gravity Thickener #2 under the major Gravity Thickener Rehabilitation project was completed in October and Gravity Thickener #4 was turned over to the contractor to begin work on October 15 and is expected to be completed by February 2020. DITP has six (6) gravity thickeners used to concentrate sludge that is generated from the primary treatment process, and scum that is generated from all treatment processes. The sludge and scum thickening equipment and five (5) of the six (6) Fiberglass-Reinforced Plastic (FRP) domed covers have reached the end of their useful lives and are in need of replacement. This rehabilitation project will upgrade all six (6) gravity thickeners including complete replacement of each tank's sludge and scum thickening equipment as well as replacement of five (5) of the six (6) FRP dome covers (the FRP domed cover for Gravity Thickener #2 has already been replaced). Additionally, critical components which were previously fabricated from carbon steel, including the center columns and center cages, will now be fabricated from type 316 stainless steel in order to provide superior protection against hydrogen sulfide gas which is present in high concentrations in this highly corrosive environment. The entire rehabilitation project is anticipated to take nearly three (3) years to complete. The rehabilitation of Gravity Thickeners #1 and #2 has been completed.

### Odor Control:

Activated carbon in carbon adsorber (CAD) unit #4 and unit #5 in the East Odor Control (EOC) Facility was changed out in December as part of routine practice to replace spent carbon. Additionally, the activated carbon was removed from EOC CAD unit #3 and West Odor Control (WOC) Facility CAD unit #6 to allow for scheduled contractor work in the coming months to recoat the internal surface of these CAD units.

The Gravity Thickener (GT) airflow treatment portion of the Residuals Odor Control (ROC) Facility was taken offline on two (2) separate days for approximately four (4) to six (6) hours on December 17 and December 19 to allow a contractor to replace the dampers in the facility that serves Gravity Thickeners #4 and #6. These odor control dampers are being replaced as part of the Gravity Thickener Rehabilitation project. The dampers serving Gravity Thickeners #1, #2, #3, and #5 were replaced earlier in March and April 2019. Therefore, all six (6) gravity thickener dampers have now been replaced. Process air was contained within the building during both shutdowns and there were no resident odor complaints received as a result of these shutdowns.

### Energy and Thermal Power Plant:

Overall, total power generated on-site accounted for 25.0% of Deer Island's total power use during Quarter 2. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 24.8% of Deer Island's total electrical power use for the quarter.

Following annual maintenance in September, staff conducted combustion tuning on Deer Island's two (2) boilers in October. This tuning ensures that the boilers operate safely and efficiently while meeting all regulatory requirements. The tuning requires the boilers to be operated in several different modes (fuel oil combustion, digester gas combustion, and dual-fuel combustion). There were no impacts on the treatment plant's operation as one (1) boiler remained in operation at all times throughout the week of testing.

DITP experienced a boiler trip during the early morning of November 15 which was later determined to have been caused by a controller issue on the main steam turbine generator (STG). The boiler was reignited using fuel oil within 35 minutes after staff completed a checkout of the boiler and it was placed back on digester gas as the fuel source within 50 minutes of the boiler trip. Therefore, there was no significant heat loss to the heating loop. However, the main STG remained out of service until the afternoon of November 18 while staff and the service contractor continued with troubleshooting and the eventual replacement of the faulty controller unit with an older but properly functional unit. The back pressure steam turbine generator (BP-STG) was operated at maximum generation output (1.2 MW) during this time to minimize the impact to electricity generation.

DITP took delivery of 420,000 gallons of #2 fuel oil, a total of 42 oil tanker trucks, without incident from December 2 through December 11. 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.

CTG-2B was operated for approximately two (2) hours on December 4 for an ISO-New England declared Demand Response winter audit event.

### Clinton Treatment Plant Operations

**Dewatering Building:** Maintenance replaced bent skimmer arm on #2 gravity thickener. Staff washed down Gravity thickener #1.

**Chemical Building:** Maintenance staff continued to work on replacing #3 RAS pump. Operations staff cleaned soda ash mixing tank and removed approximately one yard of inorganic material or (old soda ash). Staff performed PM on Milton Roy, bisulfite, hypochlorite, and ferric chemical metering pumps. Staff also replaced the actuator on the # 2 final clarifier influent 24 inch valve.

**Aeration Basins:** Staff also cleaned pH and DO probes

**Phosphorus Building:** Staff acid washed all three disk filters and also cleaned troughs and inspected all nozzles. Maintenance staff and FOD vactor truck vactored out two man holes. Also DOC contractor installed four shut off breakers for Hach instruments in building.

**Headworks:** Maintenance installed a shear pin in bucket elevator.

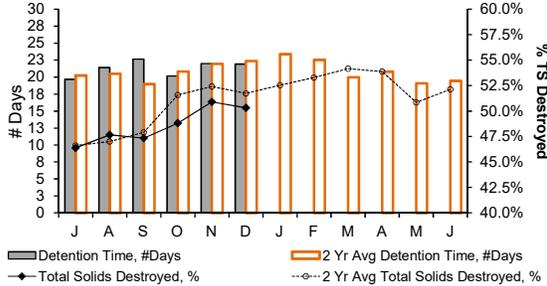
**Digester Building:** Contractor replaced two circulator pumps that were seized in the digester boiler room. Maintenance staff rebuilt two gas traps on digester gas line in lower digester building.

# Deer Island Operations and Residuals

2nd Quarter - FY20

Page 4 of 4

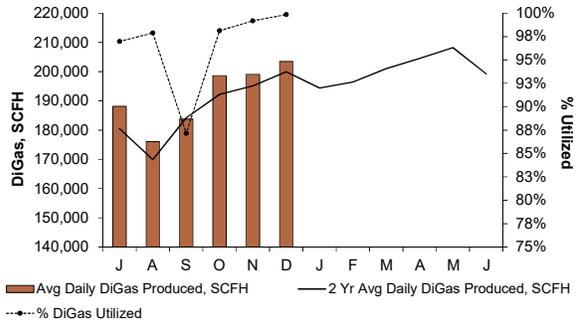
### Sludge Detention Time in Digesters and Total Solids Destruction



Total solids (TS) destruction following anaerobic sludge digestion averaged 50.0% during the 2nd Quarter, 3.4% below target with the 3 year average of 51.9%. Sludge detention time in the digesters was 1.6% lower than target at 21.7 days as DI operated with an average of 8.0 digesters. The lower solids destruction and detention time is attributed to a 7.3% higher-than-expected total sludge production.

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

### Digester Gas Production and % Utilized

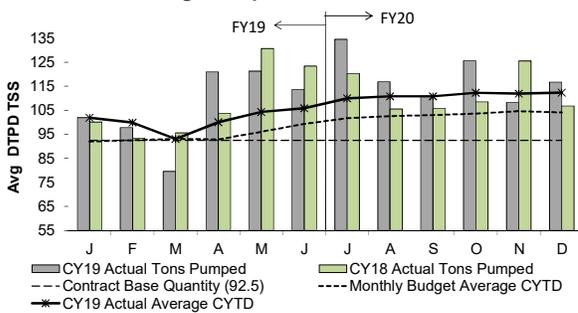


The Avg Daily DiGas Production in the 2nd Quarter was 2.4% above target with the 2 Year Avg Daily DiGas Production. On average, 99.1% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant (TPP).

## Residuals Pellet Plant

New England Fertilizer Company (NEFCO) operates the MWRA Biosolids Processing Facility (BPF) in Quincy under contract. MWRA pays a fixed monthly amount for the calendar year to process up to 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).

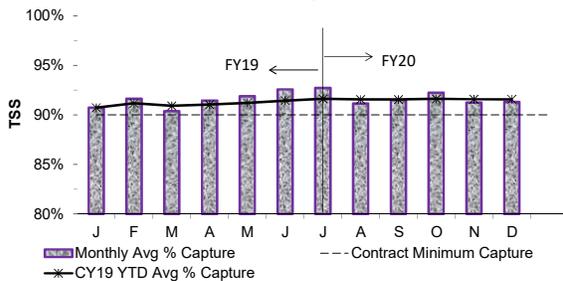
### Sludge Pumped From Deer Island



The average quantity of sludge pumped to the Biosolids Processing Facility (BPF) in the 2nd Quarter was 116.8 TSS Dry Tons Per Day (DTPD) - 8.9% above target with the FY20 budget of 107.3 TSS DTPD for the same period. Sludge delivered to the BPF was higher than expected during the quarter mainly due to higher-than-expected primary and secondary sludge production, in addition to inventory shifts in the digested sludge holding tanks on DITP.

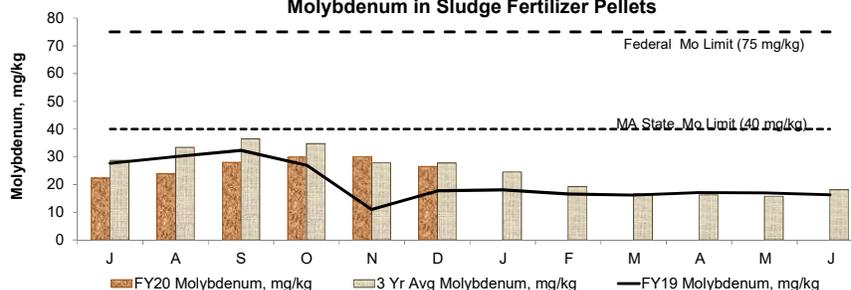
The CY19 average quantity of sludge pumped is 112.3 DTPD - 7.9% above target with the CY19 average budget of 104.1 DTPD for the same time period.

### 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 2nd Quarter was 91.6% and the CY19 average capture was also 91.6%.

### 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 2nd Quarter averaged 28.8 mg/kg, 4% below the 3 year average, 28% below the MA State Limit, and 62% below the Federal Limit.

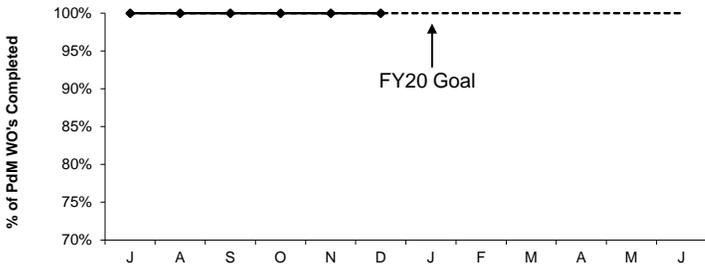
# Deer Island Maintenance

2nd Quarter - FY20

## Productivity Initiatives

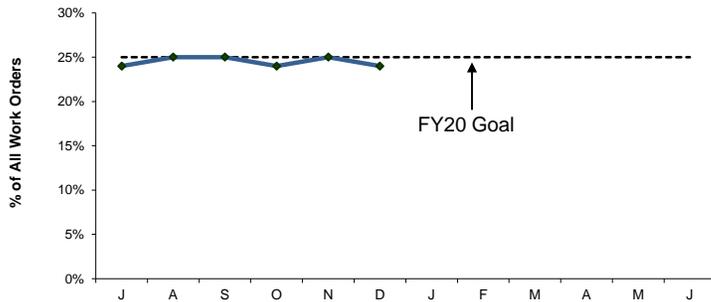
Productivity initiatives include increasing predictive maintenance compliance and increasing PdM work orders. Accomplishing these initiatives should result in a decrease in overall maintenance backlog.

### Predictive Maintenance Compliance



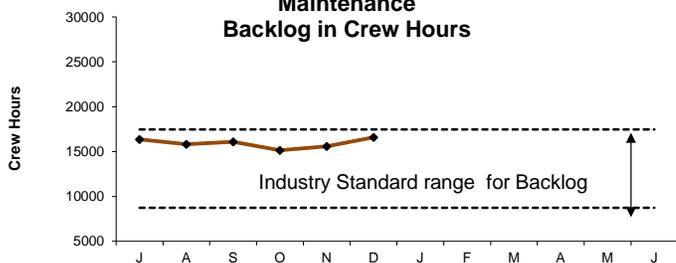
Deer Island's FY20 predictive maintenance goal is 100%. DITP completed 100% of all PdM work orders this quarter. DITP is continuing with an aggressive predictive maintenance program.

### Predictive Maintenance



Deer Island's increased FY20 predictive maintenance goal is 25% of all work orders to be predictive. 24% 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.

### Maintenance Backlog in Crew Hours

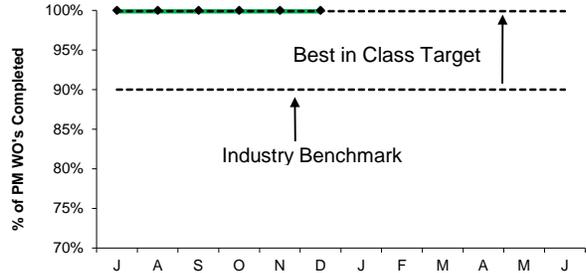


DITP's maintenance backlog at Deer Island is 16,581 hours this quarter. DITP is at the upper end of the industry average for backlog. The industry Standard for maintenance backlog with 97 staff (currently planned staffing levels) is between 8,730 hours and 17,460 hours. Backlog is affected by the following vacancies; (3) Electricians and (1) Instrument Technician. Management continues to monitor backlog and to ensure all critical systems and equipment are available.

## Proactive Initiatives

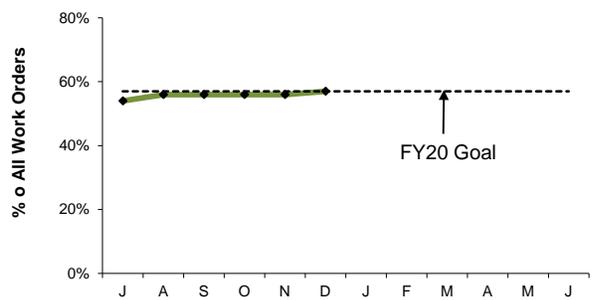
Proactive initiatives include completing 100% of all preventative maintenance tasks and increasing preventative maintenance kitting. These tasks should result in lower maintenance costs.

### Preventative Maintenance Compliance



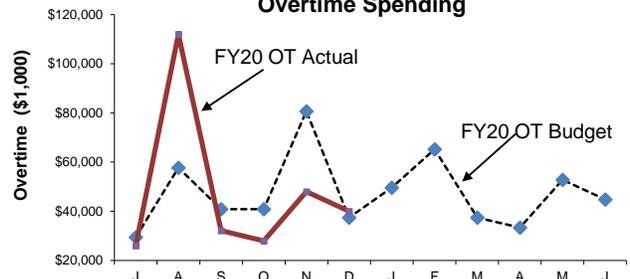
Deer Island's FY20 preventative maintenance goal is 100% completion of all work orders from Operations and Maintenance. DITP completed 100% of all PM work orders this quarter.

### Maintenance Kitting



Deer Island's increased FY20 maintenance kitting goal is 57% of all work orders to be kitted. 56% 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.

### Overtime Spending



Maintenance overtime was under budget by \$44k this quarter and is \$25k under for the FY20. 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, South Main Pump Station Elevated Flow, North Main Pump Station #1 Motor Installation, Thermal Power Plant Steam Turbine Startup Support, Cryo Mole Sieve #2 Heater Coil Replacement and Fabrication of Disinfection Actuator Bases.



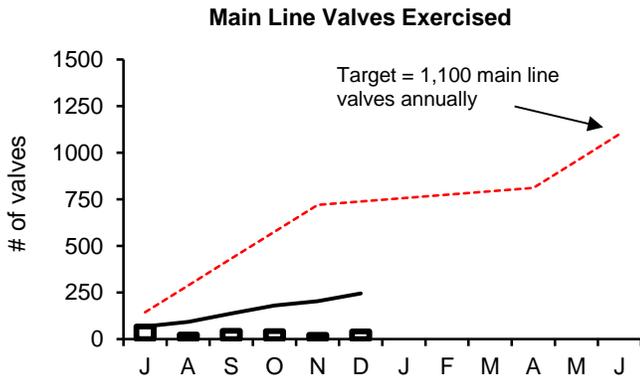
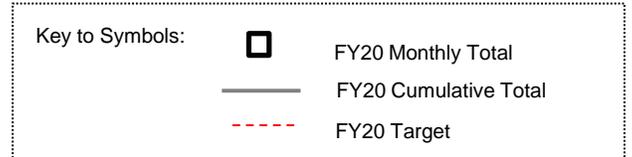
# Water Distribution System Valves

2nd Quarter - FY20

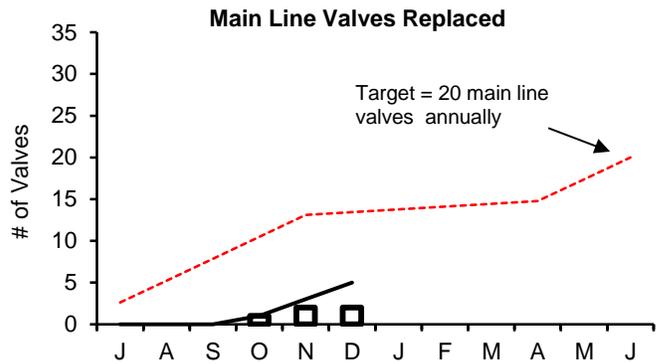
## Background

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.

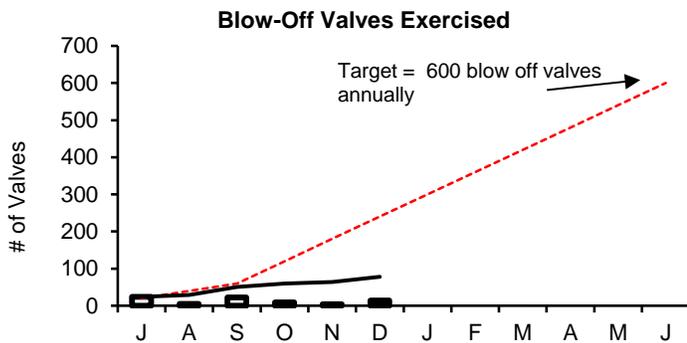
Type of Valve	Inventory #	Operable Percentage	
		FY20 to Date	FY20 Targets
Main Line Valves	2,159	96.7%	95%
Blow-Off Valves	1,317	98.6%	95%
Air Release Valves	1,380	95.1%	95%
Control Valves	49	100.0%	95%



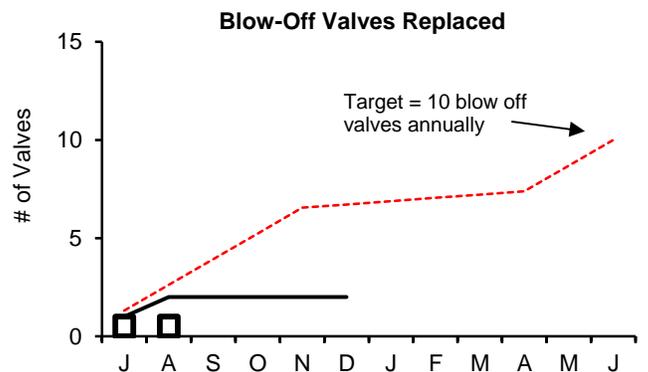
During the 2nd Quarter of FY20, 108 main line valves were exercised. Below target due to staffing shortage and high priority CIP projects; Section 110 and WASM 1. The total exercised for the fiscal year to date is 245.



During the 2nd Quarter of FY20, there were five main line valves replaced. Below target due to isolation and permit issues. The total replaced for the fiscal year to date is five.



During the 2nd Quarter of FY20, 27 blow off valves were exercised. Below target due to staffing shortage and high priority CIP projects; Section 110 and WASM 1. The total exercised for the fiscal year to date is 78.

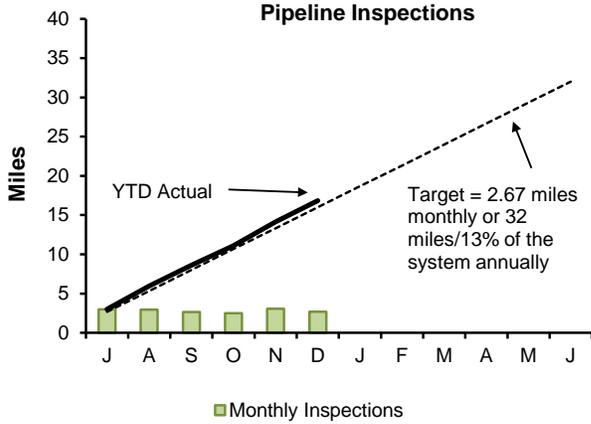


During the 2nd Quarter of FY20, there were no blow off valves replaced. Below target due to isolation and permit issues. The total replaced for the fiscal year to date is two.

# Wastewater Pipeline and Structure Inspections and Maintenance

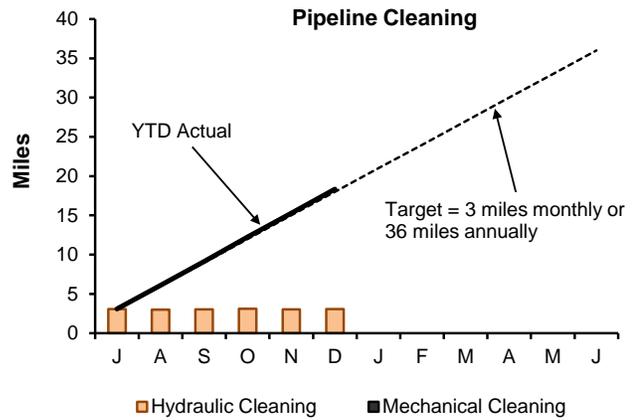
2nd Quarter - FY 20

## Inspections



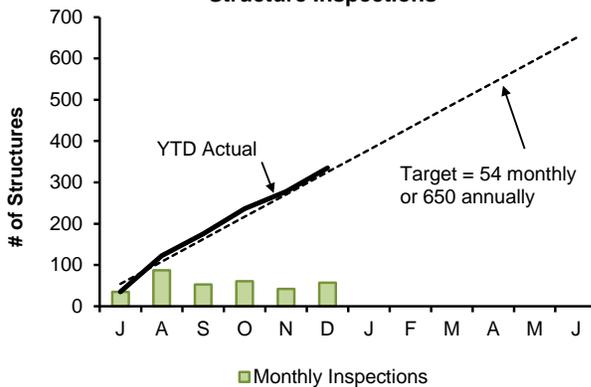
Staff internally inspected 8.23 miles of MWRA sewer pipeline during this quarter. The year to date total is 16.84 miles. No Community Assistance was provided quarter.

## Maintenance



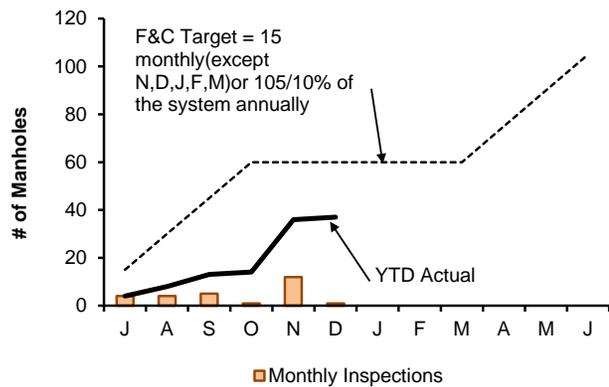
Staff cleaned 9.21 miles of MWRA's sewer system and removed 31 yards of grit and debris during this quarter. The year to date total is 18.34 miles. No Community Assistance was provided this quarter.

## Structure Inspections



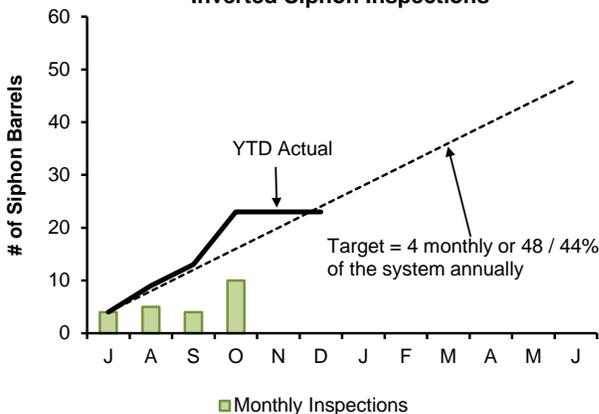
Staff inspected the 36 CSO structures and performed 124 additional manhole/structure inspections during this quarter. The year to date total is 335 inspections.

## Manhole Rehabilitation



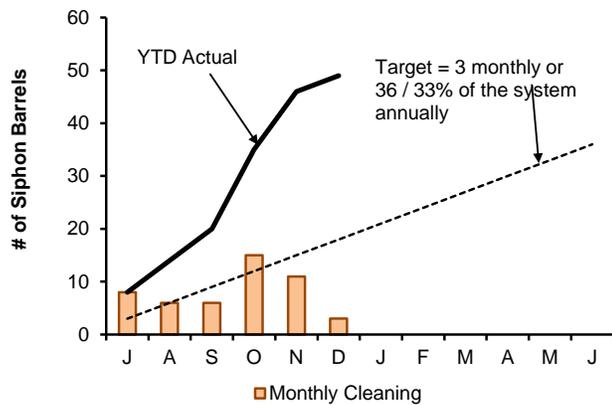
Staff replaced 14 frames & covers during this quarter. The year to date total is 37. Staff have been working the DITP Shaft Project shutdowns.

## Inverted Siphon Inspections



Staff inspected 10 siphon barrels this quarter. Year to date total is 23 inspections.

## Inverted Siphon Cleaning

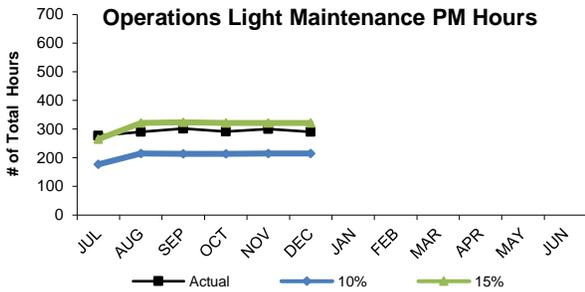


Staff cleaned 29 siphon barrels during this quarter. Year to date total is 49.

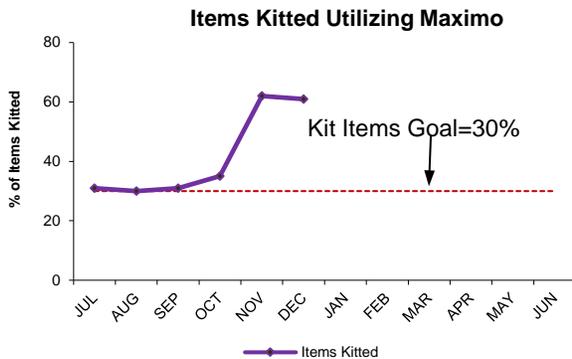
# Field Operations' Metropolitan Equipment & Facility Maintenance

2nd Quarter - FY20

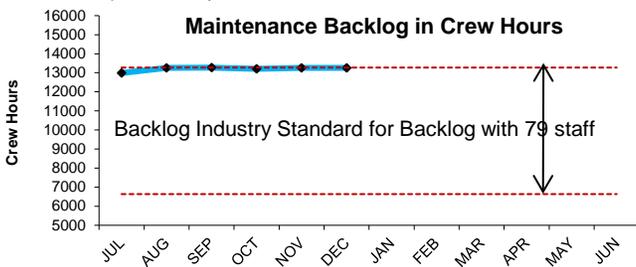
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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



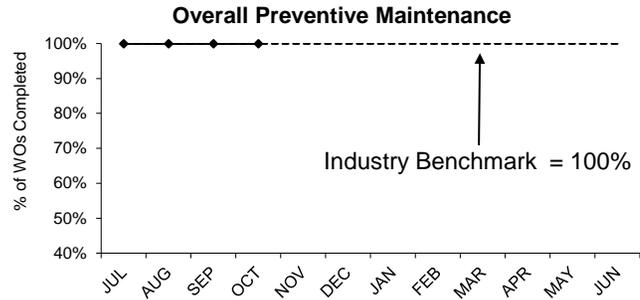
Operations staff averaged 294 hours of preventive maintenance during the 2nd Quarter, an average of 14% of the total PM hours for the 2nd Quarter, which is within the industry benchmark of 10% to 15%.



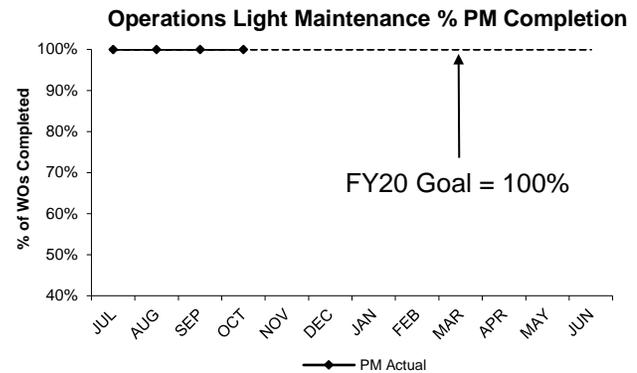
Operation's FY20 maintenance kitting goal has been set at 30% of all work orders to be kitted. Kitting is the staging of parts or material necessary to complete maintenance work. In the 2nd Quarter, 53% of all applicable work orders were kitted. This resulted in more wrench time and increased productivity.



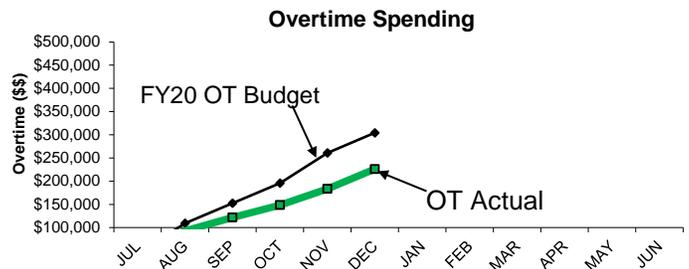
The 2nd Quarter backlog average is 13241 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6636 to 13275 hours.



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 2nd Quarter.



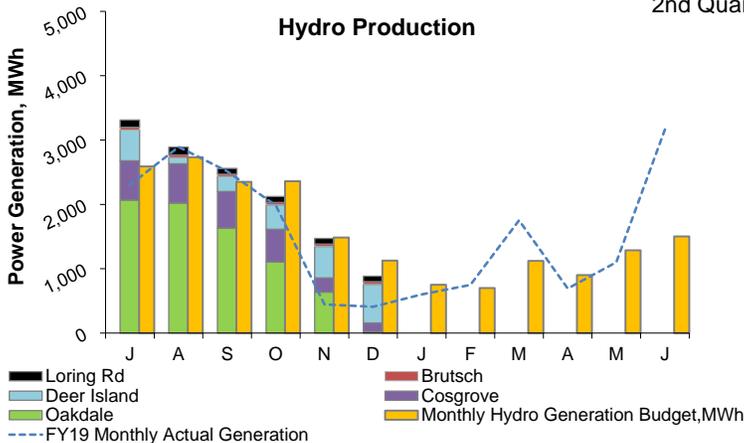
Wastewater Operators complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY20 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 100% of PM work orders in the 2nd Quarter.



Maintenance overtime was \$47k under budget for the 2nd Quarter. Overtime was used for critical maintenance repairs and wet weather events. Overtime for FY20 is \$226k which is currently \$78k under budget for the fiscal year.

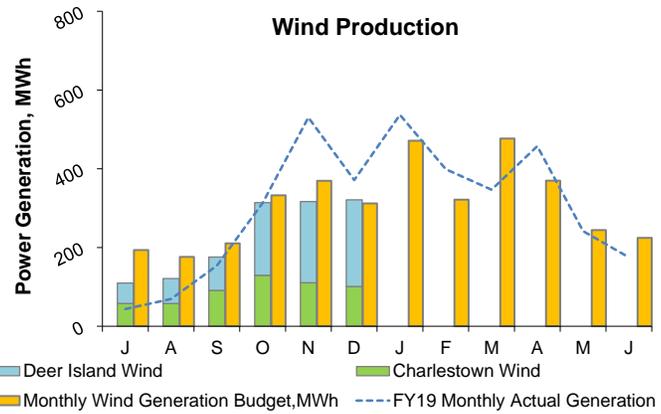
# Renewable Electricity Generation: Savings and Revenue

2nd Quarter - FY20



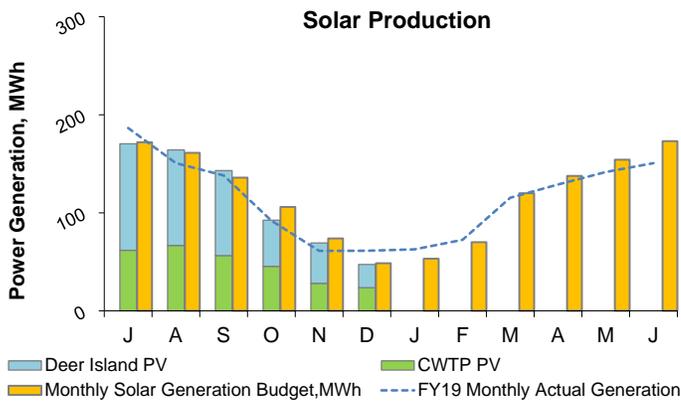
In the 2nd Quarter of FY20, the renewable energy produced from all hydro turbines totaled 4,479 MWh; 10% below budget<sup>3</sup>. Quabbin transfers stopped on 12/2/2019. The total energy produced to-date in FY20 is 13,242 MWh; 5% above budget<sup>3</sup>.

The total savings and revenue<sup>2</sup> to date in FY20 (actuals through September<sup>1</sup>) is \$308,313; 14% above budget<sup>3</sup>. The savings and revenue value does not include RPS REC revenue (see next page).



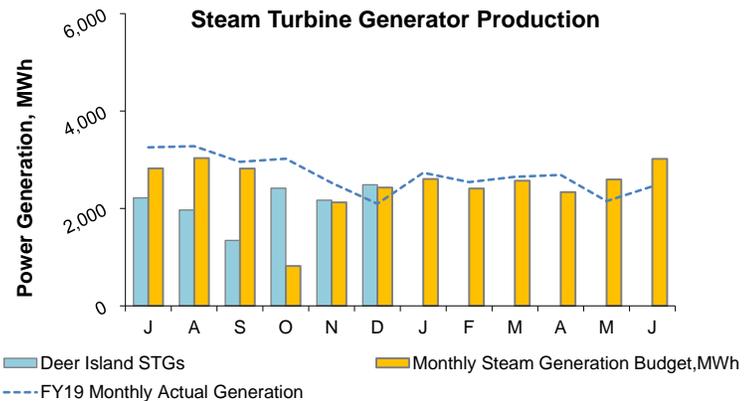
In the 2nd Quarter of FY20, the renewable energy produced from all wind turbines totaled 952 MWh; 6% below budget<sup>3</sup>. The total energy produced to-date in FY20 is 1,358 MWh; 15% above budget<sup>3</sup>.

The total savings and revenue<sup>2</sup> to date in FY20 (actuals through September<sup>1</sup>) is \$68,094; 25% below budget<sup>3</sup>. The savings and revenue value does not include RPS REC revenue (see next page).



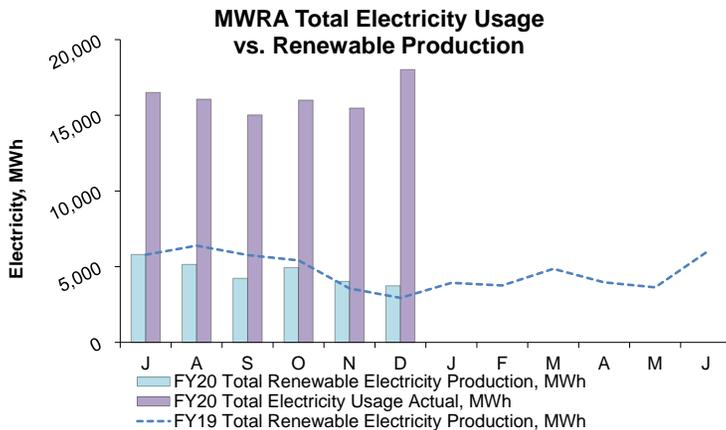
In the 2nd Quarter of FY20, the renewable energy produced from all solar PV systems totaled 209 MWh; 8% below budget<sup>3</sup>. The total energy produced to-date in FY20 is 697 MWh; equal to budget<sup>3</sup>.

The total savings and revenue<sup>2</sup> to date in FY20 (actuals through September<sup>1</sup>) is \$152,894; 151% above budget<sup>3</sup>. The savings and revenue value does not include RPS REC revenue (see next page).



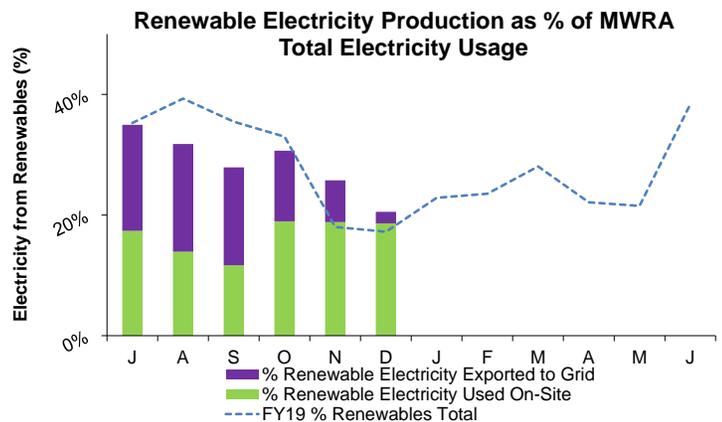
In the 2nd Quarter of FY20, the renewable energy produced from all steam turbine generators totaled 7,072 MWh; 32% above budget<sup>3</sup>. The total energy produced to-date in FY20 is 12,601 MWh; 10% below budget<sup>3</sup>.

The total savings and revenue<sup>2</sup> to date in FY20 (actuals through September<sup>1</sup>) is \$636,796; 26% below budget<sup>3</sup>. The savings and revenue value does not include RPS REC revenue (see next page).



In the first half of FY20, MWRA's electricity generation by renewable resources totaled 27,898 MWh. MWRA's total electricity usage was approximately 97,103 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.

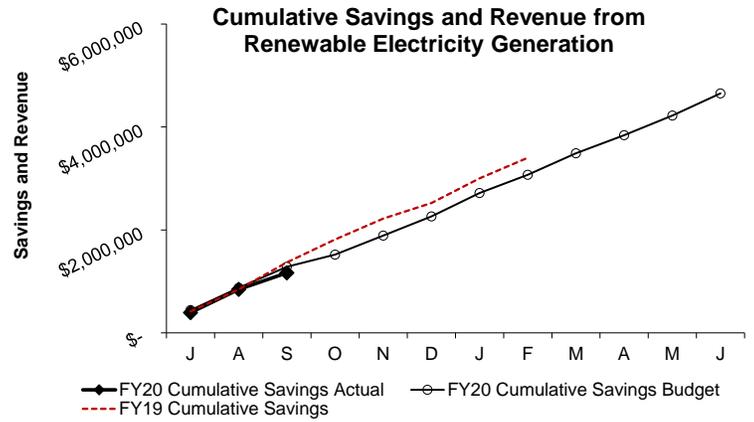
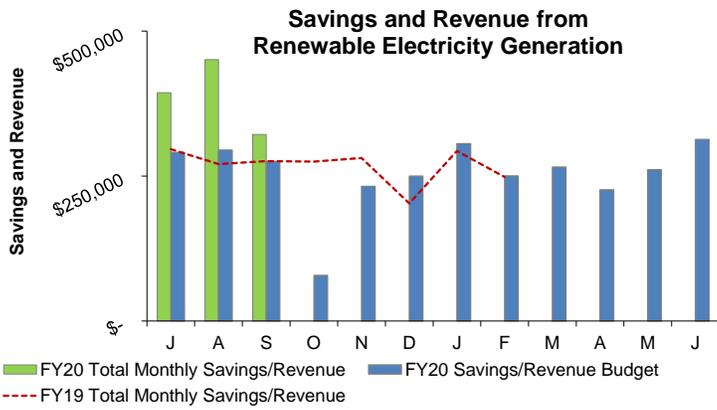
In the first half of FY20, green power generation represented approximately 29% of total electricity usage. All renewable electricity generated on DI is used on-site (this accounts for more than 50% of MWRA renewable generation). Almost all renewable electricity generated off-DI is exported to the grid.



- 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

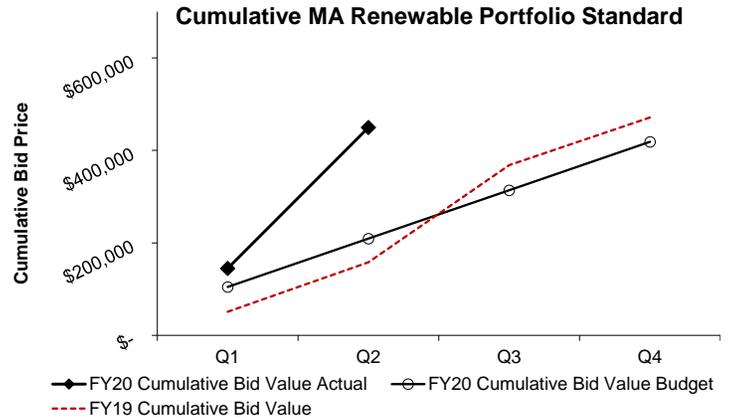
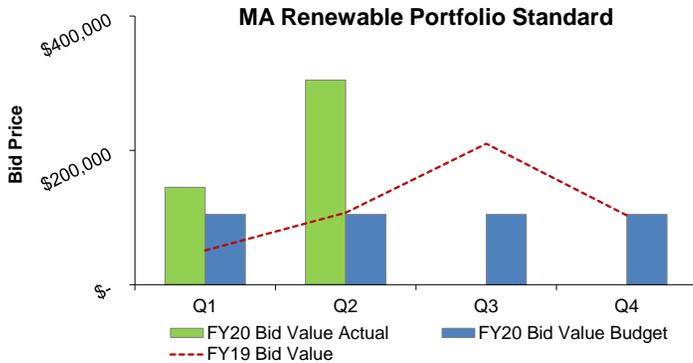
2nd Quarter - FY20



Savings and revenue from MWRA renewable electricity generation in the first 3 months of FY20 (actuals only through September<sup>1</sup>) is \$1,166,098; which is 9% below the budget<sup>3</sup>.

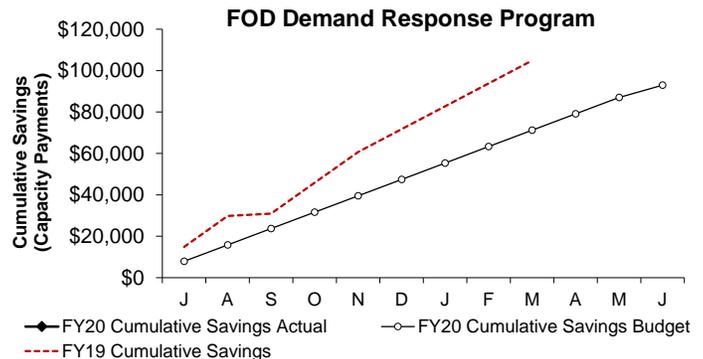
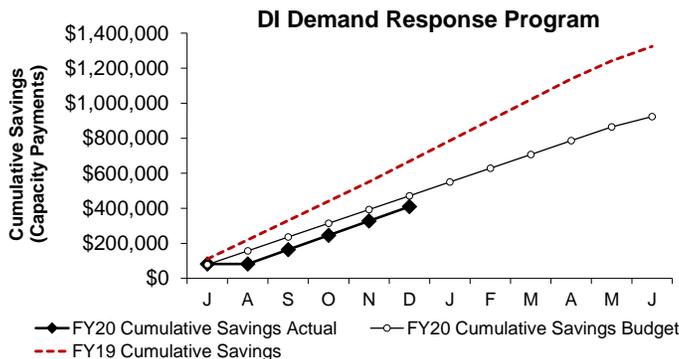
Savings and revenue<sup>2</sup> from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs).

The use of DITP digester gas as a fuel source provides the benefit of both electricity generation from the steam turbine generators, and provides thermal value for heating the plant, equivalent to approximately 5 million gallons of fuel oil per year (not included in charts above).



Bids were awarded during the 2nd Quarter<sup>1</sup> from MWRA's renewable energy assets; 5,590 Q2 CY2019 Class I Renewable Energy Certificates (RECs), 3,689 Q2 CY2019 Class II RECs, and 92 Q2 CY2019 Solar RECs were sold for a total value of \$304,820 RPS revenue; which is 191% above budget<sup>3</sup> for the Quarter. This is mostly due to Class I REC prices being over 200% above the budget for the quarter.

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

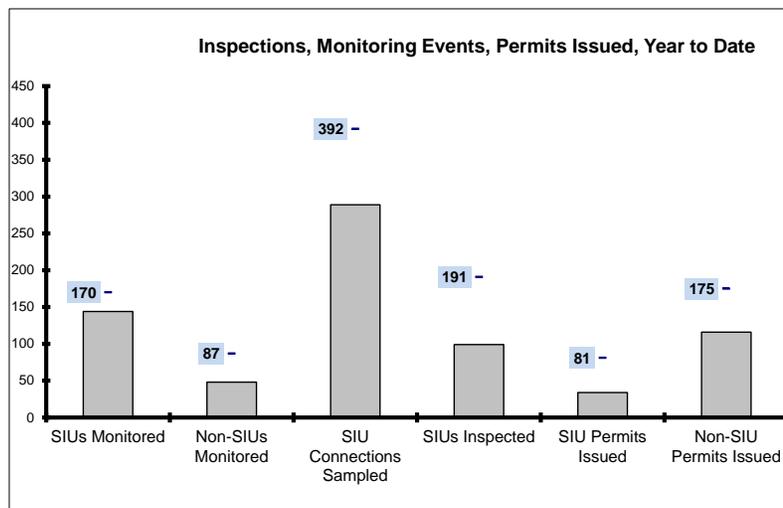


Currently Deer Island, JCWTP, and Loring Rd participate in the ISO-New England Demand Response Programs<sup>4</sup>. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments 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) through December<sup>1</sup> total \$409,931 for DI and payments for FOD have not yet been received for this reporting period<sup>1</sup>.

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

# Toxic Reduction and Control

2nd Quarter - FY20



EPA Required SIU Monitoring Events for FY20: 170  
YTD: **144**

Required Non-SIU Monitoring Events for FY20: 87  
YTD: **48**

SIU Connections to be Sampled For FY20: 392  
YTD: **289**

EPA Required SIU Inspections for FY20: 191  
YTD: **99**

SIU Permits due to Expire In FY20: 81  
YTD: **34**

Non-SIU Permits due to Expire for FY20: 175  
YTD: **116**

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						Permits Issued	
	0 to 120		121 to 180		181 or more		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	6	19	0	1	0	1	6	21
Nov	5	17	0	2	0	0	5	19
Dec	9	12	0	3	0	1	9	16
Jan								
Feb								
Mar								
Apr								
May								
Jun								

% YTD	97%	90%	0%	9%	3%	2%	34	116
-------	-----	-----	----	----	----	----	----	-----

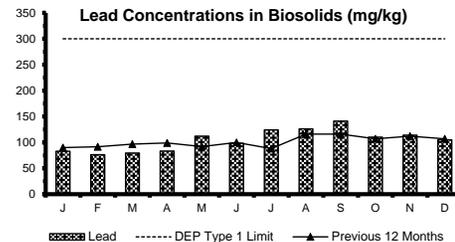
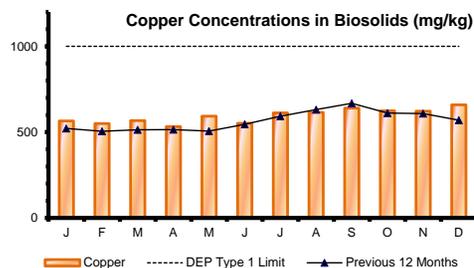
EPA requires MWRA to issue or renew 90% of SIU permits within 120 days of receipt of the application or the permit expiration date - whichever is later. EPA also requires the remaining 10% of SIU permits to be issued within 180 days.

The MWRA fiscal year is at the halfway mark.

In the 2nd quarter of FY20, seventy-six permits were issued, twenty of which were SIUs. All the SIU permits were issued within the 120-day timeframe. There is 97% compliance in the issuing of SIU permits so far.

In this quarter, eight of the non-SIU permits were issued after the 120-day timeframe. Timely availability of much needed data for permit processing coupled with the late payment of the permit fees, led to those eight permits being issued beyond the 120-day timeframe.

For the Clinton Sewer Service area, no SIU permit was issued in this quarter and none so far in the fiscal year.



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.

December 2019 saw a slight rise in copper but overall, copper and lead levels remain relatively constant, below the DEP Type 1 Limit, and within the range of values over the past several years.

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

# Field Operations Highlights

2nd Quarter – FY20

## Western Water Operations and Maintenance

Carroll Water Treatment Plant: Staff supported replacement of one of the emergency generators. Staff completed annual B-side half plant shutdown, maintenance, and cleaning activities. Grounds and facility staff constructed an outdoor stairway to provide winter access to the sampling location for NPDES discharge sampling during half plant operations.

Chicopee Valley Aqueduct: Staff completed the annual Sanitary Survey of the system with the Department of Environmental Protection.

## Metro Water Operations and Maintenance

Lynnfield Pump Station: Staff deployed and set up a Mobile Pump Unit at Lynnfield's Pump Station to support the town's rehabilitation project. The MPU will be the town's standby pump until construction is complete.

Water Pipeline Program: Work was completed on the drainage and road repairs on "10% Road" at the Wachusett Dam, including repairing the existing drains and catch basins, restoring and upgrading the drainage swale, and re-grading the road. Staff installed a 20-inch valve in Newton's main near Commonwealth Ave Pump Station to support ongoing construction. Seven leaks were repaired including the service line feeding Alewife Brook Pumping Station. Leak detection was performed on over 20 miles of MWRA water main and assistance was provided to twelve customer communities.

## Operations Engineering

Staff coordinated several meetings with the SEH communities to create a written water supply contingency plan in the event Section 77 has to be isolated, and trained MWRA staff on the Section 89/110 emergency action plan. Staff continued to participate in the Risk and Resilience Assessments under AWIA. Staff assisted Framingham with their potential *E. coli* event, and reading with their Boil Order.

## Wastewater Operations & Maintenance

Remote Headworks Upgrades: Operations staff attended biweekly construction coordination meetings with Construction & Engineering staff, the contractor and the consultants, as well as internal weekly update meetings. Channels #1 and #2 have been rehabilitated and turned back over to Operations. Channel #3 was turned over to contractor for rehabilitation on 12/3/19. Staff attended internal meetings regarding the channel #1 grit collection chain failure. Towable Generator Docking Stations: Operations staff continue to work with Construction staff, assisting with required utility power outages to install new electrical equipment at New Neponset, Framingham and Caruso Pump Stations.

Remote Headworks & Deer Island Shafts Study: Operations supported this project multiple times during Q2 as flow was stopped at the Ward Street and Columbus Park Headworks for the internal inspection of shaft "C" at Deer Island.

Wastewater OCC Improvements Project: Operations staff met with construction and SCADA staff several times during the second quarter of FY20 to review plans for the new Wastewater OCC console.

- Carbon Replacement at Braintree Weymouth PS and Hough's Neck PS: Operations staff provided operational support for the replacement of the carbon in the odor control system at both facilities on 10/4/19.

- Remote OCC: Operations staff conducted remote operation of the Wastewater OCC from the Carroll Water Treatment Plant on 12/23/19.

## Metering

- Community Outreach: Chelsea will be taking water and wastewater system operations back in-house after years of contracting most operations. In anticipation of this change, Chelsea personnel reached out to MWRA to gain a better understanding of all revenue data collection and calibration efforts. Staff provided calibration data from all Chelsea water and wastewater meters and Chelsea staff observed field calibration activities at wastewater meter CH-8C and water meter 102. We will continue to meet with Chelsea personnel as they gear up to assume control of their water and wastewater operations in July of 2020.

Metering Staff reached out to the following 12 communities to indicate higher than average flows observed in their monthly water meter flow reports; Everett, Lynnfield, Marblehead, Medford, Melrose, Malden, Milton, Nahant (x2), Norwood, Southborough (x2), Swampscott, and Arlington. In several cases the demand increases seemed to be related to a later than average shift from warm to cold weather flows. These flows were back to normal by mid-October, however staff will continue to follow up with these communities.

Staff identified an open division gate in Boston near meter #94. This was causing an increase in demand in the Southern High Zone. Metering worked with BWSC engineers to identify the location of the open gate and their valve was closed on October 15.

Through a collaborative effort with valve operations crew, the fire flow bypass valve for meter #91 in Somerville was placed back into service. The fire flow bypass valve for this meter had been left open since late 2018 in order to ensure fire flow capacity in the Somerville Low service area. Somerville low service flow thus needed to be estimated to account for backflow out of the Somerville system into MWRA's. The bypass valve and venturi meter are back in operation as of December 17, 2019 with no further estimation expected.

Verizon 4G Upgrade: Metering staff had been preparing for Verizon to shut off their 3G data network permanently on January 1, 2020 but Verizon notified the MWRA in September that the shutdown of the 3G network has been delayed to January 1, 2021. In order to maintain communications after the shutoff a total of 182 Telog RU-33 wastewater dataloggers and 316 3G modems (166 at Water meter sites and 150 at W and WW Facilities) required upgrade. Rollout of all modems and RU-35s is anticipated in the first quarter of 2020 well before the Verizon 3G shutoff.

- Prison Point Tide Gate Replacement Project: Operations staff continue to work with engineering staff on the replacement of the Prison Point tide gate.

# Field Operations Highlights

2nd Quarter – FY20

	4G Modems, Water Meters	4G Modems, at Facilities	Telog RU-35s, at WW Meters
Installed as of 9/30/19	162	20	56
Installed in Q2 FY20	4	36	59
<b>Total Installed</b>	<b>166</b>	<b>56</b>	<b>115</b>
<b>Remaining</b>	<b>0</b>	<b>94</b>	<b>67</b>

Staff provided water quality updates, reviewed Wachusett Reservoir buoy data, and monitored water quality complaints.

Regulatory and Non-Regulatory Sampling Programs: Staff provided assistance to various communities:

- Newton: a water quality evaluation of their Newton Covered Storage Tank.
- Lynnfield Water District #1: sampling throughout town in response to low chlorine residuals, coliform detections, and elevated nitrate-nitrite.
  - Wakefield: water quality evaluation of their Sydney Street tank.
- Weston and Waltham: customer water quality complaints.
- Framingham: a water quality evaluation of their Doeskin and Beebe tanks; assistance and planning associated with a potential Boil Water Order.
- Reading: Boil Water Order in early November; Revised Total Coliform Rule Level 2 Assessment
- CVA Communities (S. Hadley FD #1, Chicopee) & Westover Air Reserve Base: reports and memorandums on Q3 disinfection byproduct levels.
- Milton, Somerville, MWRA samplers: Coliform Rule sampler training
- Canton, Chicopee, Needham, Peabody, Wakefield, Wellesley, and Woburn: two sampler-training sessions for UCMR4 sampling.

## TRAC

### Inspections and Permitting

TRAC issued 59 MWRA 8(m) Permits for work within water infrastructure easements and 42 permits for work within sewer infrastructure easements. Permits were issued in an average of 68 days from the date the application was received.

TRAC monitored the septage receiving sites a total of 30 times. Staff conducted 189 inspections of existing gasoline/oil separators, and 34 new construction gasoline/oil separators.

### Monitoring

In addition to 282 SIU and 45 NSIU monitoring events, TRAC completed 511 other sampling events including Local Limits, Municipal, Clinton NPDES, Clinton Landfill, Clinton Wastewater Treatment Plant monitoring well, Sulfide Project, Cosgrove and Oakdale NPDES, Carroll Water Treatment Plant Halfplant Maintenance and Compliance sampling for discharge to Marlborough, CSO Hypochlorite Tank chemical testing, Sudbury Aqueduct monitoring, Mystic and Alewife Project CSO and Stormwater and Emergency Response.

- **On October 2, 2019**, Columbus Park Headworks reported diesel odors. TRAC staff responded, detecting low levels of organic vapors. Deer Island later reported slight diesel odors in the grit chamber. TRAC staff monitored upstream lines, but did not detect any organic vapors in the influent.
- **On October 29, 2019**, TRAC responded to a reported fuel leak in a private residence in Weymouth. It appears approximately 50-100 gallons of fuel oil were released to the floor. Monitoring by TRAC staff indicated that it did not appear it reach the sewer.
- **On December 4, 2019**, TRAC staff noticed the influent turn red at the Clinton Treatment Plant just after NPDES sampling. Staff collected samples of the flow for analysis. The Clinton Wastewater Plant staff were able to divert the flow to two offline reactor tanks and held the wastewater while analyses were performed. TRAC staff visited all industries in town looking for the source of the red flow, but were unable to locate the source. Analysis did not find any pollutants of concern and the flow was bled through the treatment system without further incident.

## Environmental Quality-Water

Algae: Elevated levels of *Chryso-sphaerella* and chlorophyll-a on Wachusett and Quabbin Reservoirs required enhanced algae monitoring by MWRA and DCR from August through October.

## Environmental Quality-Wastewater

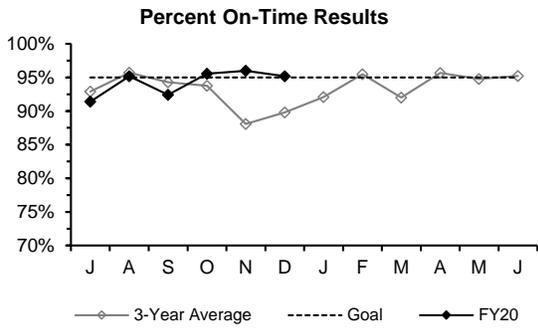
### Coordination with other MWRA Departments:

- Assisted with preparation for EPA Inspectors training/tour of Prison Point CSO Treatment Facility on November 20. Assisted DITP Process Control with roll-out updated version of OMS database application, for use by Clinton Operators. Continued to work on the receiving water quality analysis portion of the CSO Post-Construction Monitoring & Performance Assessment project, and to coordinate work by MWRA and consultant staff. Coordinated with DLS and TRAC to collect untreated CSO (one storm) and stormwater samples (four storms).

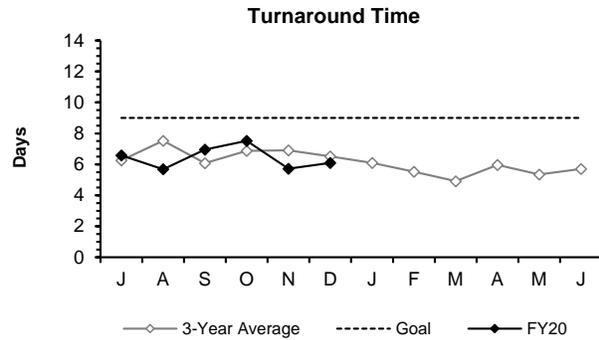
### Cooperation with other agencies:

- Coordinated with Cities of Cambridge and Somerville on stormwater sampling for the receiving water quality model. Enqual staff made a presentation to the MWRA Wastewater Advisory Committee on how we communicate MWRA's environmental data. Represented MWRA at the Massachusetts Bays Partnership Management Committee and attended the quarterly meeting of its Boston Harbor Ecosystem Network. Enqual, along with DLS, hosted a meeting between MWRA staff and local watershed associations.

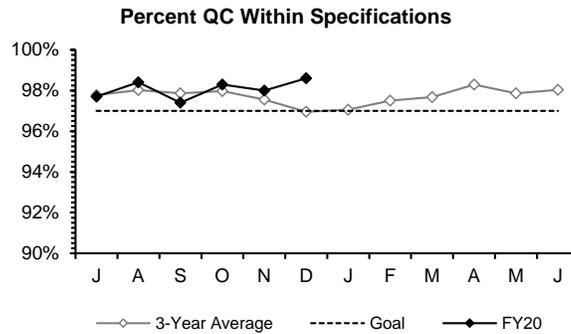
## Laboratory Services Second Quarter - FY20



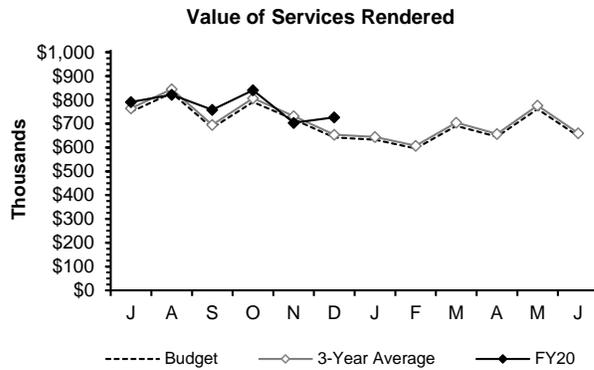
The Percent On-Time measurement met the 95% goal.



Turnaround Time was faster than the 9-day goal.



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



Value of Services Rendered met the annual budget projection.

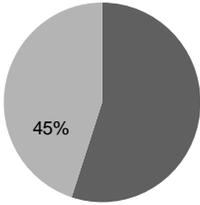
### Highlights:

**Water:** Completed annual lead and copper rule compliance testing. We also performed 681 tests on 332 samples from 69 schools and daycares through the 1st half of FY20. Since 2016 we have performed 37,637 tests on 18,349 samples from 478 schools and daycares.

# CONSTRUCTION PROGRAMS

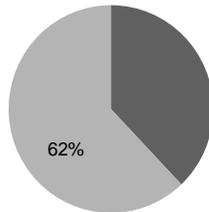
## Projects In Construction 2<sup>nd</sup> Quarter– FY20

### Money



- Amount Remaining
- Billed to Date

### Time



- Days Remaining
- Days Expended

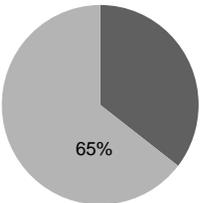
### Southern Extra High Pipeline Section 111

*Project Summary:* This project consists of 6,800 linear feet of 36-inch water main in Dedham and Westwood and includes pipe jacking 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

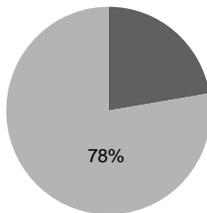
*Status and Issues:* As of December Crew 1 completed excavation and SOE for pre-cast manhole and installed manhole base for 24" gate valve and 24" DI pipe from MJ Tee at Sta. 1+16 into the structure. Crew 2 Installed 66 LF of 12" DI pipe for DWWD in East St. intersection and 46 LF of 8" DI pipe for DWWD in East St. and Jefferson street Including 3 - 45° MJ bends wrapped with insulated sleeving.

### Money



- Amount Remaining
- Billed to Date

### Time



- Days Remaining
- Days Expended

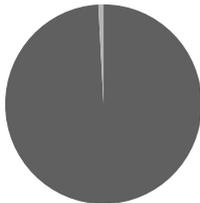
### Chelsea Creek Headworks Upgrade

*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

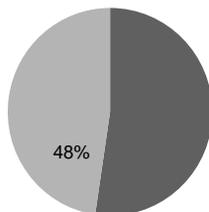
*Status and Issues:* As of December, the Contractor removed the existing grit pods from the Mezzanine level. They worked on concrete demo at the existing Channel 3 effluent gate thimble and the existing inclined screws framing. Chipped out beam pockets for the Stair A support beams. Saw cut concrete surface around manhole opening for Channel 3 Influent shaft precast planks.

### Money



- Amount Remaining
- Billed to Date

### Time



- Days Remaining
- Days Expended

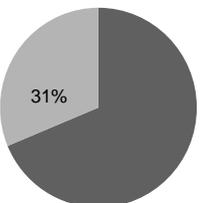
### Cottage Farm & Gillis PS Roof Replacement

*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

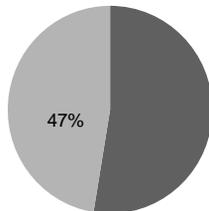
*Status and Issues:* As of December, the Contractor has provided submittals and a revised HASP, which was accepted by MWRA Safety. No physical work has begun.

### Money



- Amount Remaining
- Billed to Date

### Time



- Days Remaining
- Days Expended

### Commonwealth Ave Pump Station Improvements

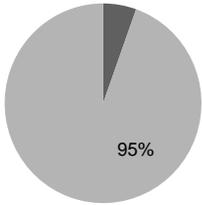
*Project Summary:* This project will provide a new connection to the station from two low service pipelines in Commonwealth Avenue and add low service pumps so that the City of Newton can be supplied in the event of a City Tunnel failure.

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

*Status and Issues:* As of December the contractor has continued work at the facility.

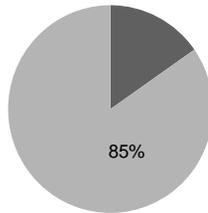
## Projects In Construction 2<sup>nd</sup> Quarter– FY20

### Money



■ Amount Remaining  
■ Billed to Date

### Time



■ Days Remaining  
■ Days Expended

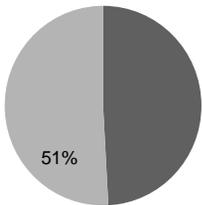
### NIH Section 110 - Stoneham

**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

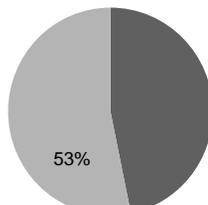
**Status and Issues:** As of December, the Contractor Disinfection and flushing of Section 110 was completed on November 26, 2019. Activation NIH pipeline occurred on December 16th 2019. Removed traffic message boards. Covered existing detour signage throughout route. Subcontractor installing pipe stands, valve stems and other components inside valve structures along pipeline.

### Money



■ Amount Remaining  
■ Billed to Date

### Time



■ Days Remaining  
■ Days Expended

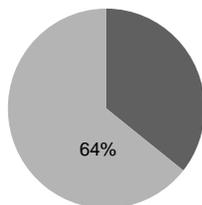
### Capital Improvements at the Biosolids Facility

**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

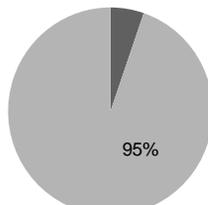
**Status and Issues:** As of December, the Contractor continued testing of Train #4.

### Money



■ Amount Remaining  
■ Billed to Date

### Time



■ Days Remaining  
■ Days Expended

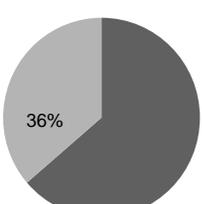
### Winthrop Terminal VFD and Motor

**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

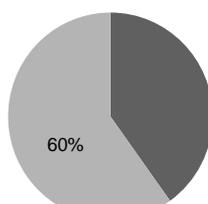
**Status and Issues:** VFD No. 5 commission test on-going.

### 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 December, the Contractor cored out previously cut-off anchors and installed new anchor bolts for mechanism. Installed repair mortar to launder exterior wall, interior face. Placed concrete for new pedestals. Continued with sandblasting to prepare walls for resurfacing and coating.

# CSO CONTROL PROGRAM

## 2<sup>nd</sup> 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 verifying 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 \$6.8 million remain to be spent, as described below.

Project/Item	Status as of December 31, 2019
BWSC Dorchester Interceptor Inflow Removal	<p>The CSO MOU/FAA with BWSC included \$5.4 million for additional inflow removal from BWSC's Dorchester Interceptor system as part of the South Dorchester Bay Sewer Separation project, of which MWRA transferred \$1.7 million to the BWSC 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 \$3.76 million from the 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 \$3.76 million.</p> <p>BWSC expects to submit construction contract plans to MWRA for approval, then award the contract, in the fall of 2020, and complete the work within the term of the agreement (by June 30, 2021).</p>
City of Cambridge Memorandum of Understanding and Financial Assistance Agreement	<p>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.</p> <p>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 <b>February 28, 2020</b>.</p>
City of Somerville Financial Assistance Agreement	<p>By this agreement, MWRA will provide up to \$1.4 million for Somerville's repair of its combined sewer trunk line upstream of the Somerville Marginal CSO Facility. Pursuant to the agreement, the repair work is intended to maintain the full in-system storage capacity of the trunk sewer to support CSO control. Somerville is in design and expects to award the construction contract by the end of 2020.</p>
MWRA CSO Performance Assessment – Contract 7572	<p>MWRA issued the Notice to Proceed with the contract for CSO Post-Construction Monitoring and Performance Assessment to AECOM Technical Services, Inc., in November 2017. The contract includes CSO inspections, overflow metering, hydraulic modeling, system performance assessments and water quality impact assessments, culminating in the submission of a report to EPA and DEP in December 2021 verifying whether the court-ordered levels of CSO control are attained.</p> <ul style="list-style-type: none"> <li>• MWRA issued a third semiannual progress report on October 31, 2019, covering the data collection and CSO discharge quantification period of January 1 – June 30, 2019, and other work progress.</li> <li>• Temporary CSO meters continue to be employed at 36 of the original 57 metered locations, in accordance with Amendment 1 to the AECOM contract.</li> <li>• AECOM completed a major upgrade and recalibration of the MWRA's hydraulic model in November 2019 and is currently addressing questions MWRA has raised concerning meter vs. model differences at certain CSO locations. Calibrated model results allow a comparison of model predicted CSO discharges with the discharges measured from the CSO metering program that began in April 2018. A key objective of the CSO performance assessment is to bring the model and meter results closer together to gain stakeholder confidence in the accuracy of the model in predicting CSO discharges and assessing compliance with the Long Term Control Plan's Typical Year levels of control.</li> <li>• 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.</li> </ul> <p>On August 30, 2019, DEP issued five-year CSO variances to water quality standards for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River effective through August 31, 2024. The variance conditions include receiving water quality modeling and CSO and stormwater sampling; the evaluation of additional CSO controls; other requirements intended to minimize CSO discharges, their impacts and public health risk; and preparation of updated CSO control plans for these waters.</p> <ul style="list-style-type: none"> <li>• AECOM continues to make progress in developing the receiving water models for the Charles River and the Alewife Brook/Upper Mystic River. MWRA staff have continued to perform CSO and stormwater sampling with the assistance of the cities of Cambridge, Somerville, Arlington and Medford, to establish water quality inputs to the models.</li> <li>• Staff are developing a Technical Assistance scope of services to evaluate whether adjustments to the operational strategy for the recently upgraded Alewife Brook Pumping Station can further reduce CSO discharges along the Alewife Brook, as required by the Alewife Brook/Upper Mystic CSO Variance.</li> </ul>

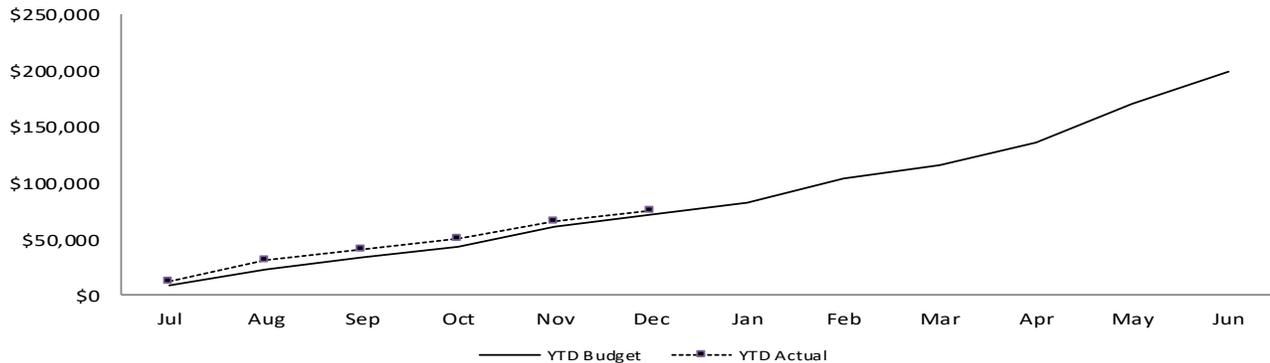
## CIP Expenditures 2<sup>nd</sup> Quarter – FY20

FY20 Capital Improvement Program Expenditure Variances through December by Program (\$ in thousands)				
Program	FY20 Budget Through December	FY20 Actual Through December	Variance Amount	Variance Percent
Wastewater	37,324	47,702	10,378	28%
Waterworks	30,591	25,476	(5,114)	-17%
Business and Operations Support	4,061	1,917	(2,144)	-53%
<b>Total</b>	<b>\$71,976</b>	<b>\$75,095</b>	<b>\$3,119</b>	<b>4%</b>

Project overspending within Wastewater was due to timing of community requests for grants and loans for the Infiltration/Inflow (I/I) Program, contractor progress for the Residuals/Electrical/Mechanical/Drum Dryer Replacements, Chelsea Creek Headworks Upgrades Construction, 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 updated schedule for the Nut Island Odor Control and HVAC Improvements, Dorchester Interceptor Sewer Construction, and timing of work for the Gravity Thickener Rehabilitation contract. Project underspending in Waterworks was due to timing of community loan requests, less than anticipated consultant progress for Section 50/57 Water and Section 21/20/19 Sewer Design contract, underspending of some sub-tasks pending reallocation for the Wachusett Pumping Station Design/ESDC/REI contract, MBTA crossing issue with Construction 3 for the Southern Extra High Section 111 Construction 3, and delay in paving for SEH Construction 2. This was partially offset by timing of watershed land purchases, work anticipated in FY19 that was completed in FY20 for the Cosgrove Intake Roof Repair, and contractor progress for NIH Section 89/29 Redundancy Phase 2 Construction.

### 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 12/28/19	\$152.3 million
Unused capacity under the debt cap:	\$1.54 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:	\$128 million
Commercial paper capacity / Revolving Loan	\$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

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

#### Sample Site: Wachusett Reservoir

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

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

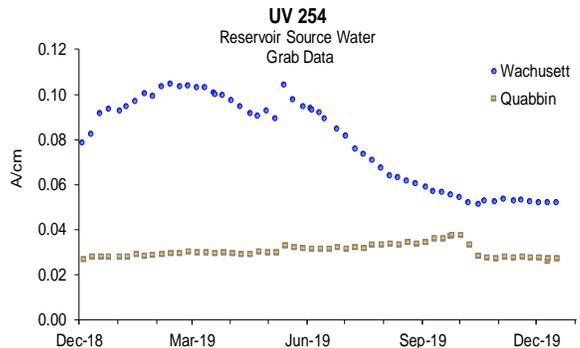
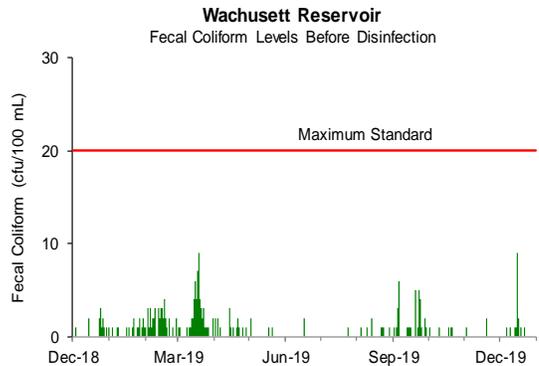
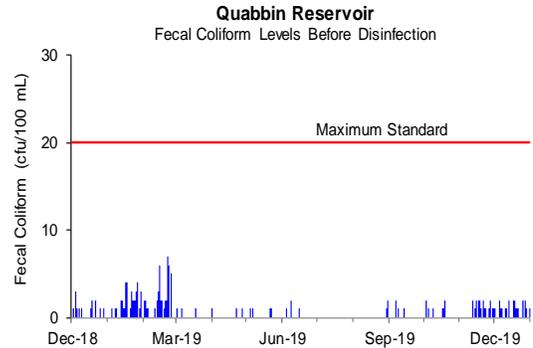
All samples collected during the 2nd Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

### Source Water – UV Absorbance

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

Quabbin Reservoir UV-254 levels are currently around 0.027 A/cm.

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



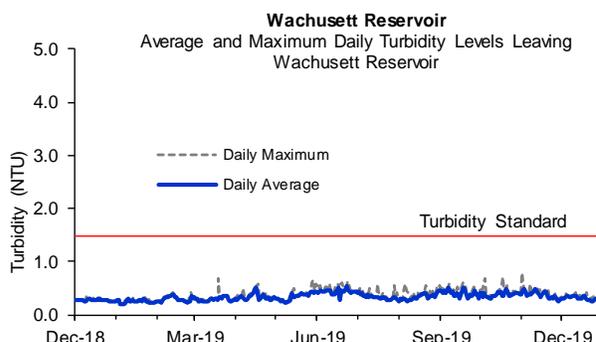
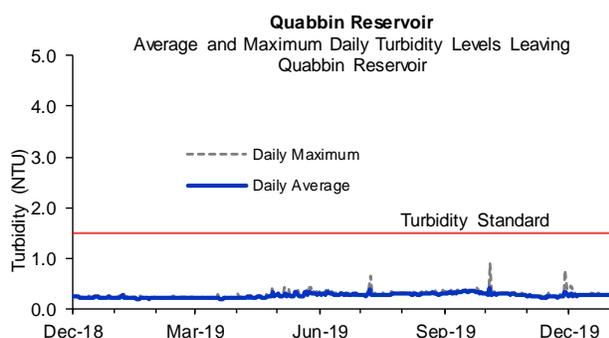
## Source Water – Turbidity

### 2nd 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.

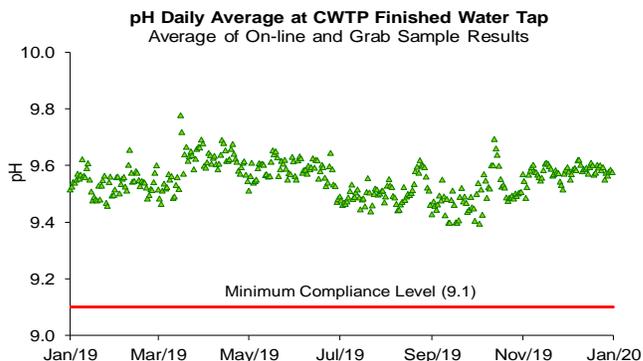
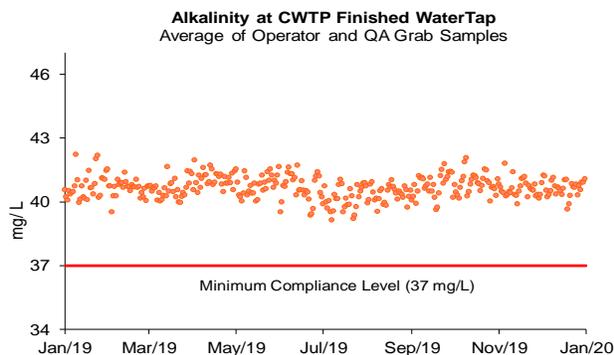


## Treated Water – pH and Alkalinity Compliance

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](http://www.mwra.com/water/html/awqr.htm).

Distribution system samples were collected on December 11 and 12, 2019. Distribution system sample pH ranged from 9.1 to 9.7 and alkalinity ranged from 38 to 41 mg/L. No sample results were below DEP limits for this quarter.



## Treated Water – Disinfection Effectiveness

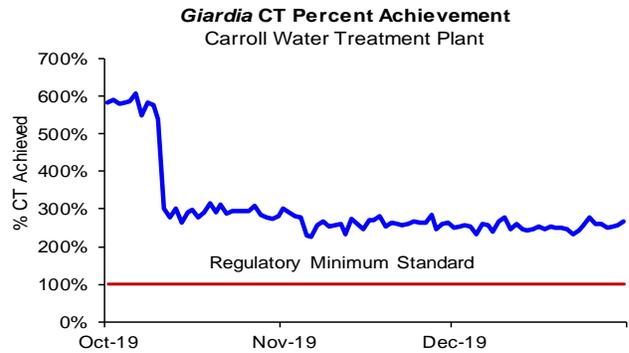
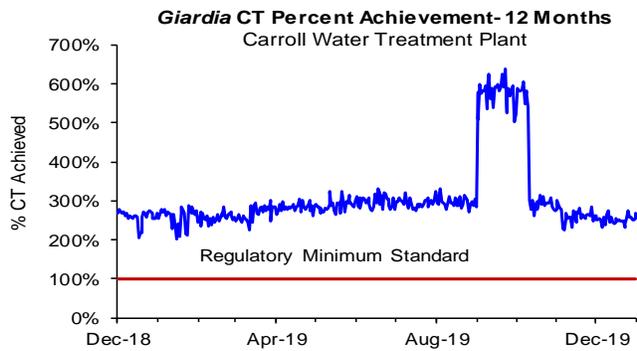
2nd Quarter – FY20

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.

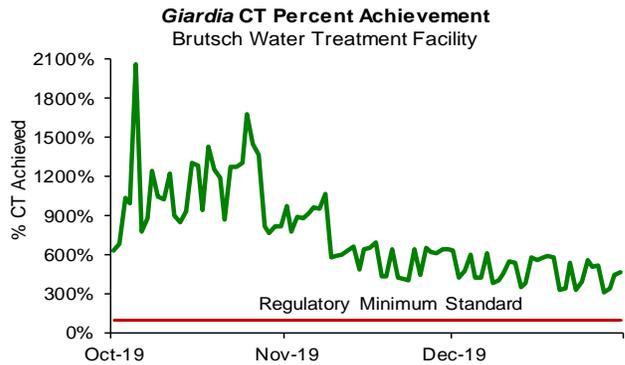
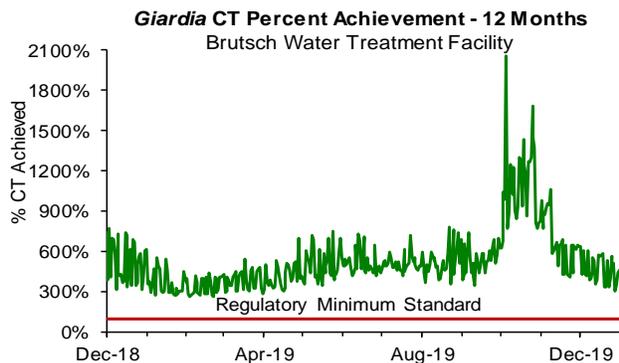
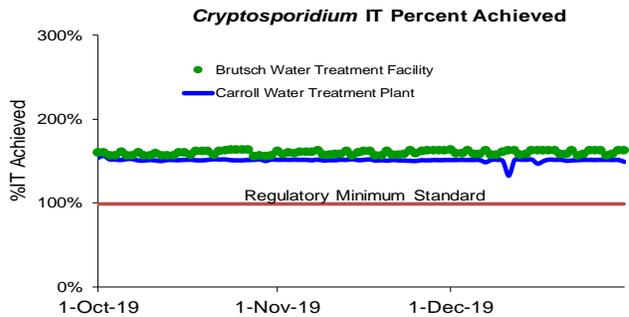
### Wachusett Reservoir – MetroWest/Metro Boston Supply:

- Ozone dose at the CWTP varied between 1.7 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 ozone dose was proactively increased from early September to mid October in response to a *Chrysozphaerella* algae bloom. This is visible in the two top graphs.



### 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 1.3 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%.



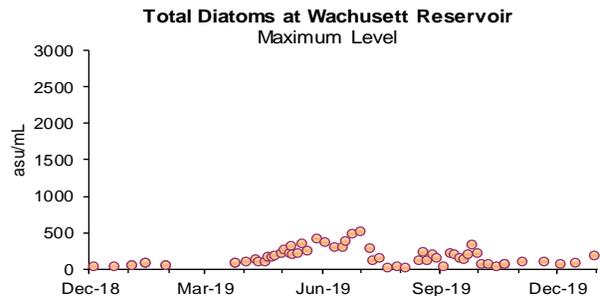
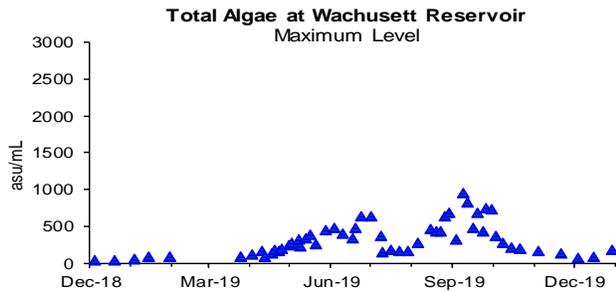
## Source Water - Algae

### 2nd 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 2nd quarter, five complaints concerned taste and odor which may be related to algae were reported from the local water departments.

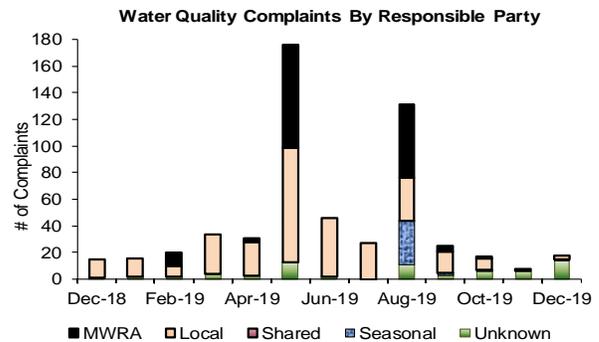
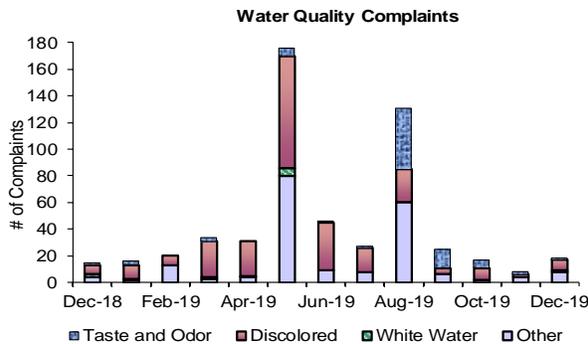


## Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

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

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

Communities reported 43 complaints during the quarter compared to 65 complaints from 2nd Quarter of FY19. Of these complaints, 19 were for "discolored water", 9 were for "taste and odor", 1 was for "white water", and 14 were for "other". Of these complaints, 14 were local community issues, 1 was an MWRA related issue, 2 were seasonal in nature, and 26 were unknown in origin.



## Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program 2nd 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.

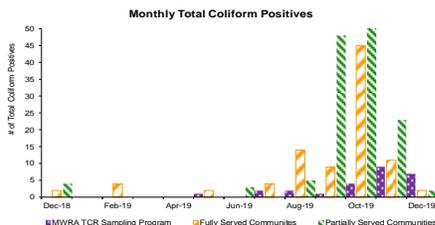
### Highlights

In the 2nd Quarter, 143 of the 6,546 community samples (2.19% system-wide) submitted to MWRA labs for analysis tested positive for total coliform (October: Bedford, Everett, Hanscom AFB, Lynnfield, Reading, Winthrop; November: Malden, Bedford, Hanscom AFB; December: Hanscom AFB). Fifteen of the 1,989 Shared Community/MWRA samples (0.96%) tested positive for total coliform. In October, one sample in Reading (10/31) tested positive for *E.coli* with a repeat sample positive for total coliform. This resulted in a town-wide Boil Water Order (an acute violation) and a Level 2 Assessment. DEP lifted the Boil Water Order on November 4. In November, one sample, collected on 11/21, in Framingham tested positive for *E.coli*. Repeat samples did not confirm for total coliform or *E.coli*, thus, no Level Assessment or Boil Water Order was required. Only 2.8% of the Fully Served community samples had chlorine residuals lower than 0.2 mg/L for the quarter. No community violated the TCR.

The following communities needed to conduct level assessments since greater than 5.0% of their samples were total coliform positive during the month: Everett (October, Level 1) and Malden (November, Level 2). The following communities needed to conduct a level assessment since each routinely collects less than 40 samples per month and more than one sample was coliform positive: Lynnfield and Southborough (October, Level 1); Winthrop (October, Level 2); Bedford (October & November, Level 2); Hanscom AFB (October – December, Level 2)

### NOTES:

- MWRA total coliform and chlorine residual results include data from community locations. In most cases these community results are indicative of MWRA water as it enters the community system; however, some are strongly influenced by local pipe conditions. Residuals in the MWRA system are typically between 1.0 and 2.8 mg/L.
- The number of samples collected depends on the population served and the number of repeat samples required.
- These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.
- Part of the Chicopee Valley Aqueduct System. Free chlorine system.
- MADEP determined that five Somerville total coliform samples collected from one routine sample site (sampling period from October through November) were invalid and not representative of the distribution system. Therefore, they are not represented in the table.



	Total Coliform		E.coli # Positive	Assessment Required
	# Samples (b)	# (%) Positive		
MWRA Locations	354	5 (1.26%)	0	
Shared Community/MWRA sites	1635	14 (0.86%)	0	
<b>Total: MWRA</b>	<b>1989</b>	<b>19 (0.96%)</b>	<b>0</b>	<b>No</b>
ARLINGTON	168	0 (0%)	0	
BELLEVILLE	104	0 (0%)	0	
BOSTON	835	15	0	No
BROOKLINE	241	0 (0%)	0	
CHELSEA	188	2	0	No
DEER ISLAND	41	0 (0%)	0	
EVERETT	178	6	1	Yes
FRAMINGHAM	247	2	1	No
LEXINGTON	117	0	0	No
LYNNFIELD	27	9	0	Yes
MALDEN	264	10	0	Yes
MARBLEHEAD	72	0 (0%)	0	
MARLBOROUGH	128	0 (0%)	0	
MEDFORD	204	0 (0%)	0	
MELROSE	117	0 (0%)	0	
MILTON	105	1	0	No
NAHANT	30	0 (0%)	0	
NEWTON	276	0 (0%)	0	
NORTHBOROUGH	48	0 (0%)	0	
NORWOOD	99	0 (0%)	0	
QUINCY	341	0	0	No
READING	153	2	1	Yes
REVERE	195	0 (0%)	0	
SAUGUS	112	0 (0%)	0	
SOMERVILLE	299	0 (0%)	0	
SOUTHBOROUGH	36	0	0	Yes
STONEHAM	91	0 (0%)	0	
SWAMPSCOTT	57	0 (0%)	0	
WALTHAM	216	0 (0%)	0	
WATERTOWN	131	0 (0%)	0	
WESTON	45	0 (0%)	0	
WINTHROP	79	3	0	Yes
<b>Total: Fully Served</b>	<b>5244</b>	<b>60 (1.14%)</b>		
BEDFORD	102	50	0	Yes
CANTON	93	1	0	No
HANSCOM AFB	57	27	0	Yes
NEEHAM	124	0 (0%)	0	No
PEABODY	214	0 (0%)	0	
WAKEFIELD	148	3	0	No
WELLESLEY	117	1	0	No
WILMINGTON	87	0 (0%)	0	No
WINCHESTER	94	1	0	No
WOBURN	195	0 (0%)	0	No
SOUTH HADLEY FD1	60	0 (0%)	0	
<b>Total: CVA &amp; Partially Served</b>	<b>1291</b>	<b>83 (6.43%)</b>		
<b>Total: Community Samples</b>	<b>6535</b>	<b>143 (2.19%)</b>		

### Chlorine Residuals in Fully Served Communities

	2018		2019											
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
% <0.1	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.2	0.3	0.7	1.1	1.7	0.2	
% <0.2	1.0	0.3	0.2	0.1	0.1	0.1	0.1	0.7	1.3	2.3	3.3	3.3	1.5	
% <0.5	2.3	1.1	0.6	0.4	0.3	0.3	0.9	2.5	4.5	7.2	8.7	7.7	4.1	
% <1.0	5.2	2.8	1.8	1.7	1.4	1.9	3.2	7.0	11.0	14.9	17.8	12.6	7.3	
% >1.0	94.8	97.2	98.2	98.4	98.7	98.1	96.8	93.0	89.0	85.1	82.2	87.4	92.7	

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

### 2nd 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.

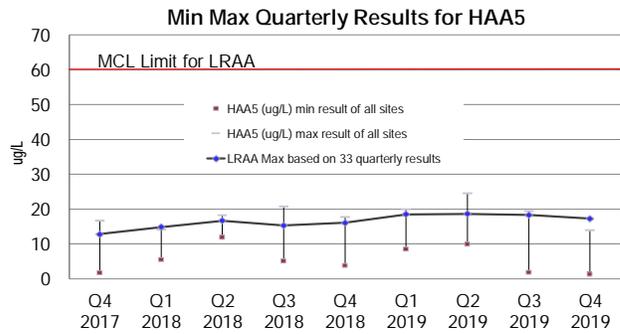
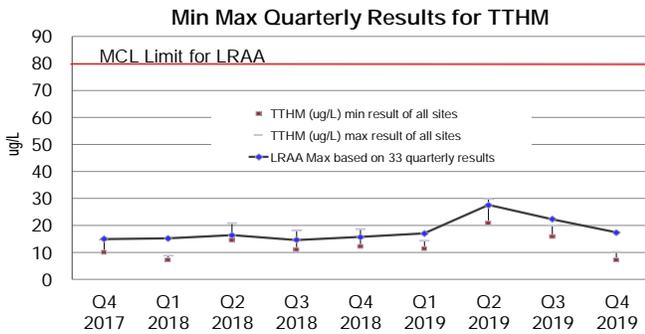
The locational running annual average calculated quarterly at each individual sampling location must be below the Total HAA5 or Total TTHM MCL standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

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.

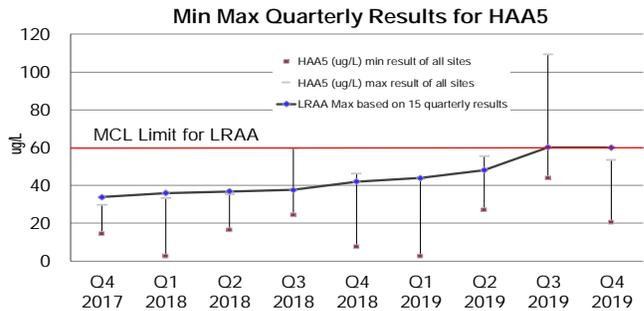
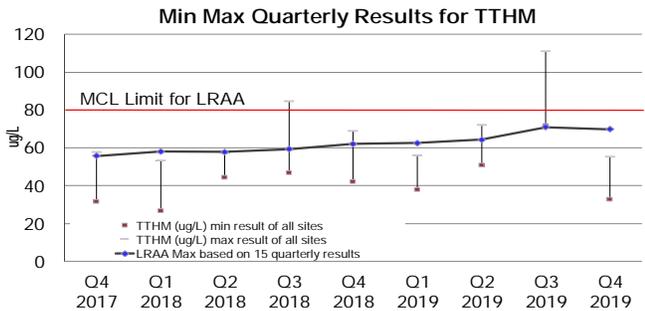
Bromate is tested monthly as required for water systems that treat with ozone. Bromide in the raw water may be converted into bromate following ozonation. EPA's RAA MCL standard for bromate is 10 µg/L.

The LRAA for TTHMs and HAA5s for MWRA's Compliance Program (represented as the line in the top two graphs below) remain below current standards. The Max LRAA in the quarter for TTHMs = 17.5 µg/L; HAA5s = 17.3 µg/L. The current RAA for Bromate = 0.0 µg/L. During the Q3 2019 sampling, two CVA communities exceeded Operational Evaluation Levels for HAA5 or Total Trihalomethanes. During the Q4 2019 sampling, one CVA community exceeded Operational Evaluation Levels for HAA5. While this does not result in a violation this requires an analysis and review of their water system and a report to MADEP. No LRAA exceedances or violations occurred this quarter for any of the CVA communities. MWRA and the CVA communities continue to closely monitor and manage the disinfection process to minimize DBP production. A quarterly DBP location in South Hadley was added in Q4, 2019.

### MetroBoston Disinfection By-Products



### CVA Disinfection By-Products (Combined Results)



# Water Supply and Source Water Management

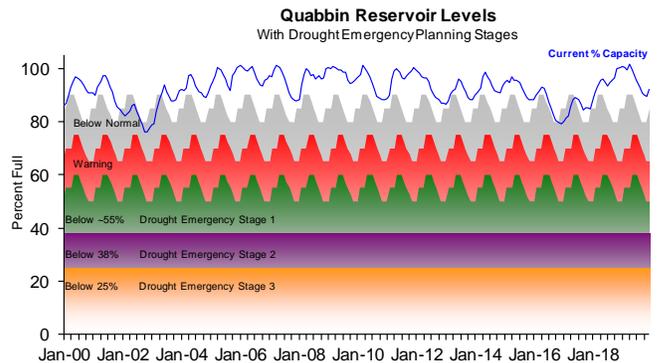
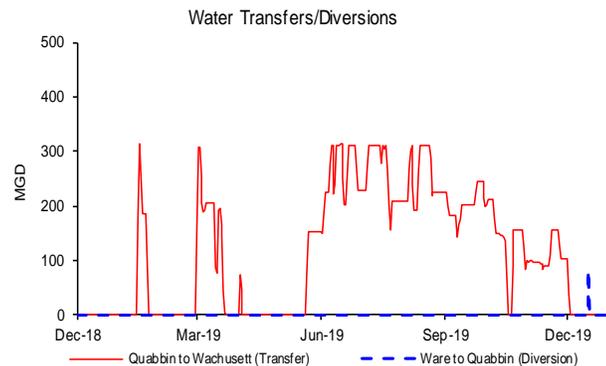
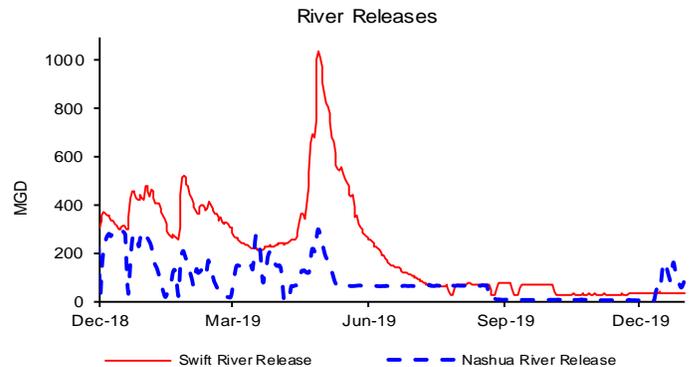
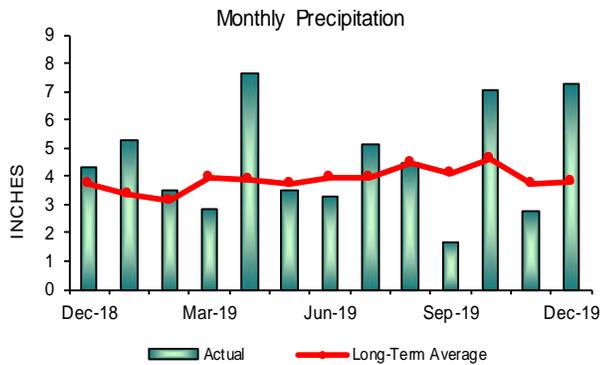
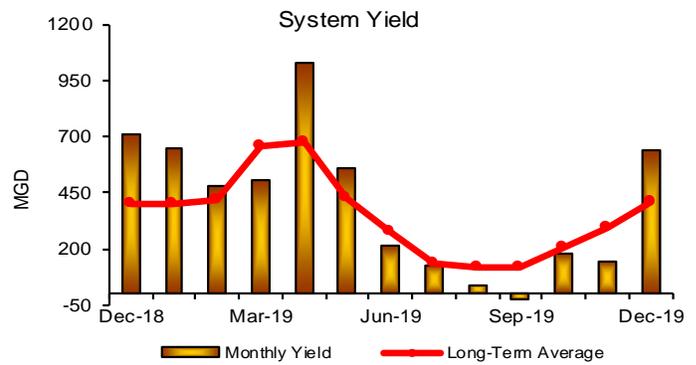
2nd Quarter – FY20

## 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 92.1% as of December 31, 2019; a 1.5% increase for the quarter, which represents an addition of more than 6.2 billion gallons of storage and an increase in elevation of 0.83' for the quarter. System withdrawal for the quarter was below the 10 year monthly average. Precipitation and Yield for the quarter were above their respective long term quarterly average.



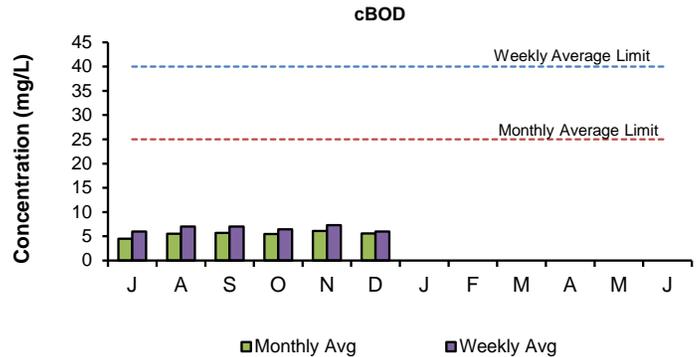
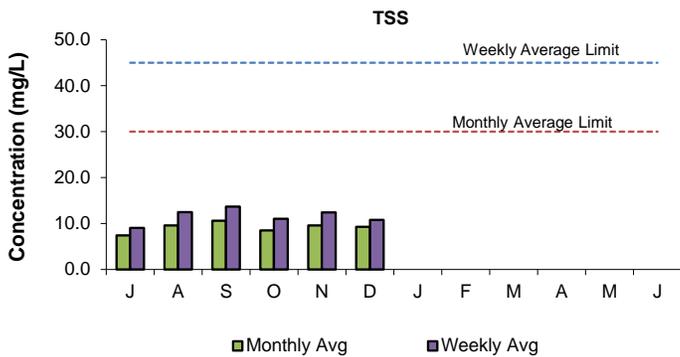
# WASTEWATER QUALITY

## NPDES Permit Compliance: Deer Island Treatment Plant 2nd Quarter - FY20

### NPDES Permit Limits

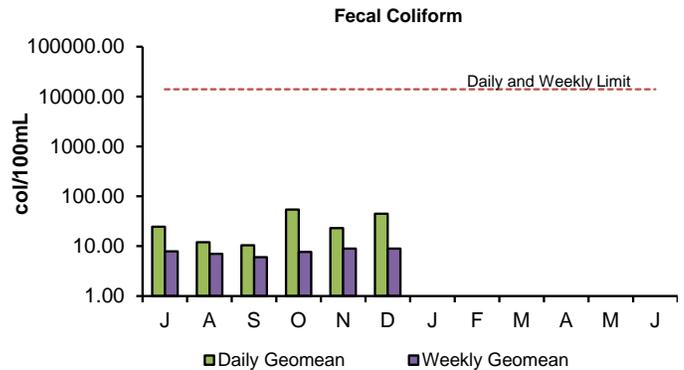
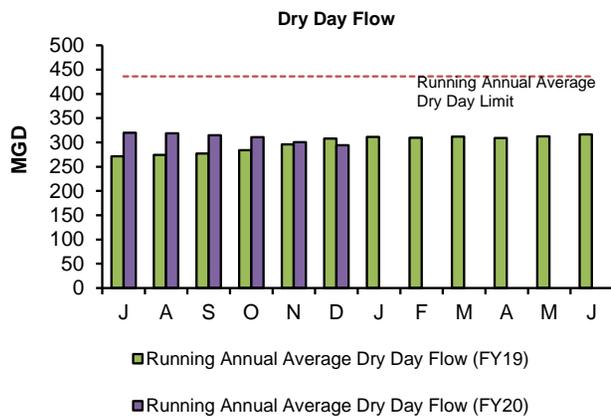
Effluent Characteristics	Units	Limits	October	November	December	2nd Quarter Violations	FY20 YTD Violations	
Dry Day Flow (365 Day Average):	mgd	436	310.8	300.4	294.5	0	0	
cBOD:	Monthly Average	mg/L	5.5	6.1	5.6	0	0	
	Weekly Average	mg/L	6.4	7.3	6.0	0	0	
TSS:	Monthly Average	mg/L	8.5	9.6	9.3	0	0	
	Weekly Average	mg/L	11.0	12.4	10.8	0	0	
TCR:	Monthly Average	ug/L	0	0	0.54	0	0	
	Daily Maximum	ug/L	631	0	16.67	0	0	
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	54	23	45	0	0
	Weekly Geometric Mean	col/100mL	14000	8	9	9	0	0
	% of Samples >14000	%	10	0	0	0	0	0
	Consecutive Samples >14000	#	3	0	0	0	0	0
pH:	SU	6.0-9.0	6.5-7.05	6.6-7.1	6.5-7.0	0	0	
PCB, Aroclors:	Monthly Average	ug/L	UNDETECTED			0	0	
Acute Toxicity:	Mysid Shrimp	%	≥50	>100	>100	>100	0	0
	Inland Silverside	%	≥50	>100	>100	>100	0	0
Chronic Toxicity:	Sea Urchin	%	≥1.5	100	100	100	0	0
	Inland Silverside	%	≥1.5	100	100	100	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 2nd Quarter were within permit limits.

Carbonaceous Biochemical Oxygen Demand (cBOD) is a measure of the amount of dissolved oxygen required for the decomposition of organic materials in the environment. All cBOD measurements for the 2nd Quarter were within permit limits.



Running Annual Average Dry Day Flow is the average of all dry weather influent flows over the previous 365 days. The Dry Day Flow for the 2nd Quarter was well below the permit limit of 436 MGD.

Fecal Coliform is an indicator for the possible presence of pathogens. The levels of these bacteria after disinfection show how effectively the plant is inactivating many forms of disease-causing microorganisms. In the 2nd Quarter, all permit conditions for fecal coliform were met.

**NPDES Permit Compliance: Clinton Wastewater Treatment Plant**  
2nd Quarter - FY20

**NPDES Permit Limits**

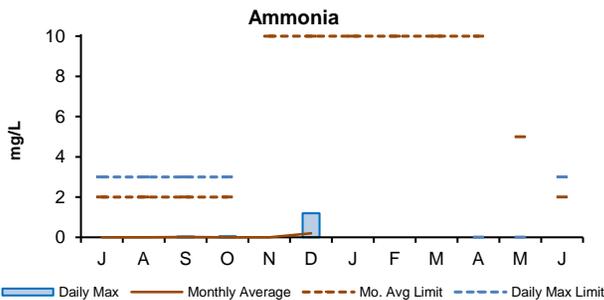
Effluent Characteristics		Units	Limits	October	November	December	2nd Quarter Violations	FY20 YTD Violations
Flow:	12-month Rolling Average:	mgd	3.01	2.92	2.62	2.53	0	3
BOD:	Monthly Average:	mg/L	20	1.40	1.60	2.50	0	0
	Weekly Average:	mg/L	20	1.60	2.60	3.20	0	0
TSS:	Monthly Average:	mg/L	20	0.40	1.70	3.80	0	0
	Weekly Average:	mg/L	20	1.30	4.20	6.60	0	0
pH:		SU	6.5-8.3	7.2-7.6	7.1-7.6	7-7.6	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	8.40	9.00	9.70	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	5	6	8	0	0
	Daily Geometric Mean:	cfu/100mL	409	7	189	70	0	0
TCR:	Monthly Average:	ug/L	17.6	0.00	0.00	0.24	0	0
	Daily Maximum:	ug/L	30.4	0.00	0.00	4.00	0	0
Copper:	Monthly Average:	ug/L	11.6	9.62	7.10	8.33	0	0
	Daily Maximum:	ug/L	14.0	9.62	7.10	8.63	0	0
Total Ammonia Nitrogen: November 1st - March 31st	Monthly Average:	mg/L	10.0	0.00	0.00	0.20	0	0
	Daily Maximum:	mg/L	35.2	0.05	0.00	1.20	0	0
Total Phosphorus: November 1st - March 31st	Monthly Average:	ug/L	1000	59	157	184	0	0
	Daily Maximum:	ug/L	RPT	80	365	302	0	0
Acute Toxicity*:	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity*:	Daily Minimum:	%	≥62.5	N/A	N/A	100	0	0

There have been three permit violations in FY20 at the Clinton Treatment Plant.

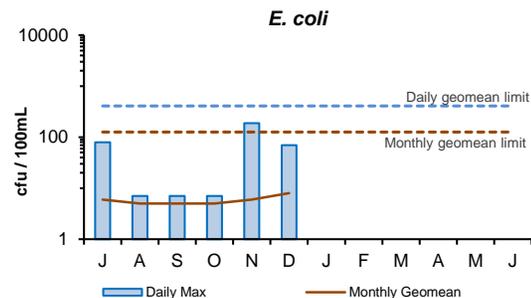
**1st Quarter:** There were three permit violations in the first quarter. The 12-month rolling average flow exceeded the limit of 3.01 MGD due to excessive rains in the region in late 2018.

**2nd Quarter:** There were no permit violations in the 2nd Quarter.

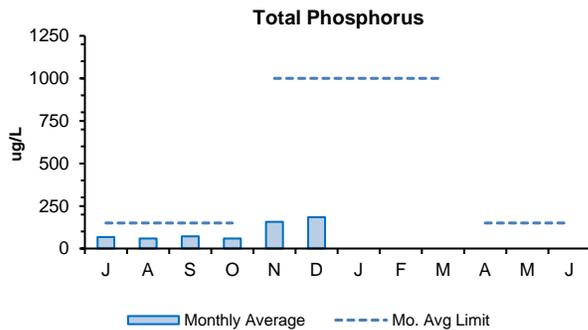
+ Toxicity testing at the Clinton Treatment Plant is conducted on a quarterly basis.



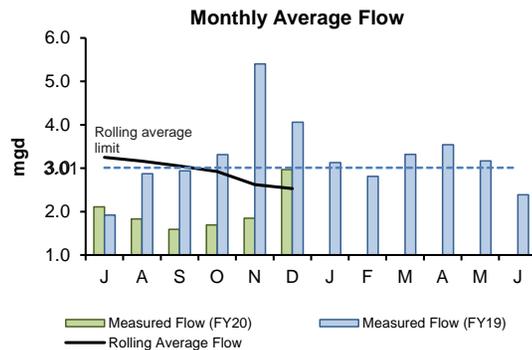
The 2nd Quarter's monthly average and daily maximum concentrations of ammonia were below the permit limits. The monthly average and daily maximum limits for the 2nd Quarter are 10 and 35.2 mg/L respectively. The permit limits are most stringent from June to October when warm weather conditions are most conducive to potential eutrophication.



*E. coli* is an indicator for the possible presence of pathogens. There were no violations of permit limits in the 2nd Quarter. The monthly and daily limits are 126 cfu/100 mL and 409 cfu/100 mL respectively.



The 2nd Quarter's monthly average concentrations for total phosphorus were below permit limits. The new seasonal permit limits went into effect April 1, 2019.

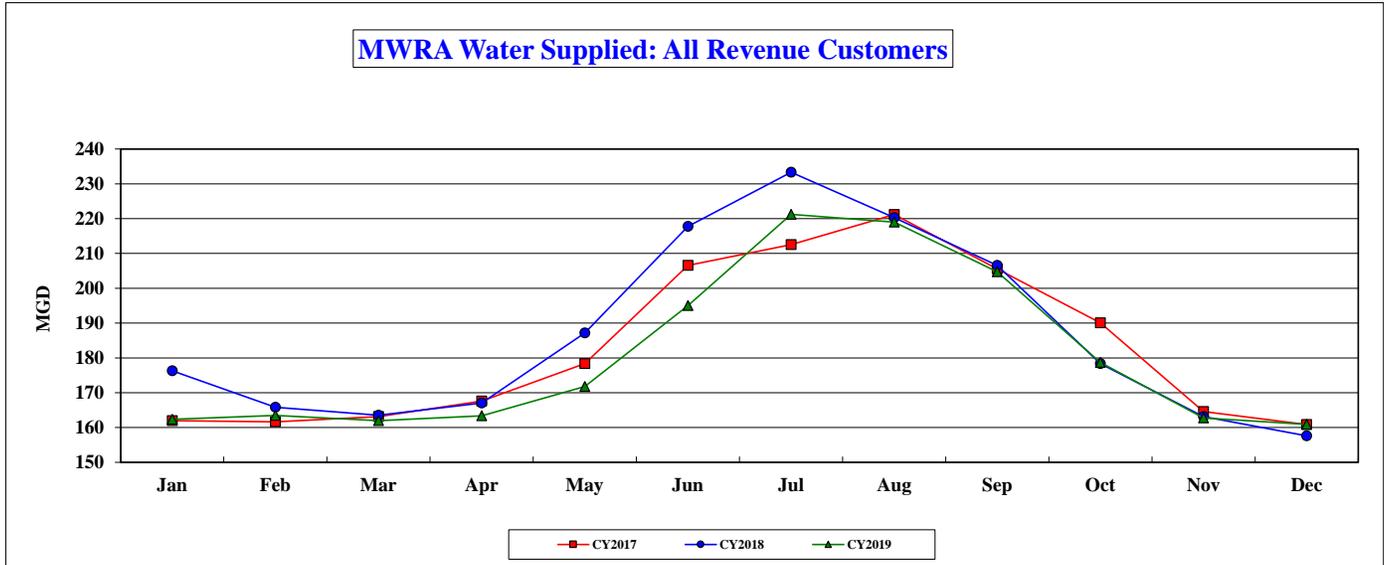


The graph depicts the rolling annual average monthly flow, measured in million gallons per day, exiting the plant. The 12-month rolling average flows during the 2nd Quarter were below the permit limit.

# COMMUNITY FLOWS AND PROGRAMS

## Customer Water Use

2nd Quarter - FY20



MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Average	Annual Average
<b>CY2017</b>	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
<b>CY2018</b>	176.294	165.841	163.539	167.056	187.145	217.776	233.321	220.268	206.586	178.340	163.125	157.612	186.553	186.553
<b>CY2019</b>	162.367	163.492	161.984	163.350	171.773	195.028	221.222	219.012	204.699	178.714	162.736	160.906	180.568	180.568

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Annual Total
<b>CY2017</b>	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
<b>CY2018</b>	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	68,091.978	68,091.978
<b>CY2019</b>	5,033.382	4,577.770	5,021.509	4,900.488	5,324.950	5,850.846	6,857.872	6,789.370	6,140.970	5,540.145	4,882.089	4,988.092	65,907.485	65,907.485

The December 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.

MWRA customers used an averaged of 167.5 mgd in the 2nd quarter of FY20. This is an increase of 1.1 mgd or 0.7% compared to the 2nd quarter of FY19. System-wide year to date consumption for CY19 was lower than CY18 with 180.6 mgd being supplied to MWRA customers. This is 6.0 mgd lower than CY18, and is a decrease of 3.2%.



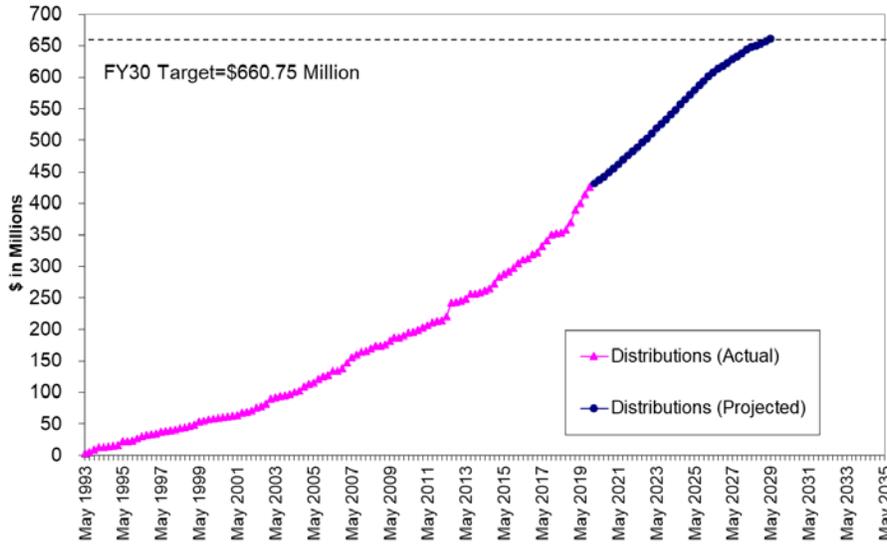
# Community Support Programs

## 2<sup>nd</sup> Quarter – FY20

### Infiltration/Inflow Local Financial Assistance Program

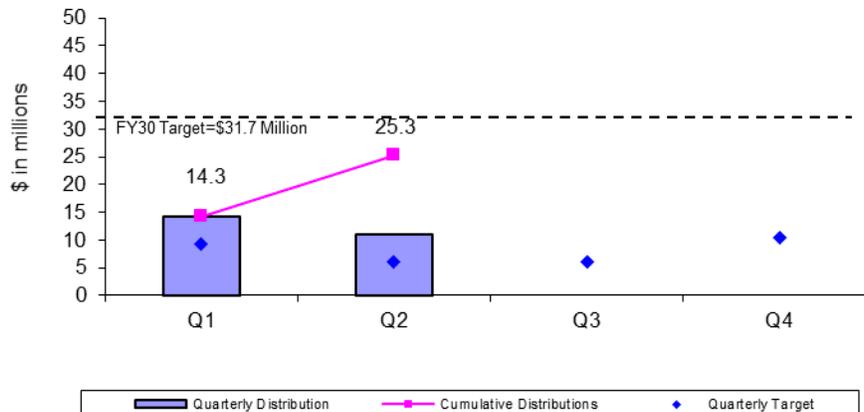
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides \$760.75 million in grants and interest-free loans (average of about \$20 million per year from FY93 through FY30) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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 2<sup>nd</sup> Quarter of FY20, \$11.0 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Braintree, Dedham, Lexington, Melrose, Needham, Stoughton, Walpole, Watertown, Wilmington, and Woburn. Total grant/loan distribution for FY20 is \$25.3 million. From FY93 through the 2<sup>nd</sup> Quarter of FY20, all 43 member sewer communities have participated in the program and \$426 million has been distributed to fund 593 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



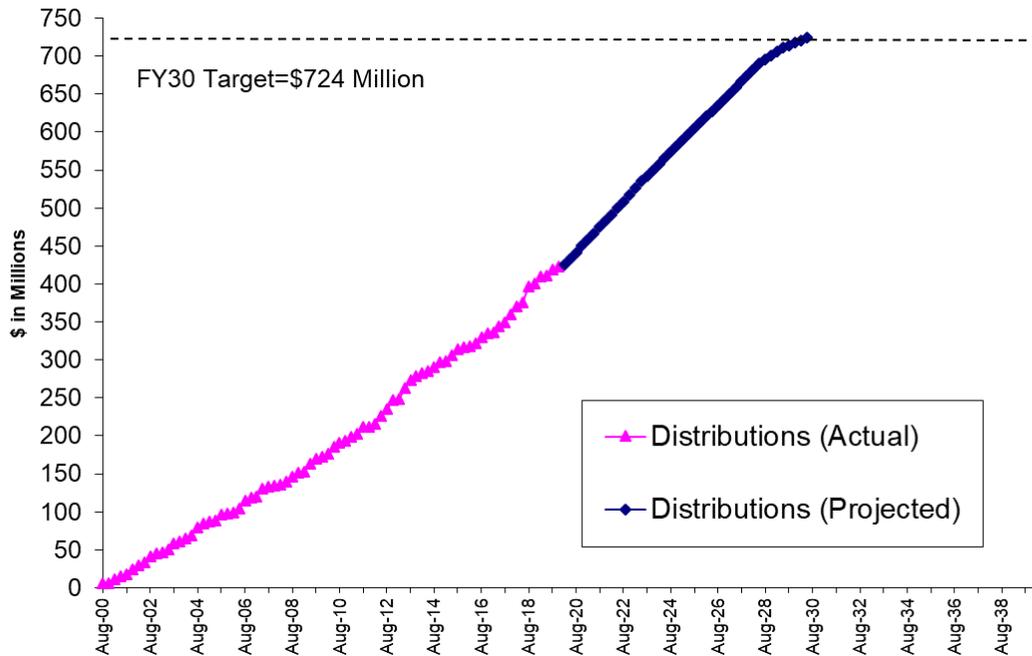
# Community Support Programs

## 2<sup>nd</sup> Quarter – FY20

### Local Water System Assistance Program

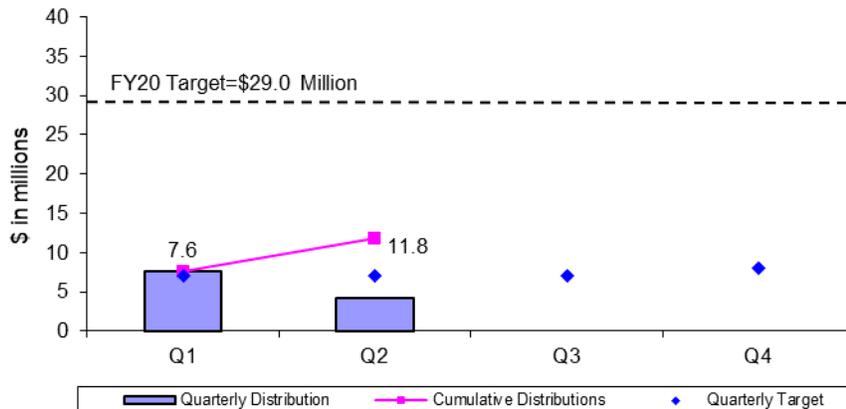
MWRA's Local Water System Assistance Programs (LWSAP) provides \$724 million in interest-free loans (an average of about \$24 million per year from FY01 through FY30) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. There 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 2<sup>nd</sup> Quarter of FY20, \$4.2 million in interest-free loans was distributed to fund local water projects in Everett, Melrose, Newton, and Saugus. Total loan distribution for FY20 is \$11.8 million. From FY01 through the 2<sup>nd</sup> Quarter of FY20, \$423.4 million has been distributed to fund 458 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 2<sup>nd</sup> 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.

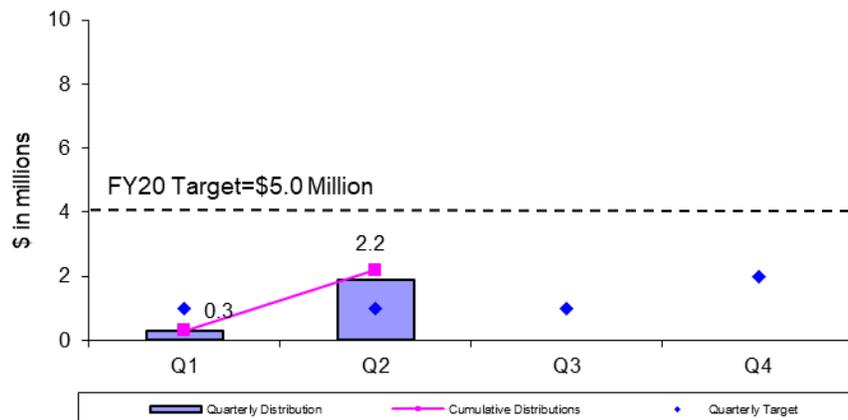
FY19 was the third year of the Lead Loan Program. During FY19, MWRA made four Lead Loan Program distributions as noted in the table below.

FY20 is the fourth year of the Lead Loan Program. One Lead Loan was made during the 1<sup>st</sup> quarter of FY20: \$300,000 to Chelsea. Two Lead Loans were made during the 2<sup>nd</sup> quarter of FY20: \$1.0 Million to Everett and \$900,000 to Somerville.

Summary of Lead Loans:

Everett in FY20	\$1.0 Million
Somerville in FY20	\$0.9 Million
Chelsea in FY20	\$0.3 Million
Marlborough in FY19	\$1.0 Million
Winthrop in FY19	\$0.5 Million
Chelsea in FY19	\$0.1 Million
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
<u>Winchester in FY17</u>	<u>\$0.5 Million</u>
<b>TOTAL</b>	<b>\$13.8 Million</b>

**FY20 Quarterly Distributions of Lead Service Line Replacement Loans**

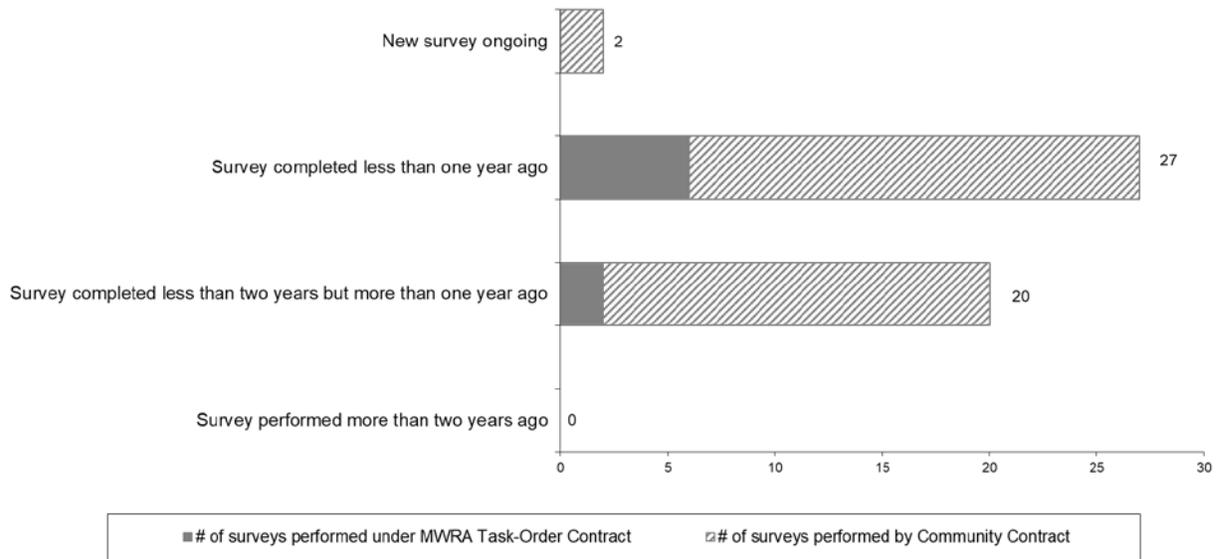


## Community Support Programs

2<sup>nd</sup> 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 2<sup>nd</sup> 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	19,735			20,375
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	791	832			1,623
Toilet Leak Detection Dye Tablets	_____	419	35,431			35,850

## BUSINESS SERVICES

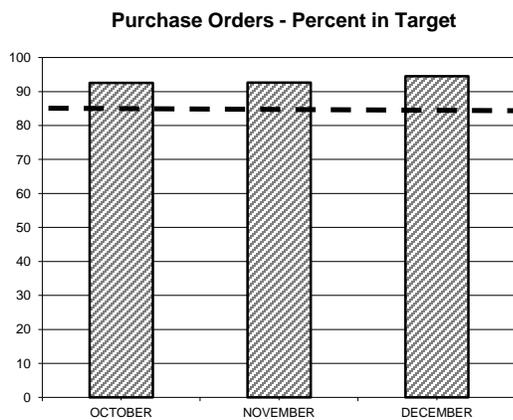
# Procurement: Purchasing and Contracts

## 2nd Quarter - FY20

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

**Outcome:** Processed 94% of purchase orders within target; Average Processing Time was 4.42 days vs. 5.23 days in Qtr 2 of FY19. Processed 67% (8 of 12) of contracts within target timeframes; Average Processing Time was 116 days vs. 192 days in Qtr 2 of FY19.

### Purchasing



	No.	TARGET	PERCENT IN TARGET
\$0 - \$500	671	3 DAYS	90.7%
\$500 - \$2K	628	7 DAYS	97.6%
\$2K - \$5K	453	10 DAYS	97.5%
\$5K - \$10K	56	25 DAYS	83.9%
\$10K - \$25K	54	30 DAYS	85.1%
\$25K - \$50K	15	60 DAYS	73.3%
Over \$50K	25	90 DAYS	92.0%

The Purchasing Unit processed 1902 purchase orders, 11 less than the 1913 processed in Qtr 2 of FY19 for a total value of \$10,770,038 versus a dollar value of \$24,523,913 in Qtr 2 of FY19.

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

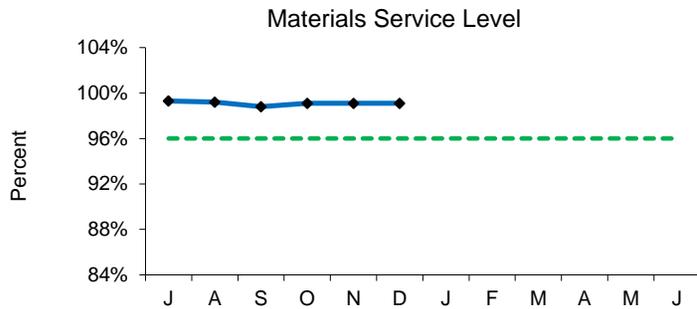
### Contracts, Change Orders and Amendments

Procurement processed twelve contracts with a value of \$27,998,868 and four amendments with a value of \$983,372. Twenty five change orders were executed during the period. The dollar value of all non-credit change orders during Q2 FY20 was \$1,808,571 and the value of credit change orders was (\$478,129).

Four contracts were not processed within the target timeframes. One contract (Insurane Broker Services FY20) was delayed due to additional insurance requirements necessary for insurance services. Insurance for all categories of coverage was obtained timely and according to schedule. A second contract was delayed due to a delay in the submittal of E-tables by the consultant. Another contract was delayed due to a delay in the submittal of financial statements by the contractor resulting in the need to process a change order. The final contract was delayed due to an unanticipated procurement issue which required the contract to be re-bid.

Staff reviewed 29 proposed change orders and 31 draft change orders.

## Materials Management 2nd Quarter - FY20



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 7,554 (99.1%) of the 7,621 items requested in Q2 from the inventory locations for a total dollar value of \$1,380,780.

## 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 – sensor cables, transmitters, junction boxes, flowmeters, flame sensor, signal processors and programmer for I&C; LED light fixtures for Electrical; diaphragm valve, hydrogen peroxide, gate operator, shim kits and motor control starters for Maintenance.
- Chelsea – LED lamps, ball valves, couplings, thermocouple and pressure switches for Work Coordination; air filters, lights, sensors and hydraulic couplers for Fleet Services; light fixtures for Electrical; manhole frames and covers for Pipeline; easel pads for Training; Permethrin repellent for Materials Management; square point shovels for Field Operations.
- Southboro – bleach wipes for Lab; air filters for Fleet Services.

Property Pass Program:

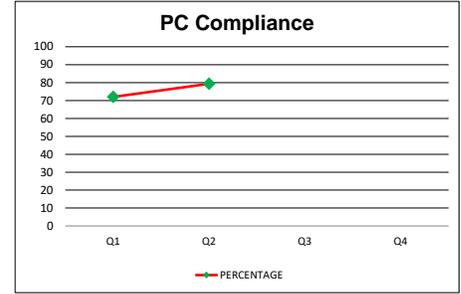
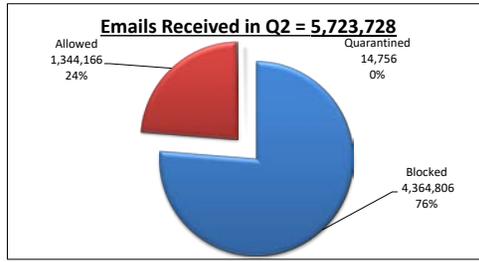
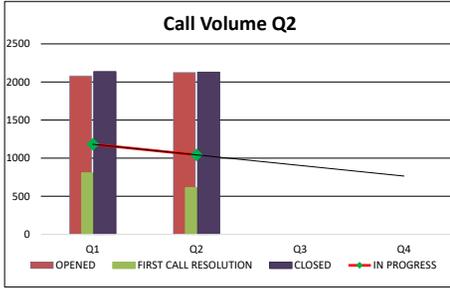
- Five audits were conducted during Q2.
- Scrap revenue received for Q2 amounted to 11,522. Year to date revenue received amounted to \$17,864.
- Revenue received from online auctions held during Q2 amounted to 72,318. Year to date revenue received amounted to \$187,037.

Items	Base Value July-19	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,462,463	8,576,666	-83,399
Spare Parts Inventory Value	9,183,923	9,044,929	-135,260
Total Inventory Value	17,646,386	17,621,595	-24,791

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

# MIS Program

## 2nd Quarter - FY20



### Performance & Backlog for Q2

- 2128 calls were completed this quarter.
- Call closure averaged 7.1 days.
- Priority 1 & 2 Service Level Agreements (SLA) were met this quarter.

### Cyber Security Q2

- In Q2, pushed 176 security fixes/updates to desktops/servers. 87% of all PCs/Laptops are compliant with approved patches.
- McAfee quarantined 11 distinct viruses from 10 PCs. PCs are current with antivirus signatures for known malware.
- 76% of all email was blocked upon initial receipt and evaluation.

**Audio/Visual Upgrades:** Vendor bids were received in October and vendor was selected in November. Purchase order was awarded in December and installations are set to begin in January 2020.

**Exchange Upgrade:** Exchange 2016 environment has been built. Change management activities have been approved to make the necessary changes in the production environment.

**AWIA Risk and Resiliency Assessment:** Purchase Order awarded to JANUS Associates. Phase 1 of cyber security assessment has begun and the final report for Phase 1 will be available at the end of January 2020.

**Chelsea Environmental Controls Monitoring System:** Original RFPQ posted in November. Revised Statement of Work (SOW) to be reposted in January 2020.

**PBX (Telephone System) Upgrade:** The Statement of Work (SOW) is being drafted for a new solution. The submission to procurement is planned for January 2020.

**Infrastructure Upgrades:** Clinton Treatment Plant server hardware infrastructure refresh and network circuit upgrade completed. Server hardware for Chelsea has been received and is being configured.

**DI Ops Hardware Segmentation:** File Servers and Print Servers are migrated. The application server migration will continue after Exchange project is completed.

**Infor/Lawson Upgrade:** The Statement of Work (SOW) has been drafted and is under review.

**Maximo:** Implemented multiple enhancements to the user interface in the Labor, Workorder Tracking, Preventative Maintenance (TR), and Self Service Applications.

**System Updates:** Version upgrades were completed for Portia, PIMS, and Crystal Reports.

**Enterprise Content Management (ECM)/e-Construction:** Posted ECM Event on Supplier portal including RFQ/P, SOW, and all related appendices and attachments. Began collecting and categorizing bidder's questions. Posted two new attachments on Supplier Portal - Attachment 1 Answers to Vendors questions and Attachment 2 Addenda to the SOW. In addition, Procurement extended Q&A to allow plan holders to submit any additional questions until Jan 3.

**Dental Certifications Application:** Demonstrated complete functionality to user Subject Matter Experts (SMEs) and management. Supported user testing and compiled initial User Acceptance Test (UAT) results. Began developing user training and job aid documents in preparation for a pilot dental office implementation in Q3.

**Contracts Management:** The MWRA's first Professional Services Contract went live on the Supplier Portal completing the implementation of the major Contract Types. Non-professional Services, MGL Chapter 30 Construction Contracts and MGL Chapter 149 Construction Contracts went live prior to this contract type.

**Library & Records Center:** The Library undertook 16 research requests, supplied 45 books for circulation, provided 25 articles, and 18 standards. The MWRA Library Portal supported 590 end user searches. Research topics included: Per- and Polyfluoroalkyl substances (PFAS) related to drinking water, funding opportunities for Electronic Vehicle charging stations, Amyntas agrestis (crazy worm) and the forest floor, and control systems cybersecurity. The Record Center (RC) added 105 new boxes to the RC and handled 249 total boxes. The RC manger attended 1 RCB meeting. The RC staff executed 4 rush requests (information needed within 24hrs) and electronically distributed 146 pages of technical information. The RC shredded on-site 9 bins of confidential documentation. The RC performed 28 database/physical box searches which saved the delivery of 11 boxes. Research included: Permitting information for Army Corp. of Engineers (ACOE) waterway licenses, Metro West Water Supply Tunnel (MWWST) contracts, Wiggins Pump Station, Castle Island Pump Station, and Couburn Atlantic Gelatin property records.

**IT Training:** 17 staff attended 5 classes this quarter. To date, 3% of the workforce has attended at least one class this year. Security Awareness trainings session were held at Chelsea and Deer Island. Conflict of Interest training sessions were held at Chelsea. Completed 29 work orders and 4 incidents. One (1) job aid was developed/updated and posted on the Intranet (Pipeline).

**Tunnel Redundancy:** Created and configured a new internet-exposed network, called a "DMZ", that is shielded by the firewall and has limited access to the MWRA Internal Administrative network. Worked with FusionTek, the Tunnel Redundancy Project contractor, to ensure that network-based routing and addressing for the document management and sharing solution, Microsoft SharePoint, were implemented correctly.

**Legal Matters**  
**2nd Quarter FY 2020**

**PROJECT ASSISTANCE**

**Real Estate, Contract, Environmental and Other Support:**

- **8(m) Permits:** Reviewed sixty-nine (69) 8(m) permits.
- **Real Property:** Prepared draft license for the Air Force Technical Applications Center for access to and use of certain designated areas at Deer Island. Drafted one-day license for entry to Oren Nichols House by the Southborough Historical Commission. Reviewed draft permit related to the use of MWRA's cell tower located at the Fells Reservoir for telecommunications equipment. Reviewed Quabbin Watershed Fee Acquisition, W-001220 for 117.8 acres in Shutesbury, MA, Wachusett Watershed Fee Acquisition, W-001221 for 46.05 acres in Princeton, MA, and Wachusett Watershed Fee Acquisition, W-001218 for 9.38 acres in Princeton, MA. Recorded certificates of compliance for orders of conditions for DEP 317-424 and 317-425 at the Hampshire County Registry of Deeds related to MWRA's fish hatchery project and MWRA's Quabbin Look Out Tower Security project in Ware, MA. Reviewed property rights for MWRA's Chicopee Valley Aqueduct (CVA) in the vicinity of 30 Bondsville Road in Ludlow, MA per the request of the landowner. Reviewed MWRA's property rights in Boston and Medford related to MWRA contract 7575 for low service PRV improvements. Reviewed MWRA's property interests in the area of Farwell Street in Newton, in the area of Charles Park Road in West Roxbury, in the area of Reservoir Lane in Newton, and for MWRA water main section 22 in Milton and Boston.
- **Boston Harbor Case:** Reviewed Semi-Annual Compliance and Progress Report.
- **Energy:** Reviewed interconnection service agreements with NGRID for the John Carroll Water Treatment Plant Solar PV and for the CVA Fish Hatchery Hydro Facility.
- **Miscellaneous:** Drafted summary of the Massachusetts law requiring the hands free use of mobile electronic devices by operators of motor vehicles.
- **Public Records Requests:** During the Second Quarter, MWRA received one hundred and thirty seven (137) public records requests and responded to one hundred and thirty-eight (138) public records requests.

**LABOR, EMPLOYMENT AND ADMINISTRATIVE**

**New Matters**

Three demands for arbitration were filed.

A union filed a charge of prohibited practice at the Massachusetts Department of Labor Relations alleging the MWRA violated Chapter 150E when it began deductions for paid medical and family leave under Chapter 175M.

## **Matters Concluded**

Received an arbitrator's decision in favor of the union finding that the MWRA violated the collective bargaining agreement when it terminated an employee.

Settled two arbitration cases alleging MWRA violated a collective bargaining agreement when it did not reclassify an employee's job.

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

Received a probable cause determination from the MCAD of a charge on the basis of age, sexual orientation and retaliation.

## **LITIGATION/CLAIMS**

**New lawsuits/claims:** MWRA v. Bharat Bhushan et al., C.A. No. 1984-CV-03586F: MWRA filed a Complaint for declaratory judgment and injunctive relief against Newton property owners who placed 90 cubic yards of fill on a portion of the Sudbury Aqueduct abutting their residential property. The Complaint alleges trespass and nuisance and seeks an order from the Court requiring the defendants to restore the affected portion of the Sudbury Aqueduct to its original condition and to enjoin them from any further encroachments onto the Sudbury Aqueduct land.

### **Significant Developments**

J' D'Amico v. MWRA, et al.: Mediation session was held on October 25, 2019.

Shea v. MWRA: Day 1 of Plaintiff's deposition was taken in November 2019.

MWRA v. N.E.L. Corporation, Dewberry Engineers, et al.  
Depositions of two MWRA employees were taken in December 2019.

**Closed Cases:** There are no closed cases.

**Closed Claims:** There are no closed claims.

**Subpoenas** During the 2<sup>nd</sup> Quarter of FY 2020, one subpoena was received and one subpoena was pending at the end of the Second Quarter FY 2020.

### **Wage Garnishments**

There are currently 14 Trustee Process matters, only one of which is considered active and monitored by Law Division.

**SUMMARY OF PENDING LITIGATION MATTERS**

<b>TYPE OF CASE/MATTER</b>	<b>As of Dec 2019</b>	<b>As of Sept 2019</b>	<b>As of June 2019</b>
Construction/Contract/Bid Protest (other than BHP)	2	2	3
Tort/Labor/Employment	4	4	5
Environmental/Regulatory/Other	2	2	2
Eminent Domain/Real Estate	0	0	0
<b>Total</b>	<b>8</b>	<b>8</b>	<b>10</b>
Other Litigation matters (restraining orders, etc.)	1	1	1
<b>Total – all pending lawsuits</b>	<b>9</b>	<b>9</b>	<b>11</b>
<b>Claims not in suit:</b>	0	0	1
Bankruptcy	0	0	0
Wage Garnishment	1	4	4
TRAC/Adjudicatory Appeals	0	1	1
Subpoenas	1	0	0
<b>TOTAL – ALL LITIGATION MATTERS</b>	<b>11</b>	<b>14</b>	<b>17</b>

**TRAC/MISC.**

**New Appeals:** There are no new appeals in 2<sup>nd</sup> Quarter FY 2020.

**Settlement by Agreement of Parties** There are no Settlement by Agreement of Parties in 2<sup>nd</sup> Quarter FY 2020.

**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 2<sup>nd</sup> Quarter FY 2020.

**Final Decisions** There are no Final Decisions issued in the 2<sup>nd</sup> Quarter FY 2020.

## INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES

### 2<sup>nd</sup> Quarter - FY20

#### Highlights

During 2<sup>nd</sup> quarter FY20, Internal Audit (IA) completed 2 incurred cost audits, Stantec and SAR Engineering. IA also completed 3 consultant preliminary reviews and 1 construction labor burden review.

Management advisory services included a report on CORI and background checks, Bay State Fertilizer 2019 financial results and investigation support. Work continues on verifying HEEC costs on the new Deer Island electric cable and on large equipment inspections.

#### Status of Recommendations

During FY20, 27 recommendations were closed of which 21 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
Review of Uniform Debit Card Program (3/30/18)	1	5	6
Fleet Services Process Review (6/30/18)	1	4	5
Fuel Use & Mileage Tracking (12/31/18)	3	5	8
Review of Purchase Card Activity (5/23/19)	1	10	11
Asset Tracking – Fleet Data Verification (8/21/19)	<u>10</u>	<u>6</u>	<u>16</u>
<b>Total Recommendations</b>	16	30	46

#### Cost Savings

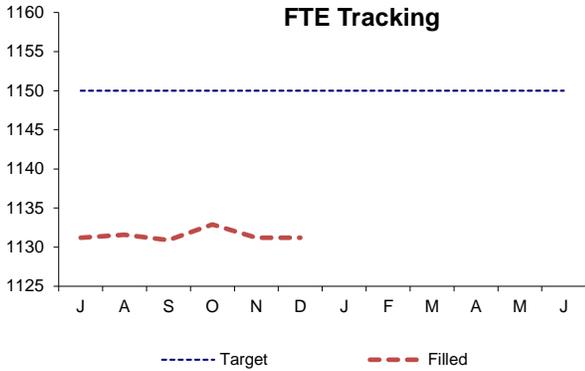
IA's target is to achieve at least \$1,000,000 in cost savings each year. Cost savings vary each year based upon many factors. In some cases, cost savings for one year may be the result of prior years' audits.

Cost Savings	FY16	FY17	FY18	FY19	FY20 Q2	TOTALS
Consultants	\$88,312	\$272,431	\$118,782	\$262,384	\$608,146	\$1,350,055
Contractors & Vendors	\$1,772,422	\$3,037,712	\$1,323,156	\$3,156,524	\$1,199,548	\$10,489,362
Internal Audits	\$220,929	\$224,178	\$204,202	\$210,063	\$106,634	\$966,006
<b>Total</b>	<b>\$2,081,663</b>	<b>\$3,534,321</b>	<b>\$1,646,140</b>	<b>\$3,628,971</b>	<b>\$1,914,328</b>	<b>\$12,805,423</b>

## OTHER MANAGEMENT

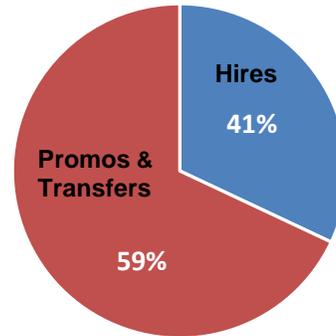
# Workforce Management

## 2nd Quarter - FY20



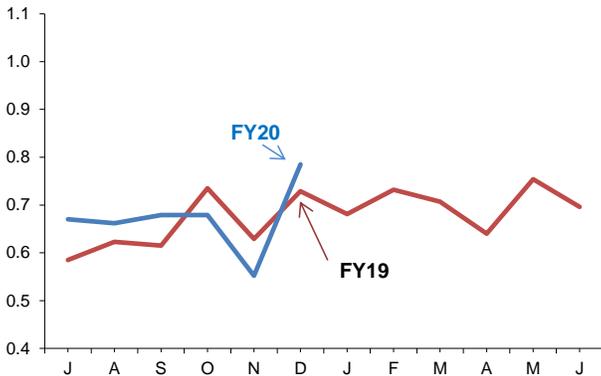
FY20 Target for FTE's = 1150  
 FTE's as of December 2019 = 1131.2  
 Tunnel Redundancy as of Dec 2019 = 7.0

**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	58 (59%)	40 (41%)	98

**Average Monthly Sick Leave Usage Per Employee**



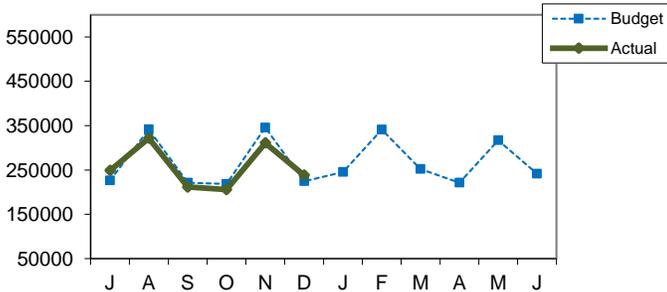
Average monthly sick leave for the 2nd Quarter of FY20 increased as compared to the 1st Quarter of FY19 (8.05 to 7.83)

**MWRA Average Cumulative Sick Leave Use By Division Per Employee**

	Number of Employees	YTD	Annualized Total	Annual FMLA %	FY19
Admin	138	3.57	7.14	26.6%	7.78
Aff. Action	5	5.26	10.53	10.3%	6.28
Executive	4	0.85	1.70	2.7%	7.05
Finance	32	2.76	5.51	0.0%	2.28
Int. Audit	6	3.35	6.69	16.2%	4.06
Law	12	3.24	6.48	12.5%	7.80
OEP	4	1.00	2.00	0.0%	5.97
Operations	930	4.16	8.32	22.3%	8.35
Tunnel Red	7	2.80	5.60	45.0%	8.11
Pub. Affs.	11	5.60	11.19	63.3%	4.45
<b>MWRA Avg</b>	<b>1149</b>	<b>1.34</b>	<b>8.05</b>	<b>22.9%</b>	<b>8.13</b>

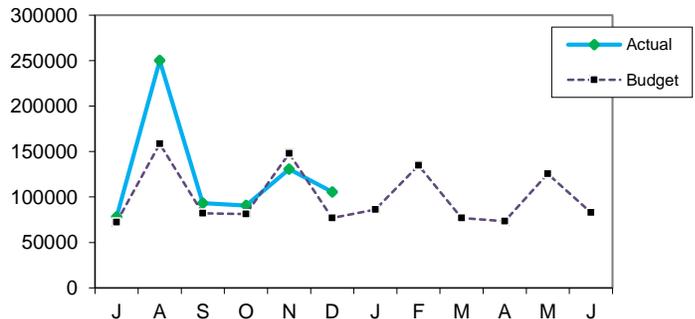
Percent of sick leave usage for FY20, attributable to Family and Medical Leave Act (FMLA) is 22.9% .

**Field Operations Current Month Overtime \$**



Total Overtime for Field Operations for the second quarter of 2020 was \$755k which is (\$34k) under budget. Emergency overtime was \$294k, which was (\$112k) under budget. Rain events totaled \$199k, CSO activation was \$9k, emergency maintenance was \$29.5k. Coverage overtime was \$149k, which was \$9k over budget, reflecting the month's shift coverage requirements. Planned overtime was \$312k or \$69k over budget, mainly for maintenance off-hours work at \$107k, community assistance (mainly quench buggy) at \$20k, and maintenance work completion at \$20k. Year-to-date, FOD has spent \$1.5m on overtime, which is (\$65k) under budget.

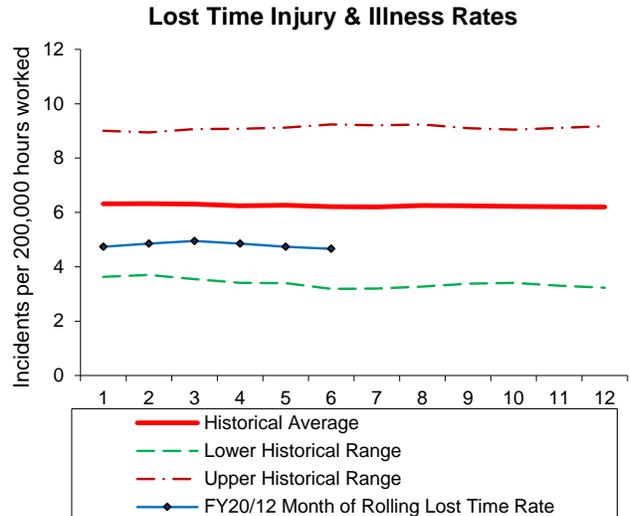
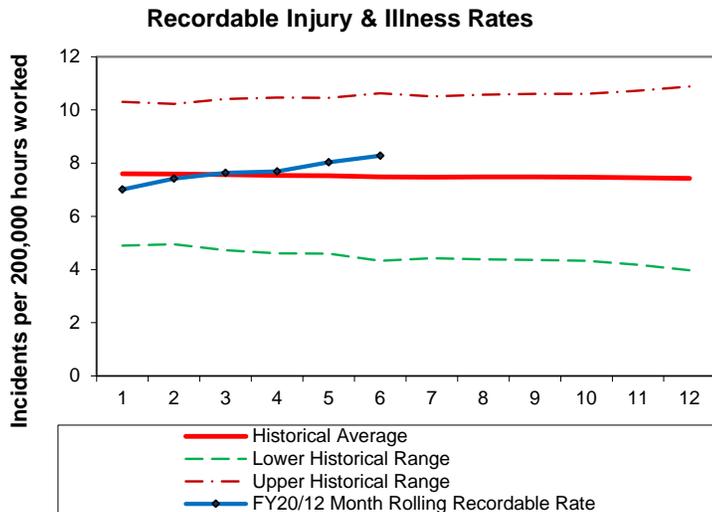
**Deer Island Treatment Plant Current Month Overtime \$**



Deer Island's total overtime expenditure for the second quarter was \$327k, which was \$21K or 7% over budget. In the second quarter Deer Island experienced higher than anticipated shift coverage requirements of \$22K and planned/unplanned overtime of \$15K. This is offset by less storm coverage of (\$17k). YTD Deer Island's overtime spending is \$748k which is \$129k or 21% over budget due to higher spending related to the HEEC cable outage of \$110k and shift coverage \$61k, offset by lower spending on storm coverage of (\$38K) and planned/unplanned overtime (non-HEEC related) of (\$4k). 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

2nd 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

	2nd Quarter Information		Open Claims
	New	Closed	
Lost Time	3	18	45
Medical Only	15	27	19
Report Only	18	18	
	<b>QYTD</b>		<b>FYTD</b>
Regular Duty Returns	7		14
Light Duty Returns	1		1
<b>Indemnity payments as of Dec 30 2019 included in open claims listed</b>			15

### COMMENTS:

#### Regular Duty Returns

**OCT** 3 Employees returned to full duty/no restrictions  
**NOV** 3 Employees returned to full duty/no restrictions  
**DECEMBER** 1 Employees returned to full duty/no restrictions

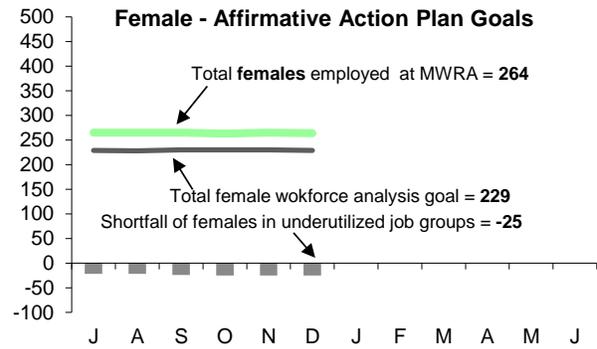
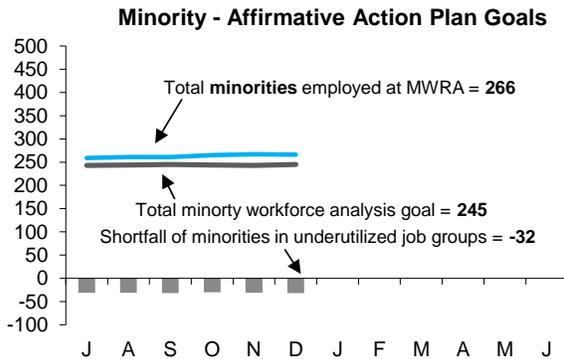
#### Light Duty Returns

**OCT** 1 Light Duty Return  
**NOV & DEC** N/A

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

## MWRA Job Group Representation

2nd Quarter - FY20



### Highlights:

At the end of Q2 FY20, 6 job groups or a total of 32 positions are underutilized by minorities as compared to 7 job groups for a total of 71 positions at the end of Q2 FY19; for females 7 job groups or a total of 25 positions are underutilized females as compared to 8 job groups or a total of 53 positions at the end of Q2 FY19. During Q2, 12 minorities and 6 females were hired. During this same period 4 minorities and 3 females were terminated.

### Underutilized Job Groups - Workforce Representation

Job Group	Employees	Minorities	Achievement	Minority	Females	Achievement	Female
	as of 12/31/2019	as of 12/31/2019	Level	Over or Under Underutilized	As of 12/31/2019	Level	Over or Under Underutilized
Administrator A	23	3	3	0	11	7	4
Administrator B	22	0	4	-4	6	5	1
Clerical A	27	11	6	5	24	17	7
Clerical B	25	9	5	4	5	10	-5
Engineer A	81	26	17	9	16	19	-3
Engineer B	63	22	14	8	16	12	4
Craft A	117	15	23	-8	0	3	-3
Craft B	146	22	28	-6	3	7	-4
Laborer	68	22	15	7	4	3	1
Management A	100	23	24	-1	34	39	-5
Management B	43	9	9	0	9	5	4
Operator A	65	4	13	-9	2	1	1
Operator B	66	18	10	8	3	1	2
Professional A	29	3	7	-4	19	14	5
Professional B	163	47	43	4	79	60	19
Para Professional	53	16	11	5	26	14	12
Technical A	52	14	12	2	7	11	-4
Technical B	6	2	1	1	0	1	-1
<b>Total</b>	<b>1149</b>	<b>266</b>	<b>245</b>	<b>53/-32</b>	<b>264</b>	<b>229</b>	<b>60/-25</b>

### AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition / Ext.	Int. / Ext.	Promotions/Transfers	AACU Ref. External	Position Status
Administrative B	Associate General Counsel	1	Ext.		0	0	NH = WF
Clerical B	Warehouse Materials Handler	3	Ext.		0	0	NH = (2WM) (HM)
Clerical B	Inventory Control Specialist	2	Int.		2	0	Promo = (HM) (WM)
Engineer A	Program Manager SCADA (Eng)	1	Int/Ext.		1	0	Promo = WM
Engineer A	Project Engineer	1	Int/Ext.		1	0	Promo = BM
Engineer A	Program Manager, Metro Meter Maint	1	Int.		1	0	Promo = WM
Craft A	M&O Specialist	2	Int/Ext.		2	0	Promo = 2WM
Craft A	WSS Foreman	2	Int.		2	0	Promo = 2WM
Craft B	Third Class Engineer	1	Ext.		0	0	NH = WM
Craft B	Specialty Valve Installer	2	Int.		2	0	Promo = 2WM
Craft B	Motor Equipment Repairman	1	Ext.		0	0	NH = WM
Craft B	Construction Pipelayer	1	Int.		1	0	Promo = WM
Craft B	Electrician	1	Ext.		0	0	NH = WM
Management A	Senior Program Manager (DISC)	1	Int/Ext.		1	0	Promo = BF
Management A	Manager, Wastewater Ops.	1	Int.		1	0	Promo = WM
Operators A	Sr. Transmission & Treatment Oper.	1	Int.		1	0	Promo = WM
Operators A	Area Supervisor	1	Int.		1	0	Promo = WM
Operators A	Supervisor, Inspection	1	Int.		1	0	Promo = WM
Professional A	Senior Staff Counsel	1	Ext.		0	0	NH = WF
Technical A	Business Systems Analyst III	1	Int.		1	0	Promo = WM
Technical A	Sr. Field Service Technician	2	Ext.		0	0	NH = 2WM

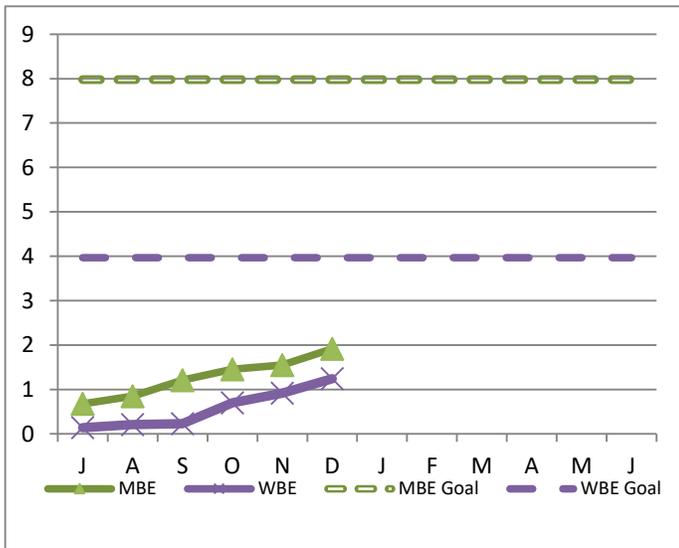
## MBE/WBE Expenditures

2nd Quarter - FY20

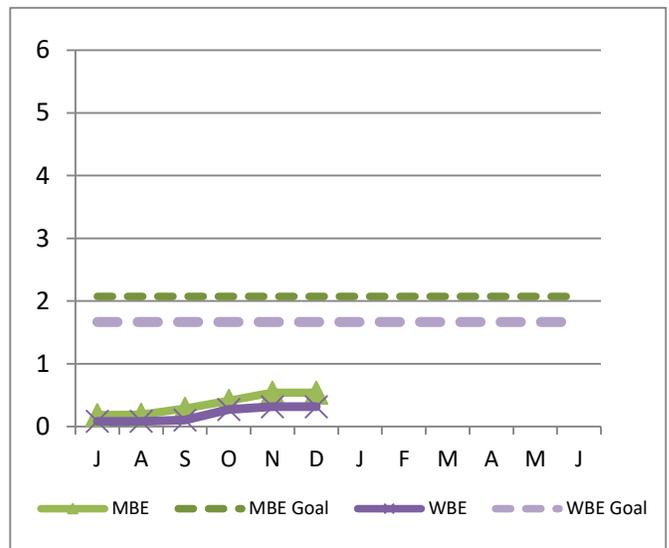
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY20 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they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

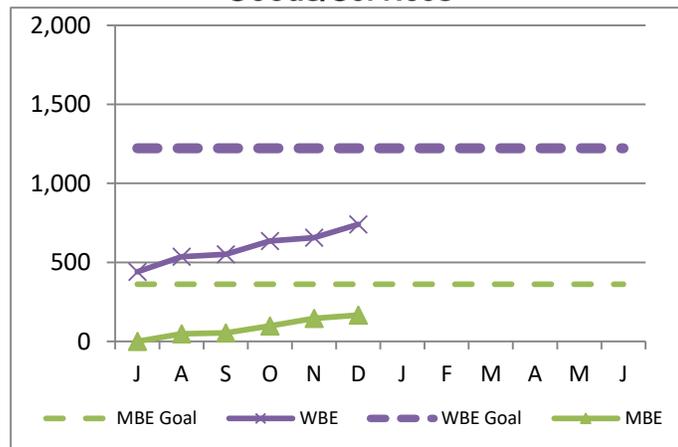
### Construction



### 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
1,914,688	24.0%	11,699,641	150.6%	Construction	1,241,634	31.3%	20,152,509	521.8%
540,271	26.0%	2,285,171	134.1%	Prof Svcs	317,162	19.0%	1,551,120	113.2%
166,429	46.0%	213,198	40.3%	Goods/Svcs	740,802	60.6%	780,760	46.7%
<b>2,621,388</b>	<b>25.2%</b>	<b>14,198,010</b>	<b>142.0%</b>	<b>Totals</b>	<b>2,299,598</b>	<b>33.5%</b>	<b>22,484,389</b>	<b>325.6%</b>

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

## MWRA FY20 CEB Expenses 2<sup>nd</sup> Quarter – FY20

As of December 2019, total expenses are \$368.0 million, \$8.6 million or 2.3% lower than budget, and total revenue is \$398.9 million, \$1.9 million or 0.5% over budget, for a net variance of \$10.5 million.

### Expenses –

**Direct Expenses** are \$117.4 million, \$5.1 million or 4.1% under budget.

- **Wages & Salaries** are under budget by \$2.0 million or 3.8%. Regular pay is \$2.1 million under budget, due to lower head count, and timing of backfilling positions. YTD through December, the average Full Time Equivalent (FTE) positions was 1,138, twenty fewer than the 1,158 FTE's budgeted.
- **Ongoing Maintenance** expense \$1.2 million or 7.1% under budget due to the actual timing of projects.
- **Professional Services** expenses are \$928k under budget or 20.8%, primarily due to under spending for Computer System Consultants of \$621k and \$169k underspending on Other Professional Services, including Finance and Law, partially offset by overspending of \$134k for Lab & Testing & Analysis.
- **Fringe Benefit** expenses are \$410k under budget or 3.9%, primarily due to under spending for Health Insurance of \$324k, driven by lower headcount.
- **Worker's Compensation** expenses are \$416k under budget or 35.4%, reflecting lower compensation payments of \$305k, medical payments of \$80k, and administrative expenses of \$31k.
- **Chemical** expenses are \$309k under budget or 4.8%, primarily due to lower than budget spending on Soda Ash at Carroll Water Treatment Plant and Clinton Plant of \$195k and lower Activated Carbon of \$188k is driven by DITP of \$156k due to lower than expected cost. The Deer Island Wastewater Treatment Plant flows are 1.6% higher than the budget and the Carroll Water Treatment Plant flows are 4% less than the budget through December. Higher flows at Deer Island resulted in increased sodium bisulfate usage which was \$135k over budget. Timing of deliveries is an important factor in chemical spending.
- **Utilities** are \$261k over budget or 2.2% as overspending on diesel \$743k for CTG usage at Deer Island during HEEC cable electrification and December fuel delivery was only partially offset by lower electricity spending of \$561k as CTG usage reduced electricity spending by \$248K at Deer Island and lower interval pricing contributed to the remaining negative electricity variance.
- **Other Materials** expenses are \$230k under budget or 8.9%, primarily due to underspending on computer hardware of \$357k in MIS and vehicle purchases/replacements of \$122k due to timing.

**Indirect Expenses** are \$21.5 million, \$3.5 million or 14.1% under budget driven by lower than expected Watershed Reimbursement of \$3.5 million due to lower costs associated with fringe benefits, compensation, equipment, major projects, and prior period adjustments.

**Debt Service Expenses** totaled \$229.0 million, right on budget, after \$5.0 million year-to-date savings was transferred to the defeasance account. The savings is the result of lower than budgeted variable rates and refunding savings.

### Revenue and Income –

**Total Revenue and Income** is \$398.9 million or \$1.9 million higher than budget primarily due to greater than budgeted other user charges of \$0.9 million driven by Stoughton's prepayment of its remaining Entrance Fee, disposal of equipment of \$257k, higher interest income of \$203k, RPS energy revenue of \$183k due to timing, and receipt of an unbudgeted operating grant for \$106k.

	Dec 2019 Year-to-Date			
	Period 6 YTD Budget	Period 6 YTD Actual	Period 6 YTD Variance	%
<b>EXPENSES</b>				
WAGES AND SALARIES	\$ 52,752,880	\$ 50,732,705	\$ (2,020,175)	-3.8%
OVERTIME	2,461,744	2,613,360	151,616	6.2%
FRINGE BENEFITS	10,642,977	10,232,647	(410,330)	-3.9%
WORKERS' COMPENSATION	1,177,128	760,729	(416,399)	-35.4%
CHEMICALS	6,438,332	6,128,834	(309,498)	-4.8%
ENERGY AND UTILITIES	11,997,847	12,258,993	261,146	2.2%
MAINTENANCE	17,087,171	15,875,827	(1,211,344)	-7.1%
TRAINING AND MEETINGS	261,685	181,928	(79,757)	-30.5%
PROFESSIONAL SERVICES	4,453,032	3,524,945	(928,087)	-20.8%
OTHER MATERIALS	2,572,695	2,342,604	(230,091)	-8.9%
OTHER SERVICES	12,616,271	12,732,635	116,364	0.9%
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 122,461,762</b>	<b>\$ 117,385,207</b>	<b>\$ (5,076,556)</b>	<b>-4.1%</b>
INSURANCE	\$ 1,305,611	\$ 1,230,136	\$ (75,475)	-5.8%
WATERSHED/PILOT	13,416,800	9,964,013	(3,452,787)	-25.7%
HEEC PAYMENT	1,155,631	1,155,630	(1)	0.0%
MITIGATION	827,309	825,534	(1,775)	-0.2%
ADDITIONS TO RESERVES	1,047,142	1,047,142	-	0.0%
RETIREMENT FUND	7,315,000	7,315,000	-	0.0%
POST EMPLOYEE BENEFITS	-	-	-	---
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 25,067,493</b>	<b>\$ 21,537,455</b>	<b>\$ (3,530,038)</b>	<b>-14.1%</b>
STATE REVOLVING FUND	\$ 43,837,982	\$ 43,741,190	\$ (96,792)	-0.2%
SENIOR DEBT	98,596,887	103,640,896	5,044,009	5.1%
DEBT SERVICE ASSISTANCE	(890,235)	(890,235)	-	0.0%
CURRENT REVENUE/CAPITAL	-	-	-	---
SUBORDINATE MWRA DEBT	85,877,606	79,856,604	(6,021,002)	-7.0%
LOCAL WATER PIPELINE CP	-	-	-	---
CAPITAL LEASE	1,608,530	1,608,530	-	0.0%
DEBT PREPAYMENT	-	-	-	---
VARIABLE DEBT	-	(3,901,462)	(3,901,462)	---
DEFEASANCE ACCOUNT	-	4,975,246	4,975,246	---
<b>TOTAL DEBT SERVICE</b>	<b>\$ 229,030,769</b>	<b>\$ 229,030,769</b>	<b>\$ -</b>	<b>0.0%</b>
<b>TOTAL EXPENSES</b>	<b>\$ 376,560,024</b>	<b>\$ 367,953,431</b>	<b>\$ (8,606,594)</b>	<b>-2.3%</b>
<b>REVENUE &amp; INCOME</b>				
RATE REVENUE	\$ 380,883,500	\$ 380,883,500	\$ -	0.0%
OTHER USER CHARGES	4,288,236	5,236,629	948,393	22.1%
OTHER REVENUE	4,161,344	4,951,838	790,494	19.0%
RATE STABILIZATION	-	-	-	---
INVESTMENT INCOME	7,605,377	7,808,459	203,082	2.7%
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 396,938,457</b>	<b>\$ 398,880,426</b>	<b>\$ 1,941,969</b>	<b>0.5%</b>

## Cost of Debt 2<sup>nd</sup> Quarter – FY20

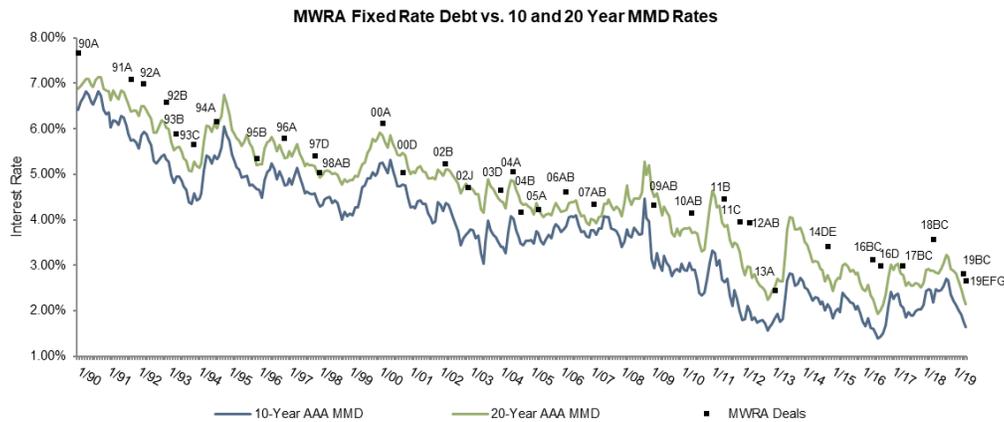
MWRA borrowing costs are a function of the fixed and variable tax exempt interest rate environment, the level of MWRA's variable interest rate exposure and the perceived creditworthiness of MWRA. Each of these factors has contributed to decreased MWRA borrowing costs since 1990.

### Average Cost of MWRA Debt FYTD

Fixed Debt (\$3.49 billion)	3.47%
Variable Debt (\$354.8 million)	1.84%
SRF Debt (\$921.4 million)	1.55%
<b>Weighted Average Debt Cost (\$4.94 billion)</b>	<b>2.97%</b>

### Most Recent Senior Fixed Debt Issue May 2019

2019 Series E, F & G (\$620.6 million) 2.66 %

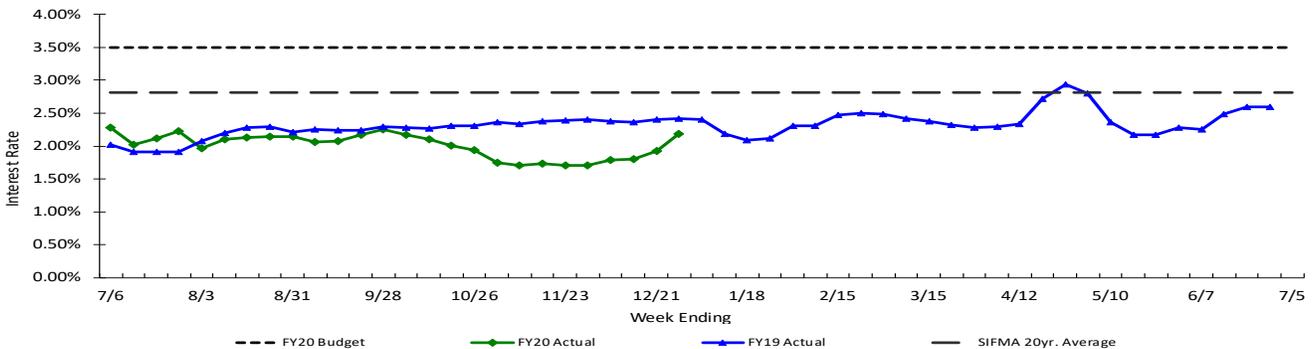


Bond Deal	1994A	1995B	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A	2004B	2005A	2006AB
Rate	6.15%	5.34%	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%	4.17%	4.22%	4.61%
Avg Life	19.5 yrs	20.5 yrs	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs	13.5 yrs	18.4 yrs	25.9 yrs

Bond Deal	2007AB	2009AB	2010AB	2011B	2011C	2012AB	2013A	2014D-F	2016BC	2016D	2017BC	2018BC	2019BC	2019EFG
Rate	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%	2.66%
Avg Life	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	18.8 yrs	11.2 yrs	11.7 yrs	11.9 yrs	9.73 yrs.

### Weekly Average Variable Interest Rates vs. Budget

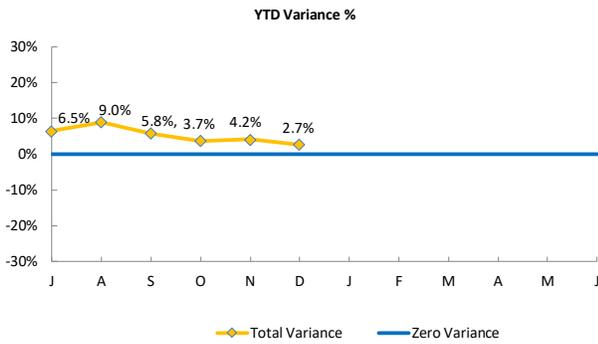
MWRA currently has ten variable rate debt issues with \$782.2 million outstanding, excluding commercial paper. Of the ten outstanding series, four have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In December, SIFMA rates ranged from a high of 1.61% to a low of 1.11% 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.



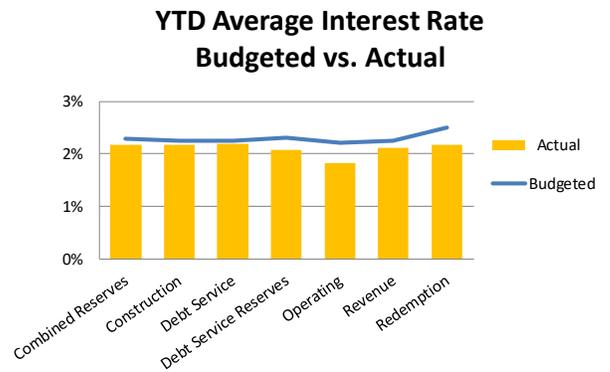
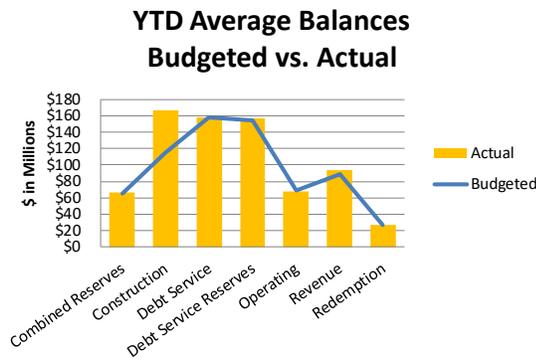
# Investment Income

## 2<sup>nd</sup> Quarter – FY20

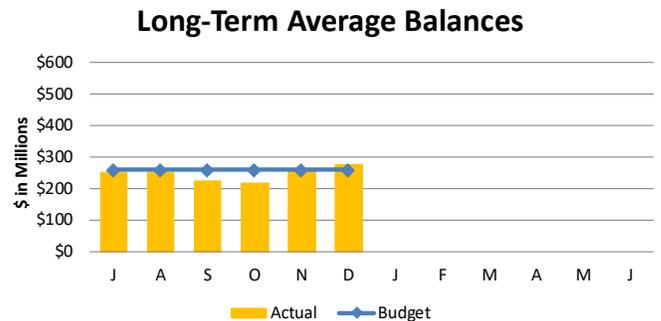
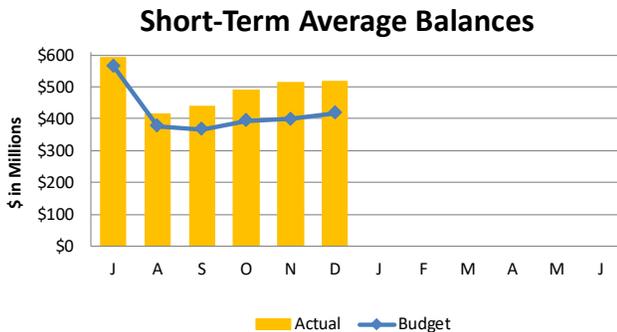
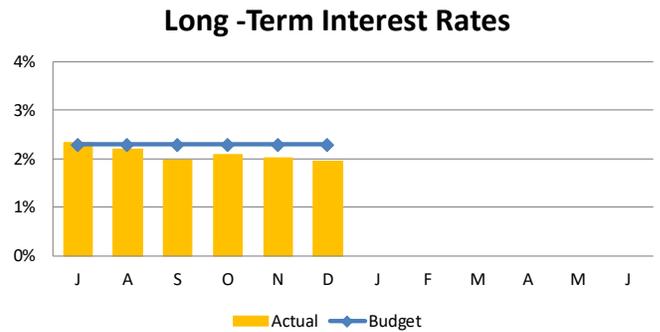
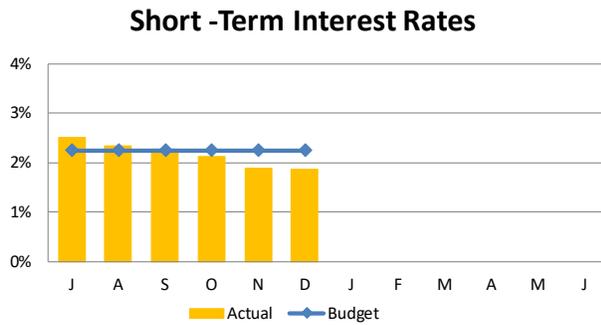
### Year To Date



	YTD BUDGET VARIANCE			
	(\$000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	\$16	(\$36)	(20)	-2.7%
Construction	\$588	(\$70)	518	40.6%
Debt Service	\$8	(\$40)	(32)	-1.8%
Debt Service Reserves	\$32	(\$183)	(152)	-8.6%
Operating	(\$12)	(\$59)	(71)	-9.4%
Revenue	\$61	(\$65)	(4)	-0.4%
Redemption	\$7	(\$44)	(37)	-11.3%
<b>Total Variance</b>	<b>\$700</b>	<b>(\$497)</b>	<b>\$203</b>	<b>2.7%</b>



### Monthly



## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Delegated Authority Report – January 2020



---

COMMITTEE: Administration, Finance & Audit

INFORMATION  
 VOTE

Linda Grasso, Admin. Systems Coordinator  
Barbara Aylward, Administrator A & F-  
Preparer/Title



Michele S. Gillen  
Director, Administration



Douglas J. Rice  
Director of Procurement

---

### RECOMMENDATION:

For information only. Attached is a listing of actions taken by the Executive Director under delegated authority for the period January 1 - 31, 2020.

This report is broken down into three sections:

- Awards of Construction, non-professional and professional services contracts and change orders and amendments in excess of \$25,000, including credit change orders and amendments in excess of \$25,000;
- Awards of purchase orders in excess of \$25,000; and
- Amendments to the Position Control Register, if applicable.

### BACKGROUND:

The Board of Directors' Management Policies and Procedures, as amended by the Board's vote on February 21, 2018, delegate authority to the Executive Director to approve the following:

Construction Contract Awards:

Up to \$1 million if the award is to the lowest bidder.

Change Orders:

Up to 25% of the original contract amount or \$250,000, whichever is less, where the change increases the contract amount, and for a term not exceeding an aggregate of six months; and for any amount and for any term, where the change decreases the contract amount. The delegations for cost increases and time can be restored by Board vote.

Professional Service Contract Awards:

Up to \$100,000 and one year with a firm; or up to \$50,000 and one year with an individual.

Non-Professional Service Contract Awards:

Up to \$250,000 if a competitive procurement process has been conducted, or up to \$100,000 if a procurement process other than a competitive process has been conducted.

Purchase or Lease of Equipment, Materials or Supplies:

Up to \$1 million if the award is to the lowest bidder.

Amendments:

Up to 25% of the original contract amount or \$250,000, whichever is less, and for a term not exceeding an aggregate of six months.

Amendments to the Position Control Register:

Amendments which result only in a change in cost center.

**BUDGET/FISCAL IMPACT:**

Recommendations for delegated authority approval include information on the budget/fiscal impact related to the action. For items funded through the capital budget, dollars are measured against the approved capital budget. If the dollars are in excess of the amount authorized in the budget, the amount will be covered within the five-year CIP spending cap. For items funded through the Current Expense Budget, variances are reported monthly and year-end projections are prepared at least twice per year. Staff review all variances and projections so that appropriate measures may be taken to ensure that overall spending is within the MWRA budget.

CONSTRUCTION/PROFESSIONAL SERVICES DELEGATED AUTHORITY ITEMS JANUARY 1 - 31, 2020

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMEND/CO	COMPANY	FINANCIAL IMPACT
C-1.	01/08/20	<b>WACHUSETT AQUEDUCT PUMPING STATION CONSTRUCTION</b> FURNISH AND INSTALL AN OPPOSED BLADE DAMPER IN EACH OF THE RETURN AIR DUCTS LOCATED IN THE MEZZANINE AREA.	7157	58	BHD/BEC, JOINT VENTURE 2015	\$35,574.00
C-2.	01/08/20	<b>MANAGEMENT, OPERATION AND MAINTENANCE OF THE UNION PARK PUMP STATION/CSO FACILITY AND THE UNMANNED STATIONS</b> INCREASE CONTRACT FUNDING ALLOWANCE TO PROVIDE FOR CORRECTIVE MAINTENANCE, MINOR REPAIRS AND SPARE PARTS TO PROCESS EQUIPMENT. (MWRA WILL PAY \$92,294 AND BWSC WILL PAY \$9,600).	\$559	1	WOODARD & CURRAN, INC.	\$101,894.00
C-3.	01/14/20	<b>FIRE ALARM SYSTEM SERVICES CENTRAL AND WESTERN MASSACHUSETTS</b> FINAL BALANCING CHANGE ORDER TO DECREASE THE FOLLOWING BID ITEMS TO REFLECT ACTUAL QUANTITIES USED: ON-SITE TESTING OF FIRE ALARM SYSTEMS, ON-SITE NON-EMERGENCY AND EMERGENCY REPAIR SERVICES, MANUFACTURER'S AUTHORIZED SERVICE REPRESENTATIVE, FIRE ALARM SYSTEM AND SPRINKLER MONITORING SERVICES, REPLACEMENT PARTS AND RENTAL EQUIPMENT.	OP-357	1	ENCORE HOLDINGS, LLC d/b/a ENCORE FIRE PROTECTION	(\$87,687.58)
C-4.	01/14/20	<b>69kV ELECTRICAL SYSTEMS MAINTENANCE</b> AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER TO PROVIDE PREVENTIVE MAINTENANCE AND REPAIR OF THE 69kV ELECTRICAL SYSTEMS AT THE JOHN J. CARROLL WATER TREATMENT PLANT FOR A TERM OF 1,095 CALENDAR DAYS.	OP-410	AWARD	INFRA-RED BUILDING AND POWER SERVICE, INC.	\$259,350.00
C-5.	01/14/20	<b>ELEVATOR MAINTENANCE AND REPAIR SERVICES - DEER ISLAND TREATMENT PLANT</b> AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER TO PROVIDE ELEVATOR MAINTENANCE AND REPAIR SERVICES AT THE DEER ISLAND TREATMENT PLANT FOR A TERM OF 1,095 CALENDAR DAYS.	\$585	AWARD	UNITED ELEVATOR COMPANY, INC.	\$793,952.00
C-6.	01/16/20	<b>AIR COMPRESSOR SYSTEM SERVICE</b> AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER TO PROVIDE AIR COMPRESSOR SYSTEM SERVICE AT VARIOUS MWRA FACILITIES FOR A TERM OF 730 CALENDAR DAYS.	OP-404	AWARD	COOLING & HEATING SPECIALISTS, INC.	\$148,300.00
C-7.	01/17/20	<b>FIRE PROTECTION SPRINKLER SYSTEM SERVICES</b> FINAL BALANCING CHANGE ORDER TO DECREASE THE FOLLOWING BID ITEMS TO REFLECT ACTUAL QUANTITIES USED: ON-SITE NON-EMERGENCY AND EMERGENCY REPAIRS, AUTHORIZED MANUFACTURER'S REPRESENTATIVE SERVICES, REPLACEMENT PARTS AND RENTAL EQUIPMENT.	OP-348	2	COGSWELL SPRINKLER COMPANY, INC.	(\$40,241.79)
C-8.	01/17/20	<b>HVAC SYSTEMS MAINTENANCE</b> AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER TO PROVIDE PREVENTATIVE MAINTENANCE AND REPAIR SERVICES TO HVAC SYSTEMS LOCATED AT VARIOUS MWRA FACILITIES FOR A TERM OF 730 CALENDAR DAYS.	OP-403	AWARD	ENE SYSTEMS, INC.	\$675,278.00
C-9.	01/28/20	<b>13.8kV ELECTRICAL SYSTEMS MAINTENANCE</b> AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER TO PROVIDE PREVENTATIVE MAINTENANCE AND REPAIR OF THE 13.8kV ELECTRICAL SYSTEMS AT THE AT THE JOHN J. CARROLL WATER TREATMENT PLANT FOR A TERM OF 1,095 CALENDAR DAYS.	OP-411	AWARD	INFRA-RED BUILDING AND POWER SERVICE, INC.	\$410,265.00

## PURCHASING DELEGATED AUTHORITY ITEMS JANUARY 1-31, 2020

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMENDMENT	COMPANY	FINANCIAL IMPACT
P-1	01/02/20	TESTING PHARMACEUTICALS IN INDUSTRIAL WASTEWATER SAMPLES AWARD OF A TWO-YEAR PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR TESTING PHARMACEUTICALS IN INDUSTRIAL WASTEWATER SAMPLES.	WRA-4795Q		TEKLAB, INC.	\$25,725.00
P-2	01/02/20	BACTERIAL SPECIES IDENTIFICATION IN DRINKING WATER SAMPLES AWARD OF A TWO-YEAR PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR BACTERIAL SPECIES IDENTIFICATION FOR DRINKING WATER SAMPLES FOR THE DEPARTMENT OF LABORATORY SERVICES.	WRA-4790Q		MIDI LABS, INC.	\$32,400.00
P-3	01/02/20	PURCHASE OF SEVEN THREE-YEAR MICROSOFT VISUAL STUDIO SUBSCRIPTIONS AWARD OF A PURCHASE ORDER FOR SEVEN THREE-YEAR MICROSOFT VISUAL STUDIO SUBSCRIPTIONS UNDER STATE CONTRACT ITSS8 TO THE LOWEST RESPONSIBLE BIDDER FOR THE PERIOD JANUARY 1, 2020 THROUGH JANUARY 1, 2023.	WRA-4792Q		CDW-G LLC	\$42,129.64
P-4	01/02/20	PURCHASE OF TWO IFIX HUMAN MACHINE INTERFACE COMPUTERS, SOFTWARE LICENSING AND MANUFACTURER'S SUPPORT AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR TWO IFIX HUMAN MACHINE INTERFACE COMPUTERS, SOFTWARE LICENSING AND MANUFACTURER'S SUPPORT FOR THE CLINTON WASTEWATER TREATMENT PLANT.	WRA-4754Q		AZTEC TECHNOLOGIES, INC.	\$58,275.00
P-5	01/10/20	MAINTENANCE AND SUPPORT OF CITRIX NETSCALER APPLIANCES, AND WORKSPACE SUITE AND XENMOBILE LICENSES AWARD OF A ONE-YEAR PURCHASE ORDER UNDER STATE CONTRACT ITC47, CATEGORY 6 TO THE LOWEST RESPONSIBLE BIDDER FOR MAINTENANCE AND SUPPORT OF CITRIX NETSCALER APPLIANCES, AND WORKSPACE AND XENMOBILE LICENSES FOR THE SERVICE PERIOD OF FEBRUARY 1, 2020 THROUGH FEBRUARY 1, 2021.	WRA-4787Q		INTRASYSTEMS, INC.	\$118,222.20
P-6	01/16/20	PURCHASE OF ONE PUMP ROTATING ASSEMBLY RE-AWARD OF A SOLE SOURCE PURCHASE ORDER FOR ONE PUMP ROTATING ASSEMBLY FOR THE QUINCY PUMP STATION.			GRUNDFOS WATER UTILITY, INC.	\$60,000.00
P-7	01/17/20	PURCHASE OF TWO REPLACEMENT HEAT EXCHANGER PLATE PACKS AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR TWO REPLACEMENT HEAT EXCHANGER PLATE PACKS.	WRA-4793Q		PROCESS SOLUTIONS	\$39,920.00
P-8	01/23/20	PURCHASE OF THIRTEEN ALUMINUM HATCH ASSEMBLIES AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR THIRTEEN ALUMINUM HATCH ASSEMBLIES FOR SIPHON STRUCTURES AT VARIOUS LOCATIONS.	WRA-4765		EI USA, INC.	\$119,078.49
P-9	01/24/20	MOBILE MASSACHUSETTS STATE VEHICLE INSPECTIONS AWARD OF A ONE-YEAR PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR MOBILE MASSACHUSETTS STATE VEHICLE INSPECTIONS.	WRA-4801Q		BAYSTATE MOBILE INSPECTIONS	\$26,375.00
P-10	01/28/20	PURCHASE OF ONE NEW MOBILE WATER DISPENSING UNIT AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR ONE NEW MOBILE WATER DISPENSING UNIT (PORTABLE WATER FOUNTAIN) USED FOR COMMUNITY EVENTS.	WRA-4794		EVENT EQUIPMENT DISTRIBUTORS, INC. O/A FESTEQUIP	\$51,300.00
P-11	01/30/20	SURVEY SERVICES TECHNICAL ASSISTANCE AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR SURVEY SERVICES TECHNICAL ASSISTANCE.	WRA-4788		JAMES PETERSON, DBA, ALPHA SURVEY GROUP, LLC	\$150,000.00

### STAFF SUMMARY

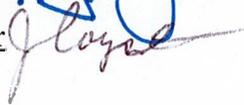
**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Fiscal Year 2020 Mid-Year Capital Improvement Program Spending Report

---

COMMITTEE: Administration, Finance & Audit

INFORMATION  
 VOTE

Michael J. Cole, Budget Director 

James J. Coyne, Budget Manager 

Preparer/Title

  
Thomas J. Durkin

Director, Finance

---

### RECOMMENDATION:

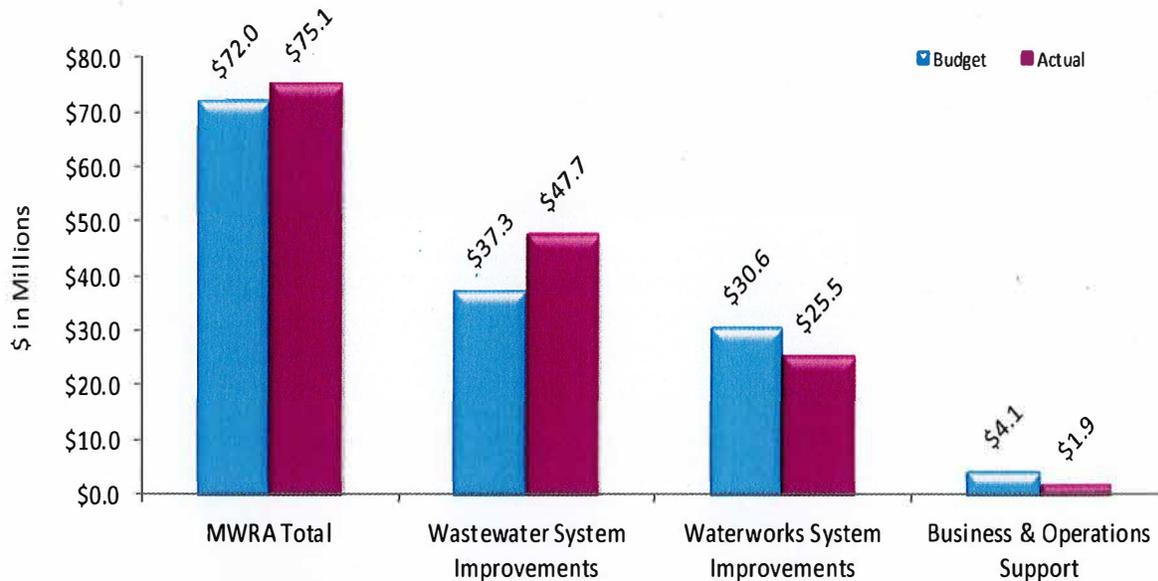
For information only. The Fiscal Year 2020 Mid-Year Capital Improvement Program Spending Report highlights major capital program accomplishments and provides explanations for spending variances and schedule changes versus the budget.

### DISCUSSION:

FY20 actual spending for the first half of the year is \$75.1 million compared to a budgeted amount of \$72.0 million which is \$3.1 million or 4.3% greater than budget. The projected spending for FY20, based on the FY21 Proposed CIP, is estimated at \$173.3 million versus the budget of \$199.5 million which is \$26.2 million or 13.1% less than budget as compared to the historical 18% variance below budget spending pattern. After accounting for programs which are not directly under MWRA's control, the projected spending for FY20 is estimated at \$139.5 million versus the budget of \$162.5 million which is \$22.7 million or 14% less than budget as compared with a historical 23% variance below budget spending pattern.

Projected spending may decline due to some major projects that have not yet been awarded. These include the Deer Island Primary and Secondary Clarifier Rehabilitation Phase 2 Construction, New Connecting Mains CP-3 Sections 23, 24, and 47 Rehabilitation, Prison Point Rehabilitation Construction, Dorchester Interceptor Sewer Construction, and the Nut Island Odor Control and HVAC Improvements Construction which was awarded later than anticipated. Staff are meeting monthly to discuss planned projects and issues that need to be resolved to ensure timely award of contracts.

**FY20 CIP Spending  
Year-To-Date  
December**



Projects that were completed or reached substantial completion in the first half of FY20 included:

Wastewater System Improvements

- Clinton Wastewater Treatment Plant Roofing Rehabilitation
  - Total Project Cost: \$0.8 million
  - Completion Date: December 2019
  - Total Project Duration: 1.3 years
  
- Deer Island Water Tank Painting
  - Total Project Cost: \$2.6 million
  - Completion Date: August 2019
  - Total Project Duration: 0.7 years
  
- Deer Island As-Needed Design 8-1
  - Total Project Cost: \$0.6 million
  - Completion Date: July 2019
  - Total Project Duration: 3 years
  -
  
- Deer Island As-Needed Design 8-2
  - Total Project Cost: \$0.8 million
  - Completion Date: July 2019
  - Total Project Duration: 3 years
  
- Cathodic Protection Metro West Tunnel Shafts E & L
  - Total Project Cost: \$0.9 million

- Completion Date: August 2019
- Total Project Duration: 0.6 years
- Bellevue 2/Turkey Hill Water Tank Painting
  - Total Project Cost: \$4.6 million
  - Completion Date: October 2019
  - Total Project Duration: 1.2 years

MWRA also has a number of projects currently in design or under construction. Expenditures for some of the larger active contracts are:

Wastewater System Improvements

<b>Project</b>	<b>FY20 Budget (\$ in millions)</b>	<b>Expenditures Thr. December 2019</b>	<b>% Complete</b>
Chelsea Creek Headworks Upgrades Construction	\$82.5	\$53.1	64%
Deer Island Gravity Thickener Rehabilitation	\$19.7	\$8.5	43%
Deer Island Winthrop Terminal Facility Variable Frequency Drives Construction	\$12.0	\$8.2	68%
Residuals Electrical/Mechanical/Drum Dryer Replacements	\$10.1	\$6.2	61%
Deer Island Chemical Tank and Digester Pipe Construction	\$8.0	\$0.5	6%
Nut Island Odor Control and HVAC Design/Construction Administration/Resident Engineering Inspection	\$6.2	\$3.1	50%
Wastewater Metering Planning/Study/Design	\$3.9	\$1.9	49%
CSO Performance Assessment	\$3.9	\$2.5	64%
Prison Point Rehabilitation Design/Construction Administration/Resident Inspection	\$3.4	\$1.8	53%
Deer Island Clarifier Rehabilitation Phase 2 Design	\$2.4	\$1.2	50%

Waterworks System Improvements

Project	FY20 Budget (\$ in millions)	Expenditures Thr. December 2019	% Complete
Northern Intermediate High Sections 89 and 29 Redundancy Phase 2 Construction	\$24.8	\$23.7	96%
Southern Extra High Section 111 Phase 3 Construction	\$19.1	\$8.6	45%
Southern Extra High Section 111 Phase 2 Construction	\$18.4	\$17.1	93%
Metropolitan Tunnel Redundancy Program Support Services	\$17.5	\$1.2	7%
Weston Aqueduct Supply Mains 3 Design/Construction Administration/Resident Inspection	\$15.5	\$3.0	19%
Commonwealth Avenue Pumping Station Improvements Construction	\$6.9	\$3.2	46%
Replace Sections 25, 75, 59 and 60 Design/Construction Administration	\$6.5	\$0.5	8%
Northern Low Service Sections 50/57 Water and Sections 21/20/19 Sewer Design/Engineering Services During Construction	\$6.0	\$2.9	48%
Carroll Water Treatment Plant SCADA Upgrade Design/Programming Resident Engineering Inspection	\$4.7	\$1.2	26%
Northern Intermediate High Sections 89 and 29 Replacement Design/Engineering Services During Construction	\$3.9	\$1.5	38%

**Community Financial Assistance**

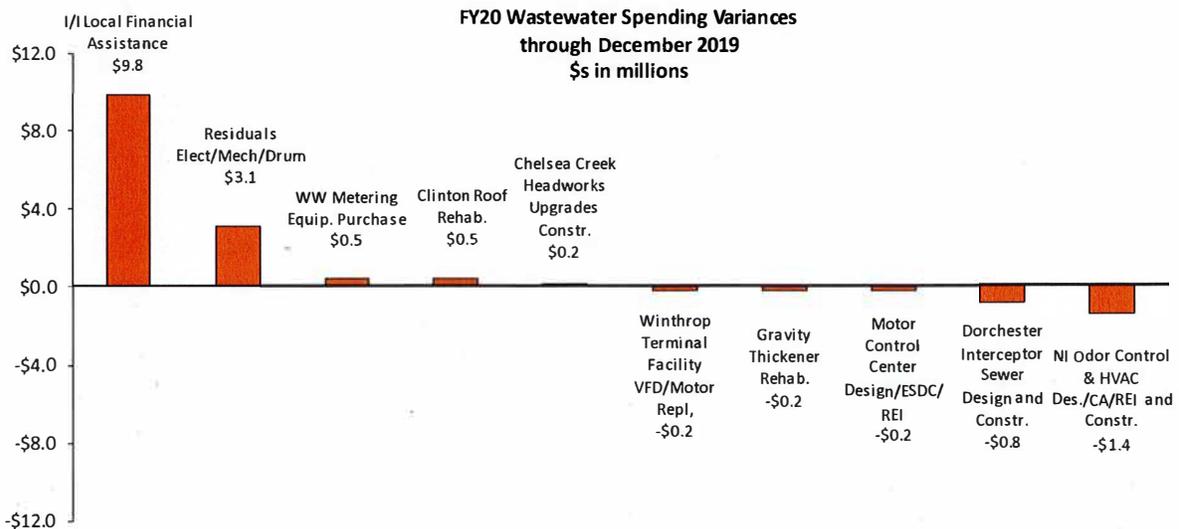
In the first half of FY20, MWRA continued support for the community financial assistance programs by providing funding distributions totaling \$39.4 million made up of wastewater infiltration and inflow (I/I) (\$25.3 million) and water pipeline improvements (\$14.1 million, including \$2.2 million for lead service replacement).

## Major Variances to FY20 Budget

FY20 Capital Improvement Program Spending Through December 2019 (\$000s)					
Program	Budgeted Spending	Actual Spending	Variance to Budget		% of Total YTD Actual Spending
			\$	%	
<b>Total Wastewater System</b>	<b>\$37,324</b>	<b>\$47,702</b>	<b>\$10,378</b>	<b>28%</b>	<b>64%</b>
Interception & Pumping	\$14,647	\$12,474	(\$2,173)	-15%	17%
Treatment	\$7,003	\$6,486	(\$518)	-7%	9%
Residuals	\$2,926	\$6,084	\$3,158	0%	8%
Combined Sewer Overflow	\$584	\$675	\$91	16%	1%
Other Wastewater Programs	\$12,164	\$21,983	\$9,819	81%	29%
<b>Total Waterworks System</b>	<b>\$30,591</b>	<b>\$25,476</b>	<b>(\$5,114)</b>	<b>-17%</b>	<b>34%</b>
Drinking Water Quality Improvements	\$1,027	\$663	(\$364)	-35%	1%
Transmission	\$6,964	\$6,294	(\$670)	-10%	8%
Distribution and Pumping	\$16,826	\$15,265	(\$1,560)	-9%	20%
Other Waterworks Programs	\$5,775	\$3,254	(\$2,521)	-44%	4%
<b>Business &amp; Operations Support</b>	<b>\$4,061</b>	<b>\$1,917</b>	<b>(\$2,144)</b>	<b>-53%</b>	<b>3%</b>
<b>Total MWRA (without Contingency)</b>	<b>\$71,976</b>	<b>\$75,095</b>	<b>\$3,119</b>	<b>4%</b>	<b>100%</b>

### Wastewater System Improvements

Wastewater year-to-date spending was \$47.7 million, \$10.4 million or 27.8% above budget. The graph below reflects a selection of contract variances greater than \$200,000:



The main reasons for the project spending variances in order of magnitude are:

**Other Wastewater:** Net overspending of \$9.8 million

- \$9.8 million for Community I/I due to greater than anticipated budgeted requests for grants and loans.

**Residuals:** Net overspending of \$3.2 million

- \$3.1 million for Electrical, Mechanical, and Dryer Drum Improvements due to greater than anticipated contractor progress and engineering costs.

**Interception & Pumping:** Net underspending of \$2.2 million

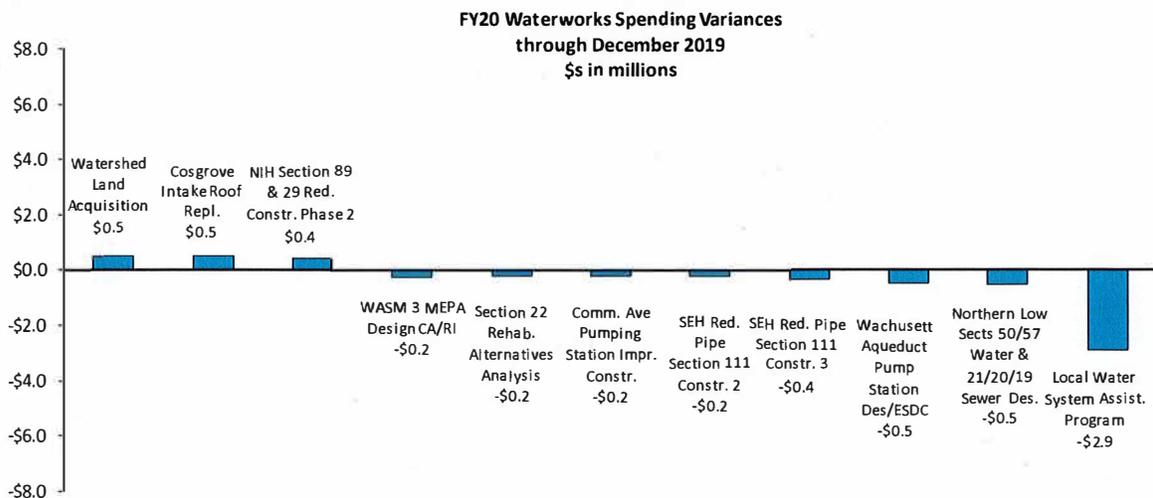
- \$1.4 million for Nut Island Odor Control HVAC Improvements Design/CA/RI and Construction and \$0.8 million for Dorchester Interceptor Sewer Design and Construction due to delay in construction awards.
- This underspending was partially offset by overspending of \$0.5 million for Wastewater Metering Equipment due to equipment purchased earlier than anticipated and \$0.2 million for Chelsea Creek Headworks Upgrades construction due to greater than anticipated contractor progress.

**Wastewater Treatment:** Net underspending of \$0.5 million

- \$0.2 million for Gravity Thickener Rehabilitation and \$0.2 million for Motor Control Center Switchgear Replacement Design/ESDC/REI.
- \$0.2 million for Winthrop Terminal Facility VFD and Motors Replacements due to vibration issue with VFD No. 5.
- This underspending was partially offset by overspending of \$0.5 million for Clinton Roofing Rehabilitation due to work scheduled in FY19 that was completed in FY20.

**Waterworks System Improvements**

Waterworks actual spending was \$25.5 million, \$5.1 million or 16.7% less than budget. The graph below reflects a selection of contract variances greater than \$200,000:



The main reasons for the Waterworks project spending variances in order of magnitude are:

**Other Waterworks:** Net underspending of \$2.5 million

- \$2.9 million for the Local Water System Assistance Program due to less than budgeted loan requests.

- This underspending was partially offset by overspending of \$0.5 million for Cosgrove Intake Roof Replacement due to work scheduled in FY19 that was completed in FY20.

**Water Distribution and Pumping:** Net underspending of \$1.6 million

- \$0.4 million for Southern Extra High Redundancy Construction 3 due to an issue with MBTA crossing and \$0.2 million for Construction 2 due to paving delays.
- \$0.5 million for Sections 50, 57 Water and Sections 21, 20, 19 Sewer Design due to consultants scheduled tasks being less than anticipated.
- \$0.2 million for Section 22 Rehabilitation Alternatives Analysis and Environmental Permitting due to schedule change.
- This underspending was partially offset by overspending of \$0.4 million for Northern Intermediate High Section 89 & 29 Redundancy Construction Phase 2 due to contractor progress.

**Waterworks Transmission:** Net underspending of \$0.7 million

- \$0.5 million for Wachusett Aqueduct Pump Station Design/ESDC/REI due to underspending of some of the sub-tasks which will be reallocated to other sub-tasks.
- \$0.2 million for WASM 3 MEPA/Design/CA/RI and \$0.2 million for Commonwealth Avenue Pumping Station Construction due to progress being less than anticipated.
- This underspending was partially offset by \$0.5 million for Watershed Land Acquisition due to timing of land purchases.

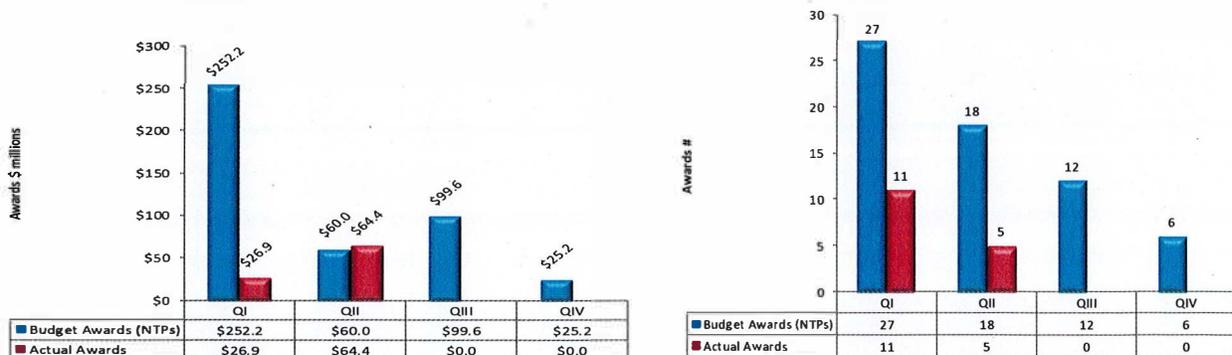
**Business & Operations Support:** Net underspending of \$2.1 million

- \$1.0 million for the timing of MIS work, \$0.4 million for timing of vehicle purchases, \$0.4 million for As-Needed Technical Assistance and Resident Engineering and Inspection Services due to lower than projected task order work, and \$0.3 million for Security Equipment & Installation due to timing of security initiatives.

Please refer to Attachment A for detailed FY20 CIP variance explanations.

**Status of Contract Awards Planned for FY20**

MWRA’s FY20 CIP projected 63 contracts to be awarded with a value of \$437.0 million. Through mid-year, MWRA has awarded 16 contracts with a value of \$91.3 million or 29.2% of the \$312.2 million planned. This total includes the \$57.6 million Nut Island Odor Control HVAC contract which was to be awarded in December, but was delayed until January with the cancellation of December’s Board meeting. Clarifier Rehabilitation Phase 2 Construction, with an estimated award value of \$135 million, was expected to commence this past August, but has been delayed until late FY20.



planned contract awards for FY20 and have updated assumptions based on new information. By the end of FY20, staff expect to award 25 additional planned contracts valued at \$217.9 million for a total of 41 contracts valued at \$309.2 million (\$135 million of which is the Clarifier Rehabilitation contract expected to be awarded by the end of FY20).

The primary reasons for not expecting to award all contracts in FY20 are:

- Six projects have been delayed due to changes in scope that have required additional work;
- Six projects whose schedules have been modified;
- Six projects have been deleted and are being either combined with another project, are on hold or will be handled through as-needed technical assistance;
- Three projects with Bidder Issue/Outside Design Delay/Contractor issue/Additional specifications review; and
- Four projects were delayed due to permitting.

The table below summarizes the total number of capital contract awards planned for FY20 and highlights the number planned for award during the second half of FY20.

Please refer to Attachment B for contract award status for all FY20 budgeted contracts.

**Recap of Planned FY20 Contract Awards**

	# of Awards	\$ Award
<b>Total Planned Awards per FY20 CIP</b>	<b>63</b>	<b>\$ 437.0</b>
Actual Awards in First Half FY20	13	86.7
Actual Unplanned Awards in First Half FY20	3	4.7
Planned Awards in Second Half of FY20	28	223.1
<b>Subtotal</b>	<b>44</b>	<b>\$ 314.5</b>
Shifted Beyond FY20 - Scope/Priority Change/Issues/Permit	16	133.2
Deleted/Transferred from CIP/Project on hold	4	4.1
<b>Total Projects Planned to be awarded in FY20</b>	<b>44</b>	<b>\$ 314.5</b>

**The following contracts were awarded in the first half of FY20:**

- Nut Island Odor Control HVAC Improvements Construction - \$57.6 million
- Deer Island Chemical Tank and Digester Pipe - \$8.5 million
- Deer Island As Needed Designs 9-1,2, & 3 - \$5.4 million (3 awards)
- NHS Section 53 & 99 Connections Design/Construction Administration - \$5.0 million
- Residuals Pellet Pipe Relocation - \$4.3 million
- NHS Section 56 Replacement/Saugus Design/Construction Administration - \$3.3 million
- Southern Spine Distribution Mains Section 22 Rehabilitation and & Environmental Review - \$2.9 million
- Charles River Valley Sewer Sections 191 & 192 Rehabilitation - \$1.6 million
- Deer Island Gas Protection Equipment Replacement - \$1.4 million
- CWTP HVAC Equipment Replacement - \$0.4 million
- Quinapoxet Dam Removal Design/Engineer Services During Construction - \$0.4 million
- Wachusett Dam Lower Gatehouse Interim Pipe Replacement - \$0.3 million
- Information Security Program Information Security Plan – \$0.2 million

- Information Security Program Active Directory - \$0.1 million

**Major Awards Planned for the 2<sup>nd</sup> Half of FY20**

Looking ahead to the second half of FY20, the MWRA anticipates awarding several major construction contracts. The largest of these projects are listed below:

<b>Major Planned Construction Contract Awards for Second Half of FY20</b>		
<b>Project</b>	<b>Contract</b>	<b>FY20 Budget in millions</b>
Deer Island Asset Protection	Clarifier Rehabilitation Phase 2 Construction	\$135.0
New Connecting Mains - Shaft 7 to WASM 3	CP3-Sections 23, 24,47 Rehab	\$14.3
Deer Island Asset Protection	Motor Control & Switchgear Replacement	\$10.6
Facility Asset Protection	Dorchester Interceptor Sewer Construction	\$5.6
Wastewater Meter System Equipment	Wastewater Metering Asset Protection/Equipment Purchase	\$3.7
Quabbin Transmission System	Wachusett Lower Gate House Pipe Replacement Construction	\$2.6
Metropolitan Redundancy Interim Improvements	CP1 Shafts 6, 8, 9A	\$2.1
Facility Asset Protection	Fuel Oil Tank Replacement Construction Phase 1	\$1.4
Sudbury/Weston Aqueduct Repairs	Weston Aqueduct Sluice Gates Construction	\$1.1
Carroll Water Treatment Plant	Cosgrove Boat Storage & Drainage	\$1.0
Clinton Wastewater Treatment Plant	Valves & Screw Pumps Replacement (contract modified for valves only)	\$0.5
<b>Total</b>		<b>\$177.9</b>

MWRA also anticipates awarding several significant professional services contracts. The largest contracts are listed below:

<b>Major Planned Professional Services Awards for Second Half of FY20</b>		
<b>Project</b>	<b>Contract</b>	<b>FY20 Budget in millions</b>
Metropolitan Redundancy Tunnel	Preliminary Design and MEPA Review	\$16.0
Deer Island Asset Protection	Clarifier Rehab Phase 2 - Resident Engineering/Inspection	\$3.0
Siphon Structure Rehab	Design/Construction Services/Resident Inspection	\$1.6
Facility Asset Protection	Hayes Pump Station Rehabilitation Design	\$1.5
Deer Island Asset Protection	Eastern Seawall Design/Engineering Services	\$1.2
Applications Improvements Program	Enterprise Content Mgmt	\$1.0
Watershed Division Capital Improvements	Maintenance Garage/Wash Bay/Storage Building Design/Construction Admin/Resident Inspection	\$1.0
Facility Asset Protection	Interceptor Renewal 7 Malden/Melrose Study	\$0.9
Metropolitan Redundancy Interim Improvements	Top of Shafts Resident Engineering/Inspection	\$0.8
MWRA Facilities Management	Design/Engineering Services Old Administration Building Demolition	\$0.6
<b>Total</b>		<b>\$27.6</b>

In the second half of the FY20, MWRA also anticipates substantial completion on major contracts including NIH Section 89 & 29 Redundancy Construction Phase 2, SEH Redundancy Pipeline Section 111 Construction 2, Cosgrove Intake Roof Replacement, and Carroll Water Treatment Plant Emergency Generator No. 1 Replacement.

**ATTACHMENTS:**

- A. FY20 CIP Variance Explanations through December 2019
- B. FY20 CIP Contract Award Update

**ATTACHMENT A**  
**FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD December	FY20 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
<b>Wastewater</b>					
Interception & Pumping (I&P)	\$14,647	\$12,474	(\$2,173)	-14.8%	<u>Underspending</u> Nut Island Odor Control & HVAC Improvements - Construction: \$1.1M (schedule shift) Interceptor Renewal No. 3, Dorchester Interceptor Sewer - Design, CA/RI and Construction: \$825k (schedule shift) Nut Island Odor Control & HVAC Design/CA/REI: \$258k (CA and REI services delayed as a result of construction schedule shift) Wastewater Meter System Planning/Study/Design: \$180k, and Wastewater Central Monitoring Design & Programming Services: \$141k (less than anticipated budgeted work) Prison Point Rehabilitation - Design/CA/RI: \$167k (delay in 100% Design Report review) Sections 191 & 192 Rehabilitation: \$125k (delay in the contract notice-to-proceed) Other smaller projects totaling \$178k. <u>Offset Overspending</u> Wastewater Metering Asset Protection/Equipment Purchases: \$486k (sooner than anticipated equipment purchases) Chelsea Creek Headworks Upgrades - Construction: \$164k (contractor progress) Remote Headworks & Deer Island Shaft - Study: \$151k (timing of work)
Treatment	\$7,003	\$6,486	(\$518)	-7.4%	<u>Underspending</u> As-Needed Design: \$281k (less than anticipated task order work) Gravity Thickener Rehab: \$216k, Motor Control Center Switchgear Replacement/ESDC/REI \$154k, and Combined Heat and Power Energy Alternatives Study: \$105k (timing of work) Winthrop Terminal Facility VFD: \$182k (vibration issue with VFD No. 5) <u>Offset Overspending</u> Clinton Roofing Rehabilitation: \$450k (work scheduled for FY19 performed in FY20) Chemical Tank and Digester Pipe: \$105k (due to contractor progress)
Residuals	\$2,926	\$6,084	\$3,158	107.9%	<u>Overspending</u> Residuals Electrical/Mechanical/Drum Replacements: \$3.1M (contractor progress)
CSO	\$584	\$675	\$91	15.6%	CSO Performance Assessment: \$147K (greater than anticipated consultant progress)

**ATTACHMENT A  
FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD December	FY20 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
Other Wastewater	\$12,164	\$21,983	\$9,819	80.7%	<u>Overspending</u> I/I Local Financial Assistance: \$9.8M (timing of community requests for grants and loans)
<b>Total Wastewater</b>	<b>\$37,324</b>	<b>\$47,702</b>	<b>\$10,378</b>	<b>27.8%</b>	

**ATTACHMENT A**  
**FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD December	FY20 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
<b>Waterworks</b>					
Drinking Water Quality Improvements	\$1,027	\$663	(\$364)	-35.5%	Carroll Water Treatment Plant Ancillary Modifications - Construction: \$173k (updated schedule) Technical Assistance 9 & 10: \$145k (timing of task order work) HVAC Equipment Replacement: \$102k (long lead time for equipment)
Transmission	\$6,964	\$6,294	(\$670)	-9.6%	<u>Underspending</u> Wachusett Aqueduct Pumping Station - Design/ESDC/RI: \$506k (underspending of some of the sub-tasks which will be reallocated to other sub-tasks) WASM 3 - MEPA/Design/CA/RI: \$240k, and Commonwealth Ave Pumping Station Improvements Construction: \$207k (progress less than anticipated) Chestnut Hill Emergency Pump Station - Design/CA: \$158k (longer than anticipated receipt of hydraulic information) Wachusett Lower Gate House Interim Pipe Repair: 150k (delayed notice-to-proceed) <u>Offset Overspending</u> Watershed Land Acquisition: \$509k (timing of land purchases) Metropolitan Tunnel Redundancy Program Support Services: \$126k (consultant progress greater than anticipated)
Distribution & Pumping	\$16,826	\$15,265	(\$1,560)	-9.3%	<u>Underspending</u> Sections 50 & 57 Water & 21/20/19 Sewer Rehab - Design/CA/RI: \$532k (less than anticipated consultant work) SEH Redundancy Pipeline Section 111 - Construction Phase 3: \$352k (delay due to MBTA crossing issue) SEH Redundancy Pipeline Section 111 - Construction Phase 2: \$228k (paving delayed due to Eversource work) Cathodic Protection Shafts E & L: \$212k (work scheduled for FY20 performed in FY19) Sections 25, 75, 59 & 60 Replacement - Design/CA/RI: \$184k (scheduled tasks being less than anticipated) Section 89 & 29 Redundancy - Design/CA: \$171k (Construction Administration services less than anticipated) Section 89 & 29 Replacement Design/ESDC: \$115K (field testing being behind schedule) Other smaller projects totaling \$142k <u>Offset Overspending</u> Section 89 & 29 Redundancy Construction Phase 2: \$376k (contractor progress)

**ATTACHMENT A**  
**FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD December	FY20 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
Other Waterworks	\$5,775	\$3,254	(\$2,521)	-43.6%	<u>Underspending</u> Local Water Pipeline Financial Assistance Program: \$2.9M (timing of community requests for loans) Gillis Pump Station and Cottage Farm Roof Replacements: \$229k (delay in contractor mobilization) Deer Island Water Tank Repainting: \$182k (timing of final work and pending credit change order) <u>Offset Overspending</u> Cosgrove Intake Roof Replacement: \$470k: (work scheduled in FY19 performed in FY20) Generator Docking Station: \$107k (timing of work) Other smaller projects totaling \$213k
<b>Total Waterworks</b>	<b>\$30,591</b>	<b>\$25,476</b>	<b>(\$5,114)</b>	<b>-16.7%</b>	
<b>Business &amp; Operations Support</b>					
<b>Total Business &amp; Operations Support</b>	<b>\$4,061</b>	<b>\$1,917</b>	<b>(\$2,144)</b>	<b>-52.8%</b>	<u>Underspending</u> MIS Projects: \$1.0M (timing of work) FY19-23 Vehicle Purchases: \$439k, and Security Equipment & Installation: \$334k (timing of purchases) As-Needed Technical Assistance: \$366k (timing of task order work)
<b>Total MWRA</b>	<b>\$71,976</b>	<b>\$75,095</b>	<b>\$3,119</b>	<b>4.3%</b>	

**ATTACHMENT B  
FY20 Final CIP Planned Contract Awards**

<b>Project</b>	<b>Contract No.</b>	<b>Subphase</b>	<b>Notice to Proceed</b>	<b>Revised Notice to Proceed</b>	<b>Total Contract Amount (\$ in millions)</b>	<b>Award Amount (\$ in millions)</b>	<b>Vendor</b>	<b>Schedule Change Reason Code *</b>
Applications Improvements Program	7650	Time Entry System / WFM	Jul-19	Scope to be included in Lawson Upgrade July-20	\$0.6			2
Applications Improvements Program	7653	8M Permit (Renamed HOML)	Jul-19	Jun-20	\$0.2			3
Information Security Program (ISP)	7657	ITSM Access Management	Jul-19	May-20	\$0.3			3
Information Technology Infrastructure Program	7654	NetScalers	Jul-19	Jun-20	\$0.1			3
Information Technology Infrastructure Program	7662	Edge Switches	Jul-19	Jul-20	\$0.7			6
Information Technology Infrastructure Program	7664	Instrumentation & Controls IT	Jul-19	May-20	\$0.3			3
Facility Asset Protection	7279	Interceptor Renewal 3, Dorchester Interceptor Sewer - Construction	Jul-19	Apr-20	\$5.6			3
Residuals Asset Protection	7173	Pellet Piping - Relocate	Jul-19	Aug-19	\$3.2	\$4.3	Walsh Construction Company	1
DI Treatment Plant Asset Protection	7373	Chemical Tank and Digester Pipe	Jul-19	Aug-19	\$8.0	\$8.5	Walsh Construction Company	1
NHS - Revere & Malden Pipeline Improvements	7485	Sect 53 and 99 Connections-Design/Construction Administration	Jul-19	Jan-20	\$4.5	\$5.0	Hazen and Sawyer, P.C.	1
CWTP Asset Protection	7605	HVAC Equipment Replacement - Construction	Jul-19	Sep-19	\$1.8	\$0.4	CAM HVAC & Construction	1
Quabbin Transmission System	7379	Wachusett Dam Lower Gate House Interim Pipe Replacement	Jul-19	Oct-19	\$0.2	\$0.3	Thielsch Engineering, Inc.	1
Facility Asset Protection	7643	Sections 191 & 192 Rehabilitation	Aug-19	Jan-20	\$0.5	\$1.6	Green Mountain Pipeline Services.	1
DI Treatment Plant Asset Protection	6723	E Seawall Design/Engineering Services During Construction/Resident Engineering Inspection	Aug-19	Apr-20	\$1.2			3
DI Treatment Plant Asset Protection	7395	Clarifier Rehabilitation Phase 2 - Construction	Aug-19	Jun-20	\$135.0			3
DI Treatment Plant Asset Protection	7397	Clarifier Rehabilitation Phase 2 - Resident Engineering Inspection	Aug-19	May-20	\$3.0			3
DI Treatment Plant Asset Protection	7420	Motor Control Center & Switchgear Replacement Construction	Aug-19	May-20	\$10.6			3
Clinton Wastewater Treatment Plant	7372	Valves & Screw Pumps Replacement (Valves only)	Aug-19	Mar-20	\$2.5			3
NHS - Revere & Malden Pipeline Improvements	7454	Sect 56 Replacement/Saugus Design/Construction Administration	Aug-19	Nov-19	\$1.5	\$3.3	AECOM Technical Services, Inc.	1
Applications Improvements Program	7438	Enterprise Content Mgmt	Sep-19	May-20	\$1.0			3
Siphon Structure Rehabilitation	6224	Design/Construction Services/Resident Inspection	Sep-19	Mar-20	\$1.6			3
Corrosion & Odor Control	7548	NI Odor Control HVAC Improvements Construction (awarded in January 2020)	Sep-19	Feb-20	\$45.0	\$57.6	Walsh Construction Company.	1

**ATTACHMENT B  
FY20 Final CIP Planned Contract Awards**

<b>Project</b>	<b>Contract No.</b>	<b>Subphase</b>	<b>Notice to Proceed</b>	<b>Revised Notice to Proceed</b>	<b>Total Contract Amount (\$ in millions)</b>	<b>Award Amount (\$ in millions)</b>	<b>Vendor</b>	<b>Schedule Change Reason Code *</b>
DI Treatment Plant Asset Protection	6705	Expansion Joint Repair - Construction 3	Sep-19	Will be done under Primary Clarifier contract.	\$2.0			2
DI Treatment Plant Asset Protection	7126	South System Pumping Station VFD Replacement Design/Engineering Services During Construction/Resident Engineering Inspection	Sep-19	May-20	\$4.5			3
New Connect Mains-Shaft 7 to WASM 3	6392	CP3-Sect 23,24,47, Rehabilitation	Sep-19	Jun-20	\$14.3			3
Waterworks Facility Asset Protection	6832	Steel Tank Improvements Design/Construction Administration	Sep-19	Jul-20	\$3.0			5
Sudbury/Weston Aqueduct Repairs	7369	Weston Aqueduct Sluice Gates - Construction	Sep-19	Jul-20	\$1.1			5
MWRA Facilities Management	6983	Design/Engineering Services Old Admin. Building	Oct-19	May-20	\$0.6			3
<b>Information Security Program (ISP)</b>	<b>7440</b>	<b>Inform Security Plan Implementation</b>	<b>Oct-19</b>	<b>Dec-19</b>	<b>\$0.4</b>	<b>\$0.1</b>	<b>Janus Software Inc.</b>	<b>1</b>
IT Infrastructure Program	7660	Telephone System Upgrade	Oct-19	Jun-20	\$0.4			3
Waterworks Facility Asset Protection	6689	Meter Vault Manhole Retrofits - Design	Oct-19	Scope combined with Water Meter Upgrade contract.	\$0.5			2
Waterworks Facility Asset Protection	7542	Water Meter Upgrade Design Construction Administration/Resident Inspection	Oct-19	May-20	\$0.2			3
Metropolitan Redundancy Interim Improvements	7561	CP1 Shafts 6, 8, 9A	Oct-19	May-20	\$2.1			3
Metropolitan Redundancy Interim Improvements	7696	Tops of Shafts Resident Engineering Inspection	Oct-19	Apr-20	\$0.8			3
Metropolitan Redundancy Interim Improvements	7547	Waltham Water Pipeline Design/Construction Administration	Oct-19	Project on hold.	\$3.0			2
Watershed Division Capital Improvements	7677	Maintenance Garage/Wash Bay/Storage Building Design/Construction Administration/Resident Inspection	Oct-19	Jul-20	\$1.0			7
Facility Asset Protection	7162	Hayes Pump Station Rehab Design	Nov-19	Aug-20	\$1.5			6
Facility Asset Protection	7462	Prison Point Rehabilitation - Construction	Nov-19	Oct-20	\$36.1			4
DI Treatment Plant Asset Protection	7134	Radio Repeater System Upgrade 2	Nov-19	Nov-20	\$2.5			4
Rehabilitation of Other Pumping Stations	7525	Pumping Station Rehabilitation-Evaluation	Nov-19	Work being done under a task order contract	\$0.5			2

**ATTACHMENT B  
FY20 Final CIP Planned Contract Awards**

<b>Project</b>	<b>Contract No.</b>	<b>Subphase</b>	<b>Notice to Proceed</b>	<b>Revised Notice to Proceed</b>	<b>Total Contract Amount (\$ in millions)</b>	<b>Award Amount (\$ in millions)</b>	<b>Vendor</b>	<b>Schedule Change Reason Code *</b>
Applications Improvements Program	7649	Lawson Golbal HR	Dec-19	Part of Lawson Upgrade July-2020	\$0.7			2
Facility Asset Protection	7554	Fuel Oil Tank Replacement Construction Phase 1	Dec-19	Mar-20	\$1.4			3
DI Treatment Plant Asset Protection	7644	As-Needed Design 9-1	Dec-19	Jul-19	\$2.8	\$1.8	Brown and Caldwell	1
DI Treatment Plant Asset Protection	7645	As-Needed Des 9-2	Dec-19	Aug-19	\$2.8	\$1.8	Hazen and Sawyer, P.C.	1
DI Treatment Plant Asset Protection	7646	As-Needed Design 9-3	Dec-19	Aug-19	\$2.8	\$1.8	Wright-Pierce	1
July 2019 - December 2019		45 Contracts Planned			\$312.0	\$86.6		
Information Security Program (ISP)	7659	Active Directory	Jan-20	Nov-19	\$0.2	\$0.1	CDW-G LLC	1
Facility Asset Protection	7216	Interceptor Renewal 7-Study/Design/Construction Administration/Resident Engineering Inspection	Jan-20	Jun-20	\$0.9			3
Clinton Wastewater Treatment Plant	7693	Equipment Storage Bldg	Jan-20	Jun-20	\$0.3			3
Quabbin Transmission System	7380	Wachusett Lower Gate House Pipe Replacement Construction	Jan-20	Jul-20	\$2.6			5
Metropolitan Redundancy Interim Improvements	7599	Shafts 5 & 9 Impr. Design/Construction Administration	Jan-20	Jul-20	\$0.8			5
Wastewater Meter System-Equipment Replacement	7191	Wastewater Metering Asset Protect/Equipment Purchase	Feb-20	May-20	\$3.7			3
Facility Asset Protection	7429	Ward St & Columbus Park Headworks Design/Construction Administration	Feb-20	Jun-20	\$11.4			3
DI Treatment Plant Asset Protection	7051	Fire Alarm System Replacement - Construction	Feb-20	Oct-20	\$25.0			4
DI Treatment Plant Asset Protection	7426	Fire System Replacement - Resident Engineering Inspection	Feb-20	Oct-20	\$2.1			4
DI Treatment Plant Asset Protection	7094	HVAC Equipment Replacement Resident Engineering Inspection	Mar-20	Apr-22	\$2.0			7
DI Treatment Plant Asset Protection	7110	HVAC Equipment Replacement - Construction	Mar-20	Apr-22	\$50.2			7
Quabbin Transmission System	6940	Oakdale High Line Replacement Construction	Mar-20	Mar-21	\$0.5			6
Waterworks Facility Asset Protection	7694	Masonry/Structural Repairs Bellevue 1/Arlington Heights	Apr-20	Feb-22	\$2.2			5
Metropolitan Tunnel Redundancy	7159	Preliminary Design & Massachusetts Environmental Policy Act Review	Apr-20	May-20	\$16.0			3
Metropolitan Redundancy Interim Improvements	7671	CP3 Shafts 5, 9	Apr-20	Oct-21	\$2.5			5
DI Treatment Plant Asset Protection	7570	Hydroturbine Replacement Design/Engineering Services During Construction/Resident Engineering Inspection	Jun-20	Jul-22	\$1.9			6

**ATTACHMENT B  
FY20 Final CIP Planned Contract Awards**

<b>Project</b>	<b>Contract No.</b>	<b>Subphase</b>	<b>Notice to Proceed</b>	<b>Revised Notice to Proceed</b>	<b>Total Contract Amount (\$ in millions)</b>	<b>Award Amount (\$ in millions)</b>	<b>Vendor</b>	<b>Schedule Change Reason Code *</b>
Distribut Systems Facilities Mapping	7489	Update of Record Drawings	Jun-20	Jul-21	\$0.5			6
Quabbin Transmission System	7698	Wachusett Lower Gate House Building Rehabilitation	Jun-20	Jan-21	\$2.2			6
January 2010 - June 2020		18 Contracts Planned			\$124.9	\$0.1		

FY20 63 Planned Contract Awards 13 awarded Through December 2019

\$437.0      \$86.7

**Unplanned Awards**

DI Treatment Plant Asset Protection	7167	Gas Protection System Replacement Phase 1	Jun-19	Sep-19	\$1.0	\$1.4	J.F. White	1
Southern Spine Distribution Mains	7155	Section 22 Rehab Alternative Analysis & Environmental Review	Jun-19	Sep-19	\$2.9	\$2.9	Black & Veatch Corp.	1
Dam Projects	7347	Quinapoxet Dam Removal Design/Engineering Services During Construction	Jul-20		\$0.2	0.4	Milone & McBroom, Inc.	1

3 Unplanned Awards Through December 2019.

\$4.1      \$4.7

16 Total Awards Through December 2019.

\$91.3

**\* Reason Codes:**

1. NTP issued in first half of FY20.
2. Project/Phase eliminated or being performed in-house; combined with another project, or phase completed but on hold.
3. NTP expected January 2020 - June 2020.
4. Schedule change due to permitting.
5. Scope changes.
6. Changes in priorities.
7. Bidder Issue/Outside Design Delay/Contractor issue/Additional specifications review.

### STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** FY20 Financial Update and Summary Through January 2020

**COMMITTEE:** Administration, Finance & Audit

X INFORMATION  
     VOTE

Michael J. Cole, Budget Director  
James J. Coyne, Budget Manager  
Preparer/Title



  
Thomas J. Durkin  
Director, Finance

#### RECOMMENDATION:

For information only. This staff summary provides the preliminary financial results and variance highlights for Fiscal Year 2020 through January 2020, comparing actual spending to the budget.

#### DISCUSSION:

MWRA is continuing the practice of setting aside favorable Capital Finance variances into the Defeasance Account with the intention of using these funds to defease debt and provide rate relief in future years. Targeted defeasances are a critical component of the Authority's multi-year rate management strategy. As such, in January the year-to-date debt related savings of \$6.1 million was transferred to the Defeasance Account. This favorable variance is the result of the lower than budgeted variable rates and refunding savings. Staff have already identified candidates for year-end defeasance and included the impact of the FY20 defeasance in the Proposed FY21 budget and planning estimates.

The total Year-to-Date variance for the FY20 CEB is \$11.4 million, due to lower direct expenses of \$6.3 million, indirect expenses of \$3.3 million, and higher revenue of \$1.8 million. The year-end favorable variance is projected at \$23.8 million, of which \$11.5 million is related to debt service. Beyond debt service savings, staff project a surplus of approximately \$12.2 million at year-end of which \$8.6 million would be from lower direct expenses, \$3.5 million from lower indirect expenses, and \$0.1 million from greater than budgeted revenues.

As the year progresses and more actual spending information becomes available, staff will continue to refine the year-end projections and update the Board accordingly.

## **FY20 Current Expense Budget**

The CEB expense variances through January 2020 by major budget category were:

- Lower Direct Expenses of \$6.3 million or 4.5% under budget. Spending was lower for Wages & Salaries, Maintenance, Professional Services, Fringe Benefits, Other Materials, Chemicals, Worker's Compensation, Utilities, and Training & Meetings. This is partially offset by higher spending on Other Services and Overtime.
- Lower Indirect Expenses of \$3.3 million or 11.7% under budget due to lower Watershed reimbursements, and lower claim spending for Insurance.

**FY20 Budget and FY20 Actual Year-to-Date Variance by Expenditure Category**  
(in millions)

	<b>FY20 Budget YTD</b>	<b>FY20 Actual YTD</b>	<b>\$ Variance</b>	<b>% Variance</b>
Direct Expenses	\$141.7	\$135.4	-\$6.3	-4.5%
Indirect Expenses	\$27.8	\$24.6	-\$3.3	-11.7%
Capital Financing	\$265.0	\$265.0	\$0.0	0.0%
<b>Total</b>	<b>\$434.5</b>	<b>\$424.9</b>	<b>-\$9.6</b>	<b>-2.2%</b>

*Totals may not add due to rounding*

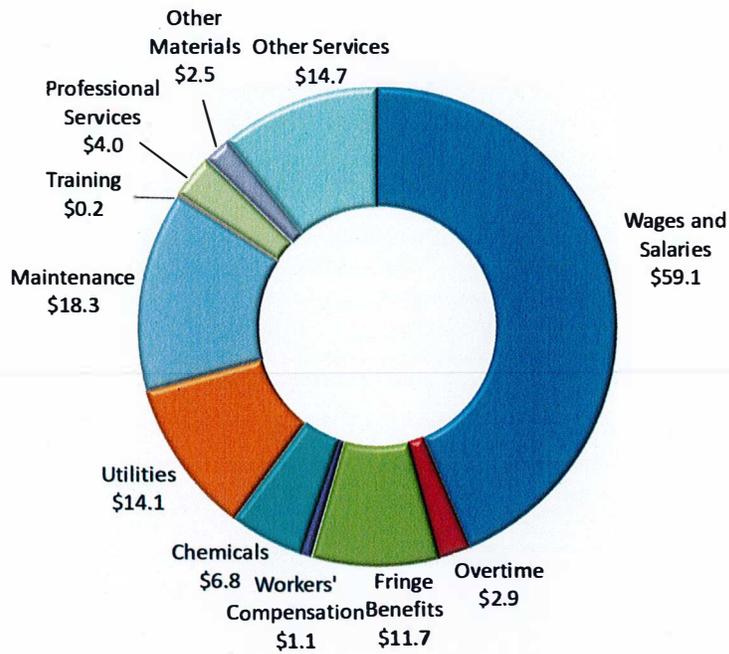
Total Revenues of \$460.6 million were \$1.8 million or 0.4% over budget. The biggest drivers of the variance are Stoughton's \$1.1 million prepayment of their entrance fee note and favorable Other Revenue of \$0.8 million driven by income from the disposal of equipment, Energy Revenue, and Miscellaneous Revenue.

*Please refer to Attachment 1 for a more detailed comparison by line item of the budget variances for the year-to-date.*

### **Direct Expenses**

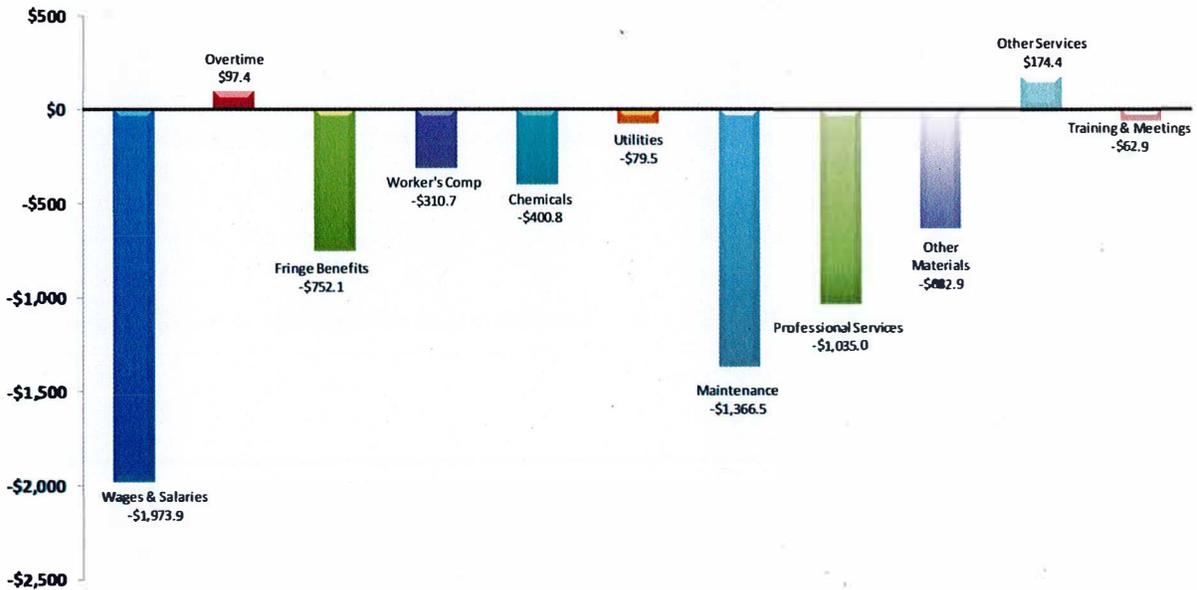
Year-to-date direct expenses totaled \$135.4 million, which was \$6.3 million or 4.5% less than budgeted.

**FY20 Year-to-Date Direct Expenses  
(in millions)**



Lower than budgeted spending for Wages & Salaries, Maintenance, Professional Services, Fringe Benefits, Other Materials, Chemicals, Worker's Compensation, Utilities, and Training and Meetings. This is partially offset by higher spending on Other Services and Overtime.

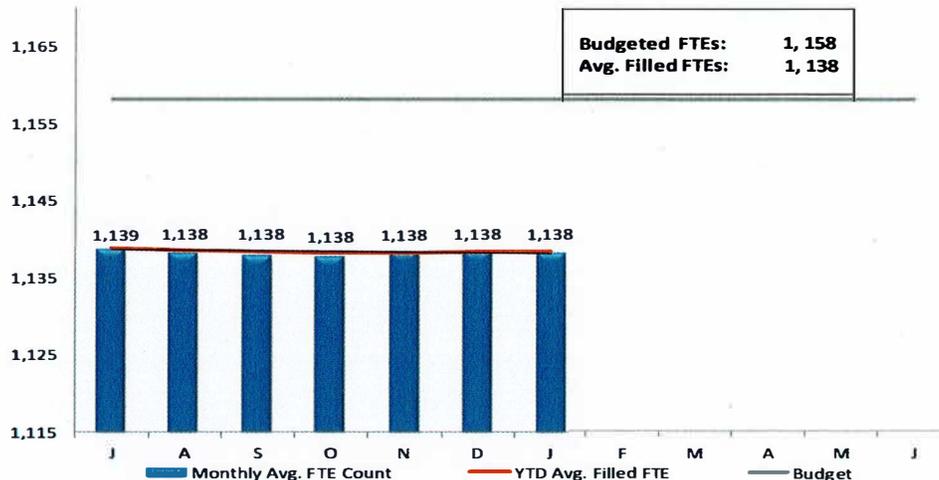
**FY20 Year-to-Date Direct Expense Variance  
(in thousands)**



## Wages and Salaries

Wages and Salaries are under budget by \$2.0 million or 3.2%. Through January, there were 20 fewer average FTEs (1,138 versus 1,158 budget) or 1.7% and lower average salaries for new hires versus retirees. The timing of backfilling vacant positions and lower leave balance accruals also contributed to Regular Pay being under budget.

**FY20 MWRA Full Time Equivalent (FTE) Position Trend**



## Maintenance

Maintenance was lower than budget by \$1.4 million or 7.0%, largely driven by the timing of projects. Maintenance Services are under budget by \$1.4 million driven by Plant and Machine Services (\$1.4 million), Computer Software Licenses (\$0.1 million), Special Equipment Services (\$0.1 million), and Pipeline Services (\$0.1 million). This is partially offset by higher spending for Building and Grounds Services (\$0.4 million).

## Professional Services

Professional Services were lower than budget by \$1.0 million or 20.6%. The overall underspending year-to-date is due to Computer Systems Consultant (\$0.7 million) in MIS and Other Professional Services (\$0.2 million) in Finance and Law.

## Fringe Benefits

Fringe Benefit spending was lower than budget by \$0.8 million or 6.1%. This is primarily driven by lower Health Insurance costs of \$0.6 million due to fewer employees and retirees participating in health insurance plans, the change to the ratio of employee contribution for past employees versus new hires that contribute at a higher percentage, and change from family to individual plans which are less costly. In addition, Paid Family Medical Leave was under budget by \$0.1 million due to a delay in the start of plan contributions until October 1, 2019.

## **Other Materials**

Other Materials were lower than budget by \$0.6 million or 20.2%, driven by lower than budgeted spending for Computer Hardware of \$0.6 million in MIS.

## **Chemicals**

Chemicals were lower than budget by \$0.4 million or 5.5%. Lower than budget spending on Soda Ash of \$0.2 million at the Carroll Water Treatment Plant is a result of lower dosing due to high raw water alkalinity combined with lower flows and lower flows and delivery not yet invoiced at the Clinton Wastewater Treatment Plant, and Activated Carbon of \$0.2 million is driven by DITP due to improvements and continuing steps to optimize the odor control treatment process as well as timing. This is offset by higher than budget spending on Sodium Bisulfite of \$0.1 million driven by the Deer Island Wastewater Treatment Plant due to increasing inventory volume and higher flows. The Deer Island Wastewater Treatment Plant flows are 2.1% higher than the budget and the Carroll Water Treatment Plant flows are 3.76% less than the budget through January. However, the timing of deliveries is an important factor.

## **Worker's Compensation**

Worker's Compensation expenses were lower than budget by \$0.3 million or 22.6%. The lower expenses were primarily due to favorable variances in compensation payments (\$159,000), medical payments (\$116,000), and administrative expenses (\$36,000).

## **Utilities**

Utilities were lower than budget by \$0.1 million or 0.6%. Underspensing in Electricity of \$0.8 million driven by DITP which had less purchased power in August when the CTGs were operated during the HEEC cable installation and in Field Operations due to lower rates for Interval accounts. This is partially offset by Diesel Fuel of \$0.6 million driven by DITP due to timing of deliveries and replenishing the inventory used during the HEEC cable installation (the outage lasted 18 days vs. the 5 days anticipated).

## **Training & Meetings**

Training & Meetings expenses were lower than budget by \$63,000 or 23.4% driven by lower spending in Tunnel Redundancy, Operations Administration, MIS, and Field Operations.

## **Other Services**

Other Services were higher than budget by \$0.2 million or 1.2%. Higher than budgeted spending for Sludge Pelletization of \$0.5 million is due to higher year-to-date quantities. This is offset by lower spending for Telecommunication Services of \$0.3 million in MIS and FOD.

## Overtime

Overtime expenses were higher than budget by \$0.1 million or 3.4%. The over spending is mainly due to coverage during the HEEC cable installation in August, 2019.

## Indirect Expenses

Year-to-date Indirect Expenses totaled \$24.6 million, which is \$3.3 million or 11.7% under budget. There are variances within the lines that comprise Indirect Expenses, including lower Watershed Reimbursements and Insurance claims. Watershed costs are lower than budget by \$3.1 million due to lower costs associated with compensation, fringe benefits, equipment, maintenance, and prior period adjustments.

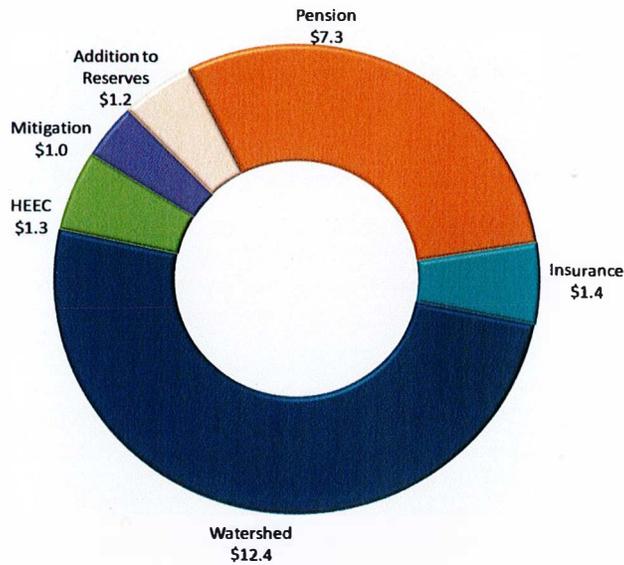
**FY20 Watershed Protection Actual Year-to-Date Variance**

<b>\$ in millions</b>	<b>YTD Budget</b>	<b>YTD Actual</b>	<b>YTD \$ Variance</b>	<b>YTD % Variance</b>
Operating Expenses	10.3	8.3	-2.0	-19.6%
Major Project Expenses	0.9	1.0	0.1	11.2%
PILOT	4.9	4.9	0.0	0.0%
Subtotal	16.1	14.2	-1.9	-11.8%
Revenue offset	0.6	0.7	0.1	19.7%
<b>Current fiscal year net total budget</b>	<b>15.5</b>	<b>13.4</b>	<b>-2.0</b>	<b>-13.1%</b>
Prior year 4th quarter accrual true-up	0.0	-0.6	-0.6	
FY16 credit balance	0.0	-0.5	-0.5	
<b>Total Budget</b>	<b>15.5</b>	<b>12.4</b>	<b>-3.1</b>	<b>-20.2%</b>

MWRA reimburses the Commonwealth of Massachusetts Department of Conservation (DCR) and Recreation - Division of Water Supply Protection – Office of Watershed Management for expenses. The reimbursements are presented for payment quarterly in arrears. Accruals are being made monthly based on estimated expenses provided by DCR and trued-up quarterly based on the quarterly invoice. MWRA’s budget is based on the annual Fiscal Year Work Plan approved by the Massachusetts Water Supply Protection Trust.

January’s estimated expenses were not available due to the timing of the DCR’s accounting calendar. Because of that, the January expenses have been accrued to budget. The FTE count at the end of January 2020 was 136, 14 FTEs or 9.3% under budget.

**FY20 Year-to-date Indirect Expenses-YTD  
(in millions)**

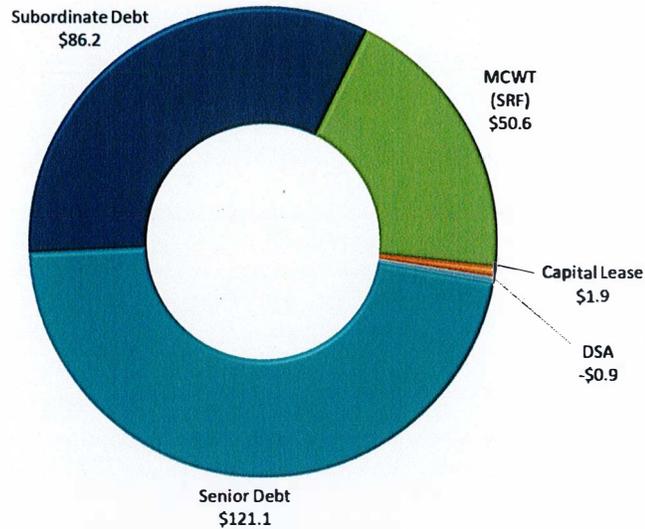


**Capital Financing**

Capital Financing expenses include the principal and interest payments for fixed debt, the variable subordinate debt, the Massachusetts Clean Water Trust (SRF) obligation, the commercial paper program for the local water pipeline projects, current revenue for capital, and the Chelsea Facility lease payment.

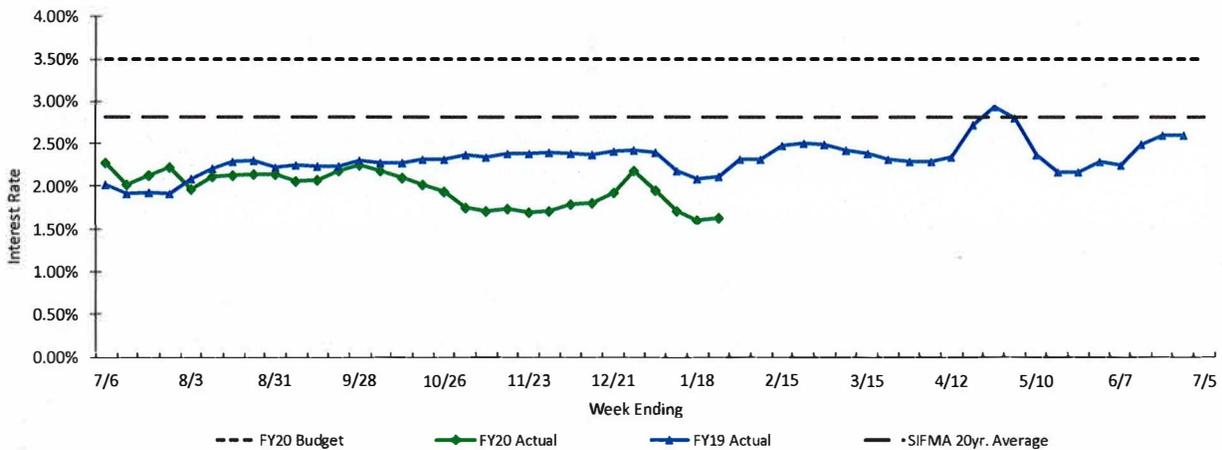
Year-to-date Capital Financing expenses for FY20 totaled \$265.0 million, which is right on budget. In January, the year-to-date debt related savings of \$6.1 million was transferred to the Defeasance Account. This favorable variance is the result of lower than budgeted variable interest rates and refunding savings. Senior debt service is over budget by \$7.3 million as a result of the 2019 Series G refunding for savings which moved expenses from the subordinate to the senior lien. This increase is offset by a corresponding decrease of \$8.7 million to the subordinate debt service expense.

**Year-to-date FY20 Capital Finance  
(in millions)**



The graph below reflects the FY20 actual variable rate trend by week year-to-date against the FY20 Budget.

**Weekly Average Interest Rate on MWRA Variable Rate Debt  
(Includes liquidity support and remarketing fees)**



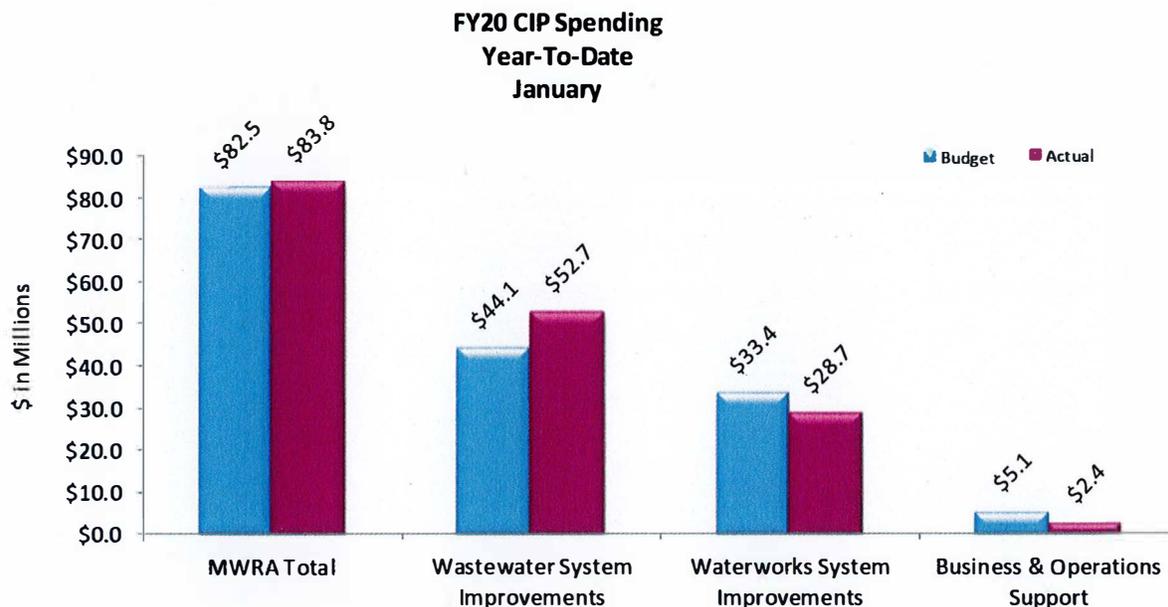
**Revenue & Income**

Year-to-date Revenues of \$460.6 million were over budget by \$189 million or 0.4%. Other User Charges were over budget by \$0.9 million or 15.1% due to Stoughton prepaying their entrance fee note. Other Revenue was favorable to budget by \$0.8 million due to income from the disposal of equipment (\$0.3 million), energy revenue for RPS credits (\$0.2 million), and miscellaneous revenue (\$0.2 million).

## FY20 Capital Improvement Program

Capital expenditures in Fiscal Year 2020 through January total \$83.8 million, \$1.2 million or 1.5% over budget.

After accounting for programs which are not directly under MWRA's control, most notably the Inflow and Infiltration (I/I) grant/loan program, the Local Water System Assistance loan program, and the community managed Combined Sewer Overflow (CSOs) projects, capital spending totaled \$61.1 million, \$6.4 million or 9.5% under budget.



Overall, CIP spending reflects the overspending in Wastewater Improvements (\$8.6 million), and underspending in Waterworks (\$4.6 million) and Business and Operations Support (\$2.7 million). Major variances in Wastewater are primarily due to timing for community requests for grants and loans for the I/I Local Financial Assistance Program and greater than anticipated progress on the Residuals Electrical/Mechanical/Drum Dryer Replacement and Chelsea Creek Upgrades Construction, scheduled work in FY19 that was completed in FY20 for the Clinton Roofing Replacement project, and earlier than anticipated equipment purchase for the Wastewater Metering project. This was partially offset by delay in awards for the Nut Island Odor Control HVAC Improvements and Dorchester Interceptor Sewer Construction contracts and timing of work for the Deer Island Gravity Thickener Rehabilitation contract.

Waterworks variances are primarily due to timing of community loan requests, less than anticipated consultant progress on Section 50/57 Water and Sections 21/20/19 Sewer Design CA/RI, contractor progress on the Commonwealth Avenue Pumping Station Improvements, and delay in mobilization for the Gillis Pump Station Cottage Farm Roof Replacement contract. This was partially offset by timing of watershed land purchases, contractor progress on the Northern Intermediate High Redundancy Sections 89 & 29 Construction Phase 2 and Southern Extra High

Section 111 Construction 3, and work scheduled in FY19 that was completed in FY20 for the Cosgrove Intake Roof Replacement.

**FY20 Budget and FY20 Actual Year-to-Date Variance by Program**  
(in millions)

\$ in Millions	Budget	Actuals	\$ Var.	% Var.
<b>Wastewater System Improvements</b>				
Interception & Pumping	18.6	15.1	(3.5)	-18.8%
Treatment	8.5	7.1	(1.4)	-16.9%
Residuals	3.8	6.7	2.9	77.3%
CSO	1.0	0.8	(0.2)	-23.8%
Other	12.2	23.1	10.9	89.6%
<b>Total Wastewater System Improvements</b>	<b>\$44.1</b>	<b>\$52.7</b>	<b>\$8.6</b>	<b>19.6%</b>
<b>Waterworks System Improvements</b>				
Drinking Water Quality Improvements	1.3	0.8	(0.5)	-38.2%
Transmission	8.4	7.6	(0.8)	-9.7%
Distribution & Pumping	17.6	16.9	(0.7)	-4.0%
Other	6.1	3.4	(2.6)	-43.7%
<b>Total Waterworks System Improvements</b>	<b>\$33.4</b>	<b>\$28.7</b>	<b>(\$4.6)</b>	<b>-13.9%</b>
<b>Business &amp; Operations Support</b>	<b>\$5.1</b>	<b>\$2.4</b>	<b>(\$2.7)</b>	<b>-53.6%</b>
<b>Total MWRA</b>	<b>\$82.5</b>	<b>\$83.8</b>	<b>\$1.2</b>	<b>1.5%</b>

*Totals may not add due to rounding*

**FY20 Year-to-date Spending by Program:**

The main reasons for the project spending variances in order of magnitude are:

**Other Wastewater:** Net overspending of \$10.9 million

- \$10.9 million for Community I/I due to timing of community requests for grants and loans.

**Interception & Pumping:** Net underspending of \$3.5 million

- \$2.6 million for Nut Island Odor Control HVAC Improvements Design/CA/RI and Construction and \$1.2 million for Dorchester Interceptor Sewer Design and Construction due to delay in construction awards.
- \$0.3 million for Sections 191 and 192 Rehabilitation due to delay in the contract notice-to-proceed.
- \$0.2 million for Wastewater Metering Planning/Study and \$0.2 million for Wastewater Central Monitoring Design due to less than anticipated budgeted work.
- \$0.2 million for Prison Point Design/ESDC/REI due to delay in 100% Design Report review.
- \$0.1 million for Remote Headworks and Deer Island Shaft Study due to contract time extension.
- This underspending was partially offset by overspending of \$1.0 million for Chelsea Creek Headworks Upgrades construction due to greater than anticipated contractor progress, and \$0.5 million for Wastewater Metering Equipment due to equipment purchased earlier than anticipated.

**Residuals:** Net overspending of \$2.9 million

- \$3.0 million for Electrical, Mechanical, and Dryer Drum Improvements due to greater than anticipated contractor progress and engineering costs partially offset by \$0.1 million for timing of work the Pellet Conveyance Relocation contract.

**Other Waterworks:** Net underspending of \$2.6 million

- \$2.9 million for the Local Water System Assistance Program due to timing of community loan requests.
- \$0.3 million for Gillis Pumping Station and Cottage Farm Roof Replacement due to delay in contractor mobilization.
- \$0.2 million DI Water Tank Painting due to timing of final work and pending credit change order.
- This underspending was partially offset by overspending of \$0.5 million for Cosgrove Intake Roof Replacement due to work scheduled in FY19 that was completed in FY20, and \$0.1 million for Generator Docking Station due to timing of work.

**Business & Operations Support:** Net underspending of \$2.7 million

- \$1.6 million for the timing and scheduling of MIS work, \$0.5 million for As-Needed Technical Assistance and Resident Engineering and Inspection Services due to lower than projected task order work, \$0.3 million for timing of vehicle purchases, and \$0.3 million for Security Equipment & Installation due to timing of security initiatives.

**Wastewater Treatment:** Net underspending of \$1.4 million

- \$0.5 million for Gravity Thickener Rehabilitation, \$0.2 million for Motor Control Center Switchgear Replacement/ESDC, and \$0.2 million for Combined Heat and Power Energy Alternatives Study and \$0.2 million for Digester Tank Rehab and Pipe Replacement due to timing of work.
- \$0.5 million for Winthrop Terminal Facility VFD and Motors Replacements due to vibration issue with VFD No. 5.
- \$0.2 million for As-Needed Design Services due to less than anticipated task order work.
- \$0.2 million for Clinton Valves and Pipe Replacement due to delay in construction award.
- This underspending was partially offset by overspending of \$0.5 million for Clinton Roofing Rehabilitation due to work scheduled in FY19 that was completed in FY20 and \$0.2 million for timing of work for Gas Protection System Replacement.

**Waterworks Transmission:** Net underspending of \$0.8 million

- \$0.3 million for Commonwealth Avenue Pumping Station Construction and \$0.3 million for WASM 3 MEPA/Design/CA/RI due to progress being less than anticipated.
- \$0.2 million for Wachusett Lower Gate House Interim Pipe Repair due to delayed notice-to-proceed.
- \$0.2 million for Chestnut Hill Emergency Pumping Station Design/CA due to longer than anticipated receipt of hydraulic information.
- \$0.2 million for Wachusett Aqueduct Sluice Gates and \$0.2 million for CP-1 Shafts 6, 8, and 9A due to schedule changes.
- This underspending was partially offset by \$0.5 million for Watershed Land Acquisition due to timing of land purchases and \$0.1 million for Metropolitan Tunnel Redundancy Program Support Services due to greater than anticipated consultant progress.

**Water Distribution and Pumping:** Net underspending of \$0.7 million

- \$0.7 million for Sections 50, 57 Water and Sections 21, 20, 19 Sewer and \$0.1 million for Sections 25, 75, 59, and 60 Design due to consultants scheduled tasks being less than anticipated.
- \$0.3 million for Section 22 Rehabilitation Alternatives Analysis and Environmental Permitting due to schedule change.
- \$0.2 million for NIH Section 89 and 29 Design/CA/RI due to less than anticipated contract administration/resident inspection budgeted spending
- \$0.2 million for Cathodic Protection Metro West Tunnel Shaft E & L for final work scheduled for FY20 that was completed in FY19.
- \$0.2 million for Southern Extra High Redundancy Construction 2 due to paving delays.
- This underspending was partially offset by overspending of \$0.5 million for Northern Intermediate High Section 89 & 29 Redundancy Construction Phase 2 and \$0.4 million for Southern Extra High Section 111 Construction 3 due to contractor progress, and \$0.1 million for Section 56 Pipe Demolition for final work completed.

**Drinking Water Quality Improvements:** Net underspending of \$0.5 million

- \$0.3 million due to updated schedule for Ancillary Modifications Construction work.
- \$0.2 million due to timing of task order work.
- \$0.1 million for Carroll Water Treatment Plant HVAC Replacement due to long lead time for equipment.

**Combined Sewer Overflow:** Net underspending of \$0.2 million

- \$0.3 million for Dorchester Inflow Removal Construction due to updated schedule partially offset by \$0.1 million for CSO Performance Assessment due to greater than anticipated consultant progress.

**Construction Fund Balance**

The construction fund balance was \$145.3 million as of the end of January. Commercial Paper/Revolving Loan available capacity was \$222 million.

**ATTACHMENTS:**

Attachment 1 – Variance Summary January 2020

Attachment 2 – Current Expense Variance Explanations

Attachment 3 – Capital Improvement Program Variance Explanations

ATTACHMENT 1  
FY20 Actuals vs. FY20 Budget

	Jan 2020 Year-to-Date				
	Period 7 YTD Budget	Period 7 YTD Actual	Period 7 YTD Variance	%	FY20 Approved
<b><u>EXPENSES</u></b>					
WAGES AND SALARIES	\$ 61,043,595	\$ 59,069,733	\$ (1,973,862)	-3.2%	\$ 109,953,483
OVERTIME	2,828,533	2,925,928	97,395	3.4%	4,898,965
FRINGE BENEFITS	12,427,952	11,675,843	(752,109)	-6.1%	21,717,533
WORKERS' COMPENSATION	1,373,316	1,062,596	(310,720)	-22.6%	2,354,256
CHEMICALS	7,223,440	6,822,687	(400,753)	-5.5%	11,811,222
ENERGY AND UTILITIES	14,227,770	14,148,287	(79,483)	-0.6%	24,454,796
MAINTENANCE	19,659,453	18,292,934	(1,366,519)	-7.0%	32,726,954
TRAINING AND MEETINGS	268,711	205,796	(62,915)	-23.4%	504,394
PROFESSIONAL SERVICES	5,026,063	3,991,090	(1,034,973)	-20.6%	8,295,315
OTHER MATERIALS	3,133,873	2,501,017	(632,856)	-20.2%	6,867,239
OTHER SERVICES	14,524,408	14,698,782	174,374	1.2%	24,683,370
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 141,737,114</b>	<b>\$ 135,394,693</b>	<b>\$ (6,342,423)</b>	<b>-4.5%</b>	<b>\$ 248,267,527</b>
INSURANCE	\$ 1,506,474	\$ 1,379,209	\$ (127,265)	-8.4%	\$ 2,611,222
WATERSHED/PILOT	15,480,923	12,352,190	(3,128,733)	-20.2%	26,833,600
HEEC PAYMENT	1,348,236	1,348,235	(1)	0.0%	4,429,316
MITIGATION	954,587	952,539	(2,048)	-0.2%	1,654,618
ADDITIONS TO RESERVES	1,208,241	1,208,241	-	0.0%	2,094,284
RETIREMENT FUND	7,315,000	7,315,000	-	0.0%	7,315,000
POST EMPLOYEE BENEFITS	-	-	-	---	5,962,457
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 27,813,461</b>	<b>\$ 24,555,414</b>	<b>\$ (3,258,047)</b>	<b>-11.7%</b>	<b>\$ 50,900,497</b>
STATE REVOLVING FUND	\$ 50,709,563	\$ 50,569,753	\$ (139,810)	-0.3%	\$ 92,797,294
SENIOR DEBT	113,765,639	121,083,745	7,318,106	6.4%	202,299,609
DEBT SERVICE ASSISTANCE	(890,235)	(890,235)	-	0.0%	(890,235)
CURRENT REVENUE/CAPITAL	-	-	-	---	15,200,000
SUBORDINATE MWRA DEBT	99,534,616	90,837,614	(8,697,002)	-8.7%	169,609,845
LOCAL WATER PIPELINE CP	-	-	-	---	5,846,823
CAPITAL LEASE	1,855,996	1,855,996	-	0.0%	3,217,060
DEBT PREPAYMENT	-	-	-	---	-
VARIABLE DEBT	-	(4,619,185)	(4,619,185)	---	-
DEFERRED ACCOUNT	-	6,137,890	6,137,890	---	5,000,000
<b>TOTAL DEBT SERVICE</b>	<b>\$ 264,975,579</b>	<b>\$ 264,975,579</b>	<b>\$ -</b>	<b>0.0%</b>	<b>\$ 493,080,396</b>
<b>TOTAL EXPENSES</b>	<b>\$ 434,526,154</b>	<b>\$ 424,925,686</b>	<b>\$ (9,600,470)</b>	<b>-2.2%</b>	<b>\$ 792,248,420</b>
<b><u>REVENUE &amp; INCOME</u></b>					
RATE REVENUE	\$ 439,480,961	\$ 439,480,961	\$ -	0.0%	\$ 761,767,000
OTHER USER CHARGES	6,101,068	7,022,619	921,551	15.1%	9,216,425
OTHER REVENUE	4,424,532	5,187,913	763,381	17.3%	5,761,022
RATE STABILIZATION	-	-	-	---	-
INVESTMENT INCOME	8,743,328	8,877,194	133,866	1.5%	15,503,973
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 458,749,889</b>	<b>\$ 460,568,688</b>	<b>\$ 1,818,797</b>	<b>0.4%</b>	<b>\$ 792,248,420</b>

**ATTACHMENT 2  
Current Expense Variance Explanations**

Total MWRA	FY20 Budget YTD January	FY20 Actuals YTD January	FY20 YTD Actual vs. FY20 Budget		Explanations
			\$	%	
<b>Direct Expenses</b>					
Wages & Salaries	61,043,595	59,069,733	(1,973,862)	-3.2%	Wages and Salaries are under budget by \$2.0 million. Year to date, there have been 20 fewer average FTEs (1,138 versus 1,158 budget), lower average new hire salaries versus retirees, the timing of backfilling vacant positions, and lower leave balance accruals contributed to Regular Pay being under budget.
Overtime	2,828,533	2,925,928	97,395	3.4%	Higher spending mainly in Deer Island for coverage during the HEEC cable installation.
Fringe Benefits	12,427,952	11,675,843	(752,109)	-6.1%	Lower than budget in <b>Health Insurance</b> of \$624,000, due to fewer than budgeted participants in health insurance plans, increased contribution by external new hires vs. lower contribution rates of staff retiring, and the shift from family to individual plans which are less expensive. In addition, <b>PFML</b> was under budget by \$68,000 due to a delay in the start of plan contributions until 10/1/19.
Worker's Compensation	1,373,316	1,062,596	(310,720)	-22.6%	The lower expenses were due to favorable variances in <b>Compensation Payments</b> of \$159,000, <b>Medical Payments</b> of \$116,000, and <b>Administrative Expenses</b> of \$36,000. Due to uncertainties of when spending will happen, the budget is spread evenly throughout the year.
Chemicals	7,223,440	6,822,687	(400,753)	-5.5%	Lower than budget spending on <b>Soda Ash</b> of \$232,000 at CWTP is a result of lower dosing due to high raw water alkalinity combined with lower flows and lower flows and delivery not yet invoiced at Clinton; <b>Activated Carbon</b> of \$188,000 driven by DITP (\$156,000) due to improvements and continuing steps to optimize the odor control treatment process as well as timing and FOD (\$33,000) due to lower than expected cost at NITP; and <b>Sodium Hypochlorite</b> of \$108,000 due to less than anticipated usage. This is offset by higher than budget spending on <b>Sodium Bisulfite</b> of \$119,000 driven by DITP (\$111,000) due to increasing inventory and higher flows. DITP flows are 2.1% higher than the budget and CWTP flows are 3.8% less than the budget through January. It is important to note that Chemical variances are also based on deliveries which in general reflect the usage patterns. However, the timing of deliveries is an important factor.
Utilities	14,227,770	14,148,287	(79,483)	-0.6%	Underspending in <b>Electricity</b> of \$784,000 primarily at DITP (\$406,000) driven by less purchased power in August when DI operated the CTGs during the HEEC cable installation. Also, Field Operations (\$267,000) is under budget primarily due to lower rates for Interval accounts. <b>Diesel Fuel</b> is overspent by \$626,000 driven by DITP due to timing of deliveries and replenishing the inventory used during the HEEC cable installation (the outage lasted 18 days vs. the 5 days anticipated).
Maintenance	19,659,453	18,292,934	(1,366,519)	-7.0%	Underspending in <b>Ongoing Maintenance</b> by \$1.4 million is largely driven by the timing of projects. <i>Maintenance Services</i> are under budget by \$1.4 million driven by Plant and Machine Services (\$1.4 million), Computer Software Licenses (\$0.1 million), Secial Equipment Services (\$0.1 million), and Pipe Services (\$0.1 million). This is offset by <i>Maintenance Materials</i> which are over budget by \$0.1 million, driven by Plant and Machine Materials (\$0.2 million).

**ATTACHMENT 2**  
**Current Expense Variance Explanations**

Total MWRA	FY20 Budget YTD January	FY20 Actuals YTD January	FY20 YTD Actual vs. FY20 Budget		Explanations
			\$	%	
Training & Meetings	268,711	205,796	(62,915)	-23.4%	Lower than budget spending on <b>Training &amp; Meetings</b> by \$63,000 is driven by Tunnel Redundancy (\$21,000), Operations Administration (\$16,000), MIS (\$14,000), and Field Operations (\$12,000).
Professional Services	5,026,063	3,991,090	(1,034,973)	-20.6%	Lower than budget spending in <b>Computer Systems Consultant</b> of \$706,000 in MIS; <b>Other Professional Services</b> of \$210,000 in Finance, Law, and Administration; and <b>Legal</b> of \$98,000 in Law and Administration.
Other Materials	3,133,873	2,501,017	(632,856)	-20.2%	Driven by lower than budgeted spending for <b>Computer Hardware</b> of \$583,000 in MIS primarily due to timing.
Other Services	14,524,408	14,698,782	174,374	1.2%	Higher than budgeted spending for <b>Sludge Pelletization</b> of \$530,000 due to higher year-to-date quantities, offset by lower spending for <b>Telecommunication Services</b> of \$254,000 in MIS and FOD and <b>Other Services</b> of \$121,000 for a number of services.
<b>Total Direct Expenses</b>	<b>141,737,114</b>	<b>135,394,693</b>	<b>(6,342,421)</b>	<b>-4.5%</b>	

**ATTACHMENT 2**  
**Current Expense Variance Explanations**

Total MWRA	FY20 Budget YTD January	FY20 Actuals YTD January	FY20 YTD Actual vs. FY20 Budget		Explanations
			\$	%	
<b>Indirect Expenses</b>					
Insurance	1,506,474	1,379,209	(127,265)	-8.4%	Lower claims than budgeted of \$126,000.
Watershed/PILOT	15,480,923	12,352,190	(3,128,733)	-20.2%	Lower Watershed Reimbursement of \$3.1 million due to \$1.1 million over accrual at end of FY19 as compared to actual amount paid in first quarter of FY20. January FY20 YTD favorable variance to budget estimated to be \$2.0 million driven by (1) lower Wages & Salaries of \$741,000 (136 FTEs vs budget of 150), (2) lower Fringe Benefits of \$598,000 due to timing of payments to the Commonwealth, (3) lower spending on Equipment of \$258,000 due to timing of purchases, and (4) lower spending on Maintenance of \$145,000.
HEEC Payment	1,348,236	1,348,235	(1)	0.0%	
Mitigation	954,587	952,539	(2,048)	-0.2%	
Addition to Reserves	1,208,241	1,208,241	-	0.0%	
Pension Expense	7,315,000	7,315,000	-	0.0%	
Post Employee Benefits	-	-	-		
<b>Total Indirect Expenses</b>	<b>27,813,461</b>	<b>24,555,414</b>	<b>(3,258,047)</b>	<b>-11.7%</b>	
<b>Debt Service</b>					
Debt Service	265,865,814	265,865,814	-	0.0%	Senior debt service is over budget by \$7.3 million as a result of the 2019 Series G refunding for savings which moved debt service expense from the subordinate to the senior lien. This increase is offset by a corresponding decrease of \$8.7 million to the subordinate debt service expense.
Debt Service Assistance	(890,235)	(890,235)	-	0.0%	
<b>Total Debt Service Expenses</b>	<b>264,975,579</b>	<b>264,975,579</b>	<b>-</b>	<b>0.0%</b>	
<b>Total Expenses</b>	<b>434,526,154</b>	<b>424,925,686</b>	<b>(9,600,468)</b>	<b>-2.2%</b>	

**ATTACHMENT 2  
Current Expense Variance Explanations**

Total MWRA	FY20 Budget YTD January	FY20 Actuals YTD January	FY20 YTD Actual vs. FY20 Budget		Explanations
			\$	%	
<b>Revenue &amp; Income</b>					
Rate Revenue	439,480,961	439,480,962	1	0.0%	
Other User Charges	6,101,068	7,022,619	921,551	15.1%	\$1.1 million prepayment of entrance fee note by Stoughton.
Other Revenue	4,424,532	5,187,913	763,381	17.3%	Disposal of surplus materials of \$271,000; \$189,000 for Energy Revenue for RPS credit; Miscellaneous Revenue of \$172,000 primarily associated with worker's compensation reimbursement for older claims; \$106,000 in grant money (Commonwealth Operating Grant for \$44,000 and DCR Aqueduct Trails Grant for \$62,000); and Energy Rebates of \$81,000.
Investment Income	8,743,328	8,877,194	133,866	1.5%	Investment Income is favorable due to higher than anticipated balances offset by lower than budget short-term rates (2.10% actual vs. 2.25% budget).
<b>Total Revenue</b>	<b>458,749,889</b>	<b>460,568,688</b>	<b>1,818,799</b>	<b>0.4%</b>	
<b>Net Revenue in Excess of Expenses</b>	<b>24,223,735</b>	<b>35,643,002</b>	<b>11,419,267</b>		

**ATTACHMENT 3  
FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD January	FY20 Actuals YTD January	YTD Actuals vs. Budget		Explanations
			\$	%	
<b>Wastewater</b>					
Interception & Pumping (I&P)	\$18,584	\$15,098	(\$3,486)	-18.8%	<u>Underspending</u> Nut Island Odor Control & HVAC Improvements - Design/CA/REI and Construction: \$2.6M, and Interceptor Renewal No. 3, Dorchester Interceptor Sewer - Design, CA/RI and Construction: \$1.2M (delay in construction awards) Sections 191 & 192 Rehabilitation: \$250k (delay in the contract notice-to-proceed) Wastewater Meter System Planning/Study/Design: \$199k, and Wastewater Central Monitoring Design & Programming Services: \$164k (less than anticipated budgeted work) Prison Point Rehabilitation - Design/CA/RI: \$198k (delay in 100% Design Report review) Remote Headworks and Deer Island Shaft Study: \$111k (contract time extension) Other smaller projects totaling \$226k. <u>Offset Overspending</u> Chelsea Creek Headworks Upgrades - Construction: \$976k (contractor progress) Wastewater Metering Asset Protection/Equipment Purchases: \$486k (sooner than anticipated equipment purchases)
Treatment	\$8,547	\$7,100	(\$1,447)	-16.9%	<u>Underspending</u> Gravity Thickener Rehab: \$519k, Digester Tank Rehab and Pipe Replacement: \$209k, Combined Heat and Power Energy Alternatives Study: \$204k, and Motor Control Center Switchgear Replacement/ESDC/REI \$196k (timing of work) Winthrop Terminal Facility VFD and Motors Replacements: \$469k (vibration issue with VFD No. 5). As-Needed Design: \$188k (less than anticipated task order work) Clinton Valves and Pipe Replacement: \$167k (delay in construction award) Other smaller projects totaling \$212k. <u>Offset Overspending</u> Clinton Roofing Rehabilitation: \$536k (work scheduled for FY19 performed in FY20) Gas Protection System Replacement: \$181k (timing of work)
Residuals	\$3,760	\$6,667	\$2,907	77.3%	<u>Overspending</u> Residuals Electrical/Mechanical/Drum Replacements: \$3.0M (contractor progress and greater than anticipated engineering costs) <u>Offset Underspending</u> Pellet Conveyance Relocation: \$125k (timing of work)

**ATTACHMENT 3  
FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD January	FY20 Actuals YTD January	YTD Actuals vs. Budget		Explanations
			\$	%	
CSO	\$996	\$758	(\$237)	-23.8%	<u>Underspending</u> Dorchester Inflow Removal Construction: \$342k (updated schedule) <u>Offset Overspending</u> CSO Performance Assessment: \$142K (greater than anticipated consultant progress)
Other Wastewater	\$12,164	\$23,060	\$10,895	89.6%	<u>Overspending</u> I/I Local Financial Assistance: \$10.9M (timing of community requests for grants and loans)
<b>Total Wastewater</b>	<b>\$44,051</b>	<b>\$52,682</b>	<b>\$8,632</b>	<b>19.6%</b>	

**ATTACHMENT 3  
FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD January	FY20 Actuals YTD January	YTD Actuals vs. Budget		Explanations
			\$	%	
<b>Waterworks</b>					
Drinking Water Quality Improvements	\$1,277	\$789	(\$489)	-38.2%	<u>Underspending</u> Carroll Water Treatment Plant Ancillary Modifications - Construction: \$323k (updated schedule) Technical Assistance 9 & 10: \$186k (timing of task order work) HVAC Equipment Replacement: \$136k (long lead time for equipment)
Transmission	\$8,441	\$7,623	(\$818)	-9.7%	<u>Underspending</u> Commonwealth Ave Pumping Station Improvements Construction: \$307k, and WASM 3 - MEPA/Design/CA/RI: \$294k (progress less than anticipated) Wachusett Lower Gate House Interim Pipe Repair: \$200k (delayed notice-to-proceed) Chestnut Hill Emergency Pump Station - Design/CA: \$170k (longer than anticipated receipt of hydraulic information) Weston Aqueduct Sluice Gates - Construction: \$164k, and CP-1 Shafts 6, 8, and 9A: \$162k (schedule changes) <u>Offset Overspending</u> Watershed Land Acquisition: \$509k (timing of land purchases)
Distribution & Pumping	\$17,583	\$16,887	(\$696)	-4.0%	<u>Underspending</u> Sections 50 & 57 Water & 21/20/19 Sewer Rehab - Design/CA/RI: \$661k (less than anticipated consultant work) Section 22 Rehabilitation Alternatives Analysis and Environmental Permitting: \$259k (schedule change) Section 89 & 29 Redundancy - Design/CA: \$228k (Construction Administration and Resident Inspection services less than anticipated) Cathodic Protection Shafts E & L: \$212k (work scheduled for FY20 performed in FY19) SEH Redundancy Pipeline Section 111 - Construction Phase 2: \$162k (paving delayed due to Eversource work) <u>Offset Overspending</u> Section 89 & 29 Redundancy Construction Phase 2: \$475k (contractor progress) SEH Redundancy Pipeline Section 111 - Construction Phase 3: \$413k (contractor progress)

**ATTACHMENT 3  
FY20 CIP Year-to-Date Variance Report (\$000's)**

	FY20 Budget YTD January	FY20 Actuals YTD January	YTD Actuals vs. Budget		Explanations
			\$	%	
Other Waterworks	\$6,054	\$3,410	(\$2,644)	-43.7%	<u>Underspending</u> Local Water Pipeline Financial Assistance Program: \$2.9M (less than budgeted requests for loans) Gillis Pump Station and Cottage Farm Roof Replacements: \$268k (delay in contractor mobilization) Deer Island Water Tank Repainting: \$182k (timing of final work and pending credit change order) <u>Offset Overspending</u> Cosgrove Intake Roof Replacement: \$470k: (work scheduled in FY19 performed in FY20) Generator Docking Station: \$128k (timing of work) Other smaller projects totaling \$108k
<b>Total Waterworks</b>	<b>\$33,356</b>	<b>\$28,709</b>	<b>(\$4,647)</b>	<b>-13.9%</b>	
<b>Business &amp; Operations Support</b>					
<b>Total Business &amp; Operations Support</b>	<b>\$5,126</b>	<b>\$2,380</b>	<b>(\$2,745)</b>	<b>-53.6%</b>	<u>Underspending</u> MIS Projects: \$1.6M (timing of work) As-Needed Technical Assistance and REI Services: \$464k (timing of task order work) FY19-23 Vehicle Purchases: \$317k, and Security Equipment & Installation: \$284k (timing of purchases)
<b>Total MWRA</b>	<b>\$82,532</b>	<b>\$83,771</b>	<b>\$1,239</b>	<b>1.5%</b>	

**Attachment 4  
FY20 Budget vs. FY20 Projection**

TOTAL MWRA	FY20 Budget	FY20 Projection	Change FY20 Budget vs FY20 Projection	
			\$	%
<b>EXPENSES</b>				
WAGES AND SALARIES	\$ 109,953,483	\$ 106,463,279	\$ (3,490,204)	-3.2%
OVERTIME	4,898,965	4,977,878	78,913	1.6%
FRINGE BENEFITS	21,717,533	20,631,657	(1,085,876)	-5.0%
WORKERS' COMPENSATION	2,354,256	2,354,256	-	0.0%
CHEMICALS	11,811,222	11,518,199	(293,023)	-2.5%
ENERGY AND UTILITIES	24,454,796	23,757,226	(697,570)	-2.9%
MAINTENANCE	32,726,954	32,001,220	(725,734)	-2.2%
TRAINING AND MEETINGS	504,394	462,592	(41,802)	-8.3%
PROFESSIONAL SERVICES	8,295,315	6,559,062	(1,736,253)	-20.9%
OTHER MATERIALS	6,867,239	5,779,741	(1,087,498)	-15.8%
OTHER SERVICES	24,683,370	25,136,763	453,393	1.8%
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 248,267,527</b>	<b>\$ 239,641,872</b>	<b>\$ (8,625,655)</b>	<b>-3.5%</b>
INSURANCE	\$ 2,611,222	\$ 2,511,222	(100,000)	-3.8%
WATERSHED/PILOT	26,833,600	23,423,930	(3,409,670)	-12.7%
HEEC PAYMENT	4,429,316	4,429,316	-	0.0%
MITIGATION	1,654,618	1,654,618	-	0.0%
ADDITIONS TO RESERVES	2,094,284	2,094,284	-	0.0%
RETIREMENT FUND	7,315,000	7,315,000	-	0.0%
POSTEMPLOYMENT BENEFITS	5,962,457	5,962,457	-	0.0%
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 50,900,497</b>	<b>\$ 47,390,827</b>	<b>\$ (3,509,670)</b>	<b>-6.9%</b>
STATE REVOLVING FUND	\$ 92,797,295	\$ 92,420,886	(376,409)	-0.4%
SENIOR DEBT	202,299,609	221,069,643	18,770,034	9.3%
SUBORDINATE DEBT	169,609,844	139,672,356	(29,937,488)	-17.7%
LOCAL WATER PIPELINE CP	5,846,827	5,846,827	-	0.0%
CURRENT REVENUE/CAPITAL	15,200,000	15,200,000	-	0.0%
CAPITAL LEASE	3,217,060	3,217,060	-	0.0%
DEBT PREPAYMENT	5,000,000	5,000,000	-	0.0%
DEBT SERVICE ASSISTANCE	(890,239)	(890,239)	-	0.0%
<b>TOTAL DEBT SERVICE</b>	<b>\$ 493,080,395</b>	<b>\$ 481,536,533</b>	<b>\$ (11,543,863)</b>	<b>-2.3%</b>
<b>TOTAL EXPENSES</b>	<b>\$ 792,248,419</b>	<b>\$ 768,569,232</b>	<b>\$ (23,679,188)</b>	<b>-3.0%</b>
<b>REVENUE &amp; INCOME</b>				
RATE REVENUE	\$ 761,767,000	\$ 761,767,000	-	0.00%
OTHER USER CHARGES	9,216,425	9,957,409	740,984	8.0%
OTHER REVENUE	5,761,022	6,049,073	288,051	5.0%
RATE STABILIZATION	-	-	-	0.0%
INVESTMENT INCOME	15,503,973	14,575,465	(928,508)	-6.0%
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 792,248,420</b>	<b>\$ 792,348,947</b>	<b>\$ 100,527</b>	<b>0.0%</b>

**VARIANCE:**

**\$ (23,779,714) \$ (23,779,714)**

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Preliminary FY21 Water and Sewer Assessments



COMMITTEE: Administration, Finance & Audit

INFORMATION  
 VOTE

Michael Cole, Budget Director  
 Leo Norton, Asst. Mgr, Rates, Revenue and Finance  
 Preparer/Title



Thomas J. Durkin  
 Director of Finance



*Consistent with the Proposed FY21 Current Expense Budget (CEB), preliminary FY21 water and sewer assessments are based on a Rate Revenue Requirement of \$789,386,000, a 3.6% increase over the FY20 Rate Revenue Requirement.*

*The preliminary FY21 Rate Revenue Requirement will be allocated to MWRA communities based on their respective shares of CY19 MWRA water use, the average of CY17-CY19 wastewater flows, corresponding strength of flows, and population.*

**RECOMMENDATION:**

For information only. This staff summary provides information on preliminary FY21 wholesale water and sewer assessments. Staff plan to transmit preliminary FY21 assessments to MWRA communities on or before Thursday, February 20, 2019.

**DISCUSSION:**

The Proposed FY21 CEB recommends a Rate Revenue Requirement of \$789,386,000, an increase of 3.6% over the final FY20 requirement.

	<b>FY21 Preliminary</b>	<b>FY20 Approved</b>	<b>\$ Change from FY20</b>	<b>% Change from FY20</b>
<b>Water</b>	\$268,865,000	\$258,751,692	\$10,113,308	3.9%
<b>Sewer</b>	\$520,521,000	\$503,015,308	\$17,505,692	3.5%
<b>Total</b>	\$789,386,000	\$761,767,000	\$27,619,000	3.6%

Attachment 1 summarizes preliminary FY21 wholesale water and sewer charges for each MWRA community.

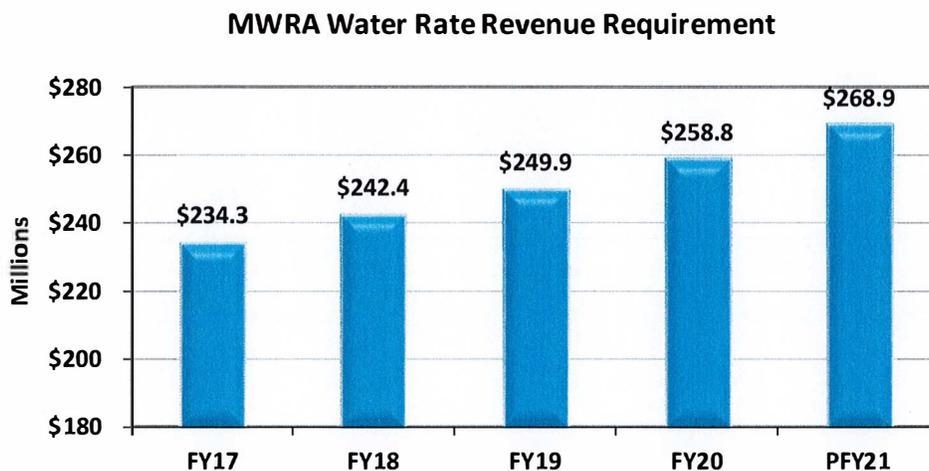
The estimated annual impact of the preliminary FY21 assessment increase on the MWRA portion of the average household bill for water and sewer service in a fully served MWRA

community that uses close to the system average of 61,000 gallons of water per year is approximately \$19.

### Water Assessments

MWRA calculates water assessments for customer communities by apportioning the water rate revenue requirement according to each community's share of total water use for the most recent calendar year. Preliminary FY21 assessments are based on each community's share of CY19 water use of 62.045 billion gallons, a 3.6% decrease compared to CY18 water use of 64.343 billion gallons. Changes in FY21 water assessments for customer communities compared to FY20 assessments will vary considerably, depending on each community's use of water and how that use factors into their share of the water system in CY19 compared to CY18. This is particularly true for communities that receive only part of their water from MWRA.

The graph below illustrates the water Rate Revenue Requirement for the past 5 years. The changes from FY20 to PFY21 are primarily the result of increased debt service related to water system rehabilitation and improvements.



MWRA staff continue to review CY19 water use data and have identified a potential increase of up to 0.7 million gallons a day to Somerville's water use for July to December. Preliminary FY21 assessments do not include this adjustment, which would result in an additional assessment increase of roughly \$550,000. Staff have been in contact with Somerville officials regarding this issue and any changes to Somerville's CY19 water use will be reflected in the final FY21 water assessment.

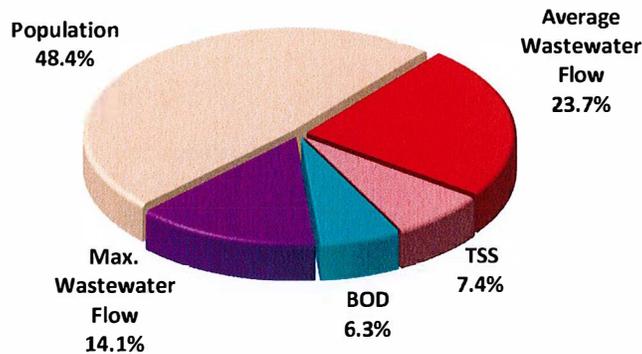
### Sewer Assessments

MWRA allocates sewer assessments based on each community's share of the following allocation parameters: three-year average of annual wastewater flow, maximum month flow, strength of flow, census population, and sewer population.

On average, approximately 52% of a community's preliminary FY21 sewer assessment is based on each community's share of wastewater flow and strength of flow (total suspended solids or

TSS and biochemical oxygen demand or BOD), and approximately 48% is based on population as illustrated in the next graph.

**Allocation of Total MWRA Sewer Utility Assessment**

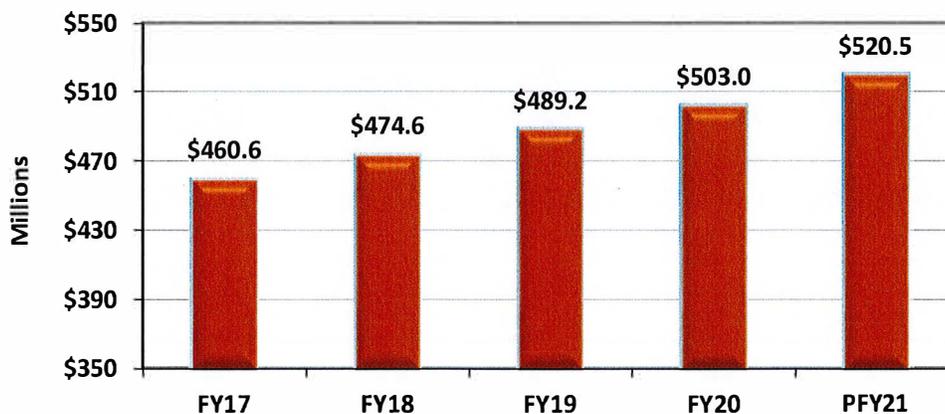


Both the preliminary and final FY21 assessments for population will be calculated using the most recent (July 2018) community population estimates from the U.S. Census Bureau, as well as the percentage of total population receiving municipal sewer service reported by each MWRA community.

Preliminary FY21 assessments have also been calculated using the average of CY17, CY18 and CY19 wastewater flows. Ongoing review of meter data may result in revised flows prior to issuing final assessments in June.

The graph below illustrates the sewer Rate Revenue Requirement for the past 5 years. As with the water utility, the annual changes continue to be primarily the result of increased debt service related to sewer system rehabilitation and improvements.

**MWRA Sewer Rate Revenue Requirement**



## **Clinton and Lancaster Sewer Assessments**

Proposed FY21 operating and maintenance (O&M) and capital expenses attributable to the Clinton Wastewater Treatment Plant are \$4,767,411, an increase of 5.6% over FY20 expenses. This includes a 3.1% increase in operating costs, and a 12.3% increase in capital expenses related primarily to the landfill cell #1 closure, digester cover replacement, and valve and screw pump replacement projects.

In accordance with the agreement that allows the City of Worcester to take water from the Wachusett watershed, Worcester is charged approximately 7.9% of the direct operating expenses for the Clinton Wastewater Treatment Plant. Proposed FY21 direct operating expenses for the plant total \$2,731,480, resulting in a preliminary FY21 charge of \$216,087 for the City of Worcester. Worcester has been paying this annual charge to MWRA or its predecessors since 1914.

The Town of Clinton and the Lancaster Sewer District are allocated proportional shares of the remaining expenses based on annual metered wastewater flow to the Clinton Plant. Based on proposed FY21 expenses and CY19 wastewater flows, Lancaster's preliminary FY21 charge is \$442,093, an increase of 17.7% from the final FY20 charge of \$375,767. In addition to the projected increase in expenses, Lancaster's preliminary FY21 charge includes \$13,000 for FY19 expenses that exceeded the FY19 budget.

The preliminary FY21 charge for the Town of Clinton is \$4,122,300. However, pursuant to Chapter 307, Section 8 of the Acts of 1987, Clinton is only liable for the first \$500,000 of its share of O&M and capital costs.

*Attachment 2* details the expenses and corresponding charges for the Clinton Sewer Service Area.

## **CVA Water Assessments**

Based on the Proposed FY21 CIP and CEB for the Chicopee Valley Aqueduct (CVA) water system, the preliminary FY21 system assessment is \$5,282,357, an increase of 2.6% from FY20 assessments.

MWRA's CVA water assessment methodology allocates CVA assessments to the three communities served by the CVA system based on their share of prior calendar year water use. Based on CY19 water use, preliminary FY21 assessments are as follows:

- City of Chicopee: \$3,707,406 (+2.8%)
- South Hadley Fire District #1: \$ 766,608 (+5.9%)
- Town of Wilbraham: \$ 808,343 (-1.2%)

As with the metropolitan water system, changes in preliminary FY21 water assessments for each CVA community compared to FY20 assessments vary depending on their water use and how that use factors into their share of the CVA water system in CY19 compared to CY18.

*Attachment 3* details the expenses and corresponding assessments for the CVA Water Service Area.

### **Wholesale Water Rate**

MWRA's wholesale water rate per million gallons is applied to customers purchasing MWRA water on a pay-as-you-go basis (including customers with emergency agreements). The preliminary wholesale water rate for FY21 is \$4,333.42 per million gallons. The proposed FY21 CEB includes revenue of \$109,562 from these customers.

### **Retail Sewer Rate**

MWRA provides direct retail sewer service to Regis College in Weston and the New England Center for Children in Southborough. In accordance with MWRA Policy #OP.11, "Admission of New Community to MWRA Sewer System and Other Requests for Sewer Service to Locations Outside MWRA Sewer Service Area", both entities are charged a modified per million gallon "retail" rate that captures both sanitary and non-sanitary flows. Based on preliminary FY21 sewer assessments, the FY21 retail sewer rate will be \$8,078.19 per million gallons. The Proposed FY21 CEB includes revenue of \$101,135 from these customers.

### **ATTACHMENTS:**

1. Preliminary FY21 Water and Sewer Assessments
2. Clinton Wastewater Treatment Plant Sewer User Charge Determination
3. Chicopee Valley Aqueduct System Assessment

MWRA Fully Served Water and Sewer Customers	Final FY20 Water Assessment	Preliminary FY21 Water Assessment	Percent Change from FY20	Final FY20 Sewer Assessment	Preliminary FY21 Sewer Assessment	Percent Change from FY20	Final FY20 Combined Assessment	Preliminary FY21 Combined Assessment	Dollar Change from FY20	Percent Change from FY20
ARLINGTON	5,428,333	5,643,748	4.0%	8,921,155	9,268,128	3.9%	\$14,349,488	\$14,911,876	\$562,388	3.9%
BELMONT	3,001,852	3,049,438	1.6%	5,321,061	5,587,200	5.0%	8,322,913	8,636,638	313,725	3.8%
BOSTON (BWSC)	93,413,175	98,271,609	5.2%	145,875,583	151,258,622	3.7%	239,288,758	249,530,231	10,241,473	4.3%
BROOKLINE	7,300,560	7,565,766	3.6%	13,202,213	13,800,085	4.5%	20,502,773	21,365,851	863,078	4.2%
CHELSEA	4,939,423	5,174,076	4.8%	8,626,321	8,959,962	3.9%	13,565,744	14,134,038	568,294	4.2%
EVERETT	5,543,676	5,975,706	7.8%	9,310,473	9,886,774	6.2%	14,854,149	15,862,480	1,008,331	6.8%
FRAMINGHAM	8,448,119	8,860,555	4.9%	13,569,073	13,710,669	1.0%	22,017,192	22,571,224	554,032	2.5%
LEXINGTON	7,413,364	8,030,101	8.3%	7,851,947	8,248,093	5.0%	15,265,311	16,278,194	1,012,883	6.6%
MALDEN	7,552,824	8,003,958	6.0%	13,705,355	13,965,507	1.9%	21,258,179	21,969,465	711,286	3.3%
MEDFORD	6,542,736	6,892,594	5.3%	12,493,747	12,852,019	2.9%	19,036,483	19,744,613	708,130	3.7%
MELROSE	2,977,071	3,114,230	4.6%	6,723,984	6,938,714	3.2%	9,701,055	10,052,944	351,889	3.6%
MILTON	3,508,765	3,534,684	0.7%	5,736,340	6,031,998	5.2%	9,245,105	9,566,682	321,577	3.5%
NEWTON	12,721,936	13,572,157	6.7%	22,443,151	22,805,214	1.6%	35,165,087	36,377,371	1,212,284	3.4%
NORWOOD	3,963,726	4,258,586	7.4%	8,171,535	8,486,687	3.9%	12,135,261	12,745,273	610,012	5.0%
QUINCY	11,714,243	12,438,188	6.2%	21,091,455	21,812,109	3.4%	32,805,698	34,250,297	1,444,599	4.4%
READING	2,370,637	2,406,856	1.5%	5,377,793	5,568,253	3.5%	7,748,430	7,975,109	226,679	2.9%
REVERE	5,262,364	5,608,417	6.6%	10,896,609	11,244,370	3.2%	16,158,973	16,852,787	693,814	4.3%
SOMERVILLE	8,240,009	8,736,900	6.0%	17,492,310	17,543,441	0.3%	25,732,319	26,280,341	548,022	2.1%
STONEHAM	3,019,242	2,879,103	-4.6%	4,812,709	5,126,864	6.5%	7,831,951	8,005,967	174,016	2.2%
WALTHAM	9,621,955	10,076,406	4.7%	13,961,534	14,507,130	3.9%	23,583,489	24,583,536	1,000,047	4.2%
WATERTOWN	3,898,438	3,947,484	1.3%	6,729,234	6,938,056	3.1%	10,627,672	10,885,540	257,868	2.4%
WINTHROP	1,848,357	1,964,235	6.3%	3,718,688	3,872,794	4.1%	5,567,045	5,837,029	269,984	4.8%
<b>TOTAL</b>	<b>\$218,730,805</b>	<b>\$230,004,797</b>	<b>5.2%</b>	<b>\$366,032,270</b>	<b>\$378,412,689</b>	<b>3.4%</b>	<b>\$584,763,075</b>	<b>\$608,417,486</b>	<b>\$23,654,411</b>	<b>4.0%</b>

MWRA Sewer and Partial Water Customers	Final FY20 Water Assessment	Preliminary FY21 Water Assessment	Percent Change from FY20	Final FY20 Sewer Assessment	Preliminary FY21 Sewer Assessment	Percent Change from FY20	Final FY20 Combined Assessment	Preliminary FY21 Combined Assessment	Dollar Change from FY20	Percent Change from FY20
CANTON	2,136,764	1,631,452	-23.6%	4,620,738	4,774,766	3.3%	\$6,757,502	\$6,406,218	(\$351,284)	-5.2%
NEEDHAM	1,412,709	1,126,226	-20.3%	6,399,114	6,655,947	4.0%	7,811,823	7,782,173	(29,650)	-0.4%
STOUGHTON	146,695	141,420	-3.6%	5,240,340	5,417,061	3.4%	5,387,035	5,558,481	171,446	3.2%
WAKEFIELD	2,581,082	2,883,067	11.7%	6,585,727	6,851,952	4.0%	9,166,809	9,735,019	568,210	6.2%
WELLESLEY	1,476,827	1,840,814	24.6%	5,933,569	6,203,614	4.6%	7,410,396	8,044,428	634,032	8.6%
WILMINGTON	732,142	601,231	-17.9%	2,987,771	3,071,580	2.8%	3,719,913	3,672,811	(47,102)	-1.3%
WINCHESTER	1,732,283	1,840,921	6.3%	4,458,416	4,644,433	4.2%	6,190,699	6,485,354	294,655	4.8%
WOBURN	4,119,106	4,211,913	2.3%	9,475,387	9,747,424	2.9%	13,594,493	13,959,337	364,844	2.7%
<b>TOTAL</b>	<b>\$14,337,608</b>	<b>\$14,277,044</b>	<b>-0.4%</b>	<b>\$45,701,062</b>	<b>47,366,777</b>	<b>3.6%</b>	<b>\$60,038,670</b>	<b>\$61,643,821</b>	<b>\$1,605,151</b>	<b>2.7%</b>

MWRA Sewer-only Customers	Final FY20 Water Assessment	Preliminary FY21 Water Assessment	Percent Change from FY20	Final FY20 Sewer Assessment	Preliminary FY21 Sewer Assessment	Percent Change from FY20	Final FY20 Combined Assessment	Preliminary FY21 Combined Assessment	Dollar Change from FY20	Percent Change from FY20
ASHLAND				2,747,924	2,802,424	2.0%	\$2,747,924	\$2,802,424	\$54,500	2.0%
BEDFORD				3,630,690	3,706,686	2.1%	3,630,690	3,706,686	75,996	2.1%
BRAINTREE				9,896,915	10,427,323	5.4%	9,896,915	10,427,323	530,408	5.4%
BURLINGTON				5,815,487	6,062,437	4.2%	5,815,487	6,062,437	246,950	4.2%
CAMBRIDGE				26,400,678	27,153,096	2.8%	26,400,678	27,153,096	752,418	2.8%
DEDHAM				5,860,551	6,125,817	4.5%	5,860,551	6,125,817	265,266	4.5%
HINGHAM SEWER DISTRICT				1,937,252	2,086,052	7.7%	1,937,252	2,086,052	148,800	7.7%
HOLBROOK				1,857,144	1,901,614	2.4%	1,857,144	1,901,614	44,470	2.4%
NATICK				6,044,147	6,206,098	2.7%	6,044,147	6,206,098	161,951	2.7%
RANDOLPH				6,747,779	7,035,461	4.3%	6,747,779	7,035,461	287,682	4.3%
WALPOLE				4,096,111	4,301,489	5.0%	4,096,111	4,301,489	205,378	5.0%
WESTWOOD				3,161,944	3,254,117	2.9%	3,161,944	3,254,117	92,173	2.9%
WEYMOUTH				13,085,354	13,678,920	4.5%	13,085,354	13,678,920	593,566	4.5%
<b>TOTAL</b>				<b>\$91,281,976</b>	<b>\$94,741,534</b>	<b>3.8%</b>	<b>\$91,281,976</b>	<b>\$94,741,534</b>	<b>\$3,459,558</b>	<b>3.8%</b>

MWRA Water-only Customers	Final FY20 Water Assessment	Preliminary FY21 Water Assessment	Percent Change from FY20	Final FY20 Sewer Assessment	Preliminary FY21 Sewer Assessment	Percent Change from FY20	Final FY20 Combined Assessment	Preliminary FY21 Combined Assessment	Dollar Change from FY20	Percent Change from FY20
LYNNFIELD WATER DISTRICT	801,241	767,131	-4.3%				\$801,241	\$767,131	(\$34,110)	-4.3%
MARBLEHEAD	2,576,446	2,672,018	3.7%				2,576,446	2,672,018	95,572	3.7%
NAHANT	457,313	515,906	12.8%				457,313	515,906	58,593	12.8%
SAUGUS	4,221,536	4,478,855	6.1%				4,221,536	4,478,855	257,319	6.1%
SOUTHBOROUGH	927,672	1,005,985	8.4%				927,672	1,005,985	78,313	8.4%
SWAMPSCOTT	2,161,811	2,349,375	8.7%				2,161,811	2,349,375	187,564	8.7%
WESTON	2,413,951	2,402,122	-0.5%				2,413,951	2,402,122	(11,829)	-0.5%
<b>TOTAL</b>	<b>\$13,559,970</b>	<b>\$14,191,392</b>	<b>4.7%</b>				<b>\$13,559,970</b>	<b>\$14,191,392</b>	<b>\$631,422</b>	<b>4.7%</b>

MWRA Partial Water-only Customers	Final FY20 Water Assessment	Preliminary FY21 Water Assessment	Percent Change from FY20	Final FY20 Sewer Assessment	Preliminary FY21 Sewer Assessment	Percent Change from FY20	Final FY20 Combined Assessment	Preliminary FY21 Combined Assessment	Dollar Change from FY20	Percent Change from FY20
DEDHAM-WESTWOOD WATER DISTRICT	181,946.00	1,040,934.00	472.1%				\$181,946	\$1,040,934	\$858,988	472.1%
LYNN (LWSC)	392,593	397,272	1.2%				392,593	397,272	4,679	1.2%
MARLBOROUGH	5,875,229	6,213,086	5.8%				5,875,229	6,213,086	337,857	5.8%
NORTHBOROUGH	1,312,711	1,426,557	8.7%				1,312,711	1,426,557	113,846	8.7%
PEABODY	4,360,830	1,313,918	-69.9%				4,360,830	1,313,918	(3,046,912)	-69.9%
<b>TOTAL</b>	<b>\$12,123,309</b>	<b>\$10,391,767</b>	<b>-14.3%</b>				<b>\$12,123,309</b>	<b>\$10,391,767</b>	<b>(\$1,731,542)</b>	<b>-14.3%</b>
<b>SYSTEMS TOTAL</b>	<b>\$258,751,692</b>	<b>\$268,865,000</b>	<b>3.9%</b>	<b>\$503,015,308</b>	<b>\$520,521,000</b>	<b>3.5%</b>	<b>\$761,767,000</b>	<b>\$789,386,000</b>	<b>\$27,619,000</b>	<b>3.6%</b>

Massachusetts Water Resources Authority  
 Clinton Wastewater Treatment Plant  
 Sewer User Charge Determination

BUDGETED EXPENSES: Preliminary FY21	
Clinton Direct Operating Expenses:	\$2,731,480
MWRA Support Allocation:	656,708
Subtotal O&M Expenses:	\$3,388,188
Total Debt Service Expenses:	\$1,379,224
Total Clinton Service Area Expenses	\$4,767,411
Less Revenue (City of Worcester Payment)	-216,087
Clinton WWTP Rate Revenue Requirement:	\$4,551,324

WASTEWATER FLOW and FLOW SHARES:	CY2019		
	Town of Clinton Flow	Lancaster Sewer District Flow	Total Wastewater Flow
Average Daily Flow (MGD)	2.339	0.243	2.583
Average Flow (MG/YR)	853.904	88.869	942.773
Proportional Share of Flow	90.57%	9.43%	100.0%

Sewer User Charge Determination

TOWN OF CLINTON	
O&M Expenses	\$3,388,188
Less Revenue (City of Worcester Payment)	-216,087
O&M Expenses to be Recovered	\$3,172,101
Clinton's Share of Flow	90.57%
Clinton's Share of O&M Costs	\$2,873,087
<b>Total Clinton O&amp;M Charge</b>	<b>\$2,873,087</b>
Debt Service Costs to be Recovered	\$1,379,224
Clinton's Share of Wastewater Flow	90.57%
<b>Total Clinton Debt Service Charge</b>	<b>\$1,249,213</b>
<b>Total Clinton O&amp;M and Debt Service Charge</b>	<b>\$4,122,300</b>
Less MWRA Water Ratepayer Subsidy	-3,622,300
Billable Charge to the Town of Clinton as per CH. 307, Section 8 The Acts of 1987	\$500,000

LANCASTER SEWER DISTRICT	
O&M Expenses	\$3,388,188
Less Revenue (City of Worcester Payment)	-216,087
O&M Expenses to be Recovered	\$3,172,101
Lancaster's Share of Flow	9.43%
Lancaster's Share of O&M Costs	\$299,013
<b>Total Lancaster Sewer District O&amp;M Charge</b>	<b>\$299,013</b>
Debt Service Costs to be Recovered	\$1,379,224
Lancaster's Share of Wastewater Flow	9.43%
<b>Total Lancaster Sewer District Debt Service Charge</b>	<b>\$130,010</b>
<b>Total Lancaster O&amp;M and Debt Service Charge</b>	<b>\$429,023</b>
Billable Charge to Lancaster Sewer District	\$429,023

Clinton WWTP Charges and Payment Schedule

Sewer Customer	Billable Charges	Change from Prior Year	
		Change	%
Town of Clinton (billable)	\$500,000	\$0	0.0%
Lancaster Sewer District (before adj.)	\$429,023		
Lancaster Sewer District (prior yr. adj.)	\$13,070		
Lancaster Sewer District (billable)	\$442,093	\$66,326	17.7%
<b>Total Billable Sewer Use Charges</b>	<b>\$942,093</b>		
City of Worcester	\$216,087	\$208,773	3.5%

Payment 1 on or before Sept 15, 2020	Payment 2 on or before Nov 15, 2020	Payment 3 on or before Feb 15, 2021	Payment 4 on or before May 15, 2021
\$125,000	\$125,000	\$125,000	\$125,000
\$110,523	\$110,523	\$110,523	\$110,523
<b>\$235,523</b>	<b>\$235,523</b>	<b>\$235,523</b>	<b>\$235,523</b>
\$0	\$0	\$216,087	\$0

**Massachusetts Water Resources Authority**  
*Chicopee Valley Aqueduct Water System Assessment*  
**PFY2021**

CVA Operating Budget	FY20	PFY21	Change from Prior Year	
			Dollars	Percent
CVA Cost Center Expenses	\$935,590	\$965,147	\$29,556	3.2%
Allocated Waterworks Expenses	149,935	154,340	4,405	2.9%
Allocated Watershed/PILOT	495,188	471,049	-24,139	-4.9%
Allocated Watershed Land Acquisition	27,935	28,671	736	2.6%
Allocated MWRA Indirect Expenses	629,553	639,541	9,988	1.6%
<b>SUBTOTAL OPERATING BUDGET</b>	<b>\$2,238,201</b>	<b>\$2,258,748</b>	<b>\$20,547</b>	<b>0.9%</b>

CVA Capital Budget	FY20	PFY21	Change from Prior Year	
			Dollars	Percent
Capital Expenses	\$3,064,467	\$3,049,558	-\$14,908	-0.5%
<b>TOTAL CVA BUDGET</b>	<b>\$5,302,668</b>	<b>\$5,308,306</b>	<b>\$5,638</b>	<b>0.1%</b>

BASE COMMUNITY ASSESSMENT	FY20 <sup>1</sup>	PFY21 <sup>2</sup>	Change from Prior Year	
			Dollars	Percent
Chicopee	\$3,728,618	\$3,726,532	-\$2,086	-0.1%
South Hadley Fire District #1	748,587	770,569	21,982	2.9%
Wilbraham	825,463	811,205	-14,258	-1.7%
<b>CVA BASE SYSTEM ASSESSMENT</b>	<b>\$5,302,668</b>	<b>\$5,308,306</b>	<b>\$5,638</b>	<b>0.1%</b>

PRIOR PERIOD ADJUSTMENTS	FY20 <sup>3</sup>	PFY21 <sup>3</sup>	Change from Prior Year	
			Dollars	Percent
Chicopee	-\$123,896	-\$19,126	\$104,770	-84.6%
South Hadley Fire District #1	-25,004	-3,961	21,043	-84.2%
Wilbraham	-7,657	-2,861	4,795	-62.6%
<b>TOTAL ADJUSTMENTS</b>	<b>-\$156,557</b>	<b>-\$25,949</b>	<b>\$130,608</b>	<b>-83.4%</b>

ADJUSTED ASSESSMENT	FY20	PFY21	Change from Prior Year	
			Dollars	Percent
Chicopee	\$3,604,721	\$3,707,406	\$102,684	2.8%
South Hadley Fire District #1	723,584	766,608	43,025	5.9%
Wilbraham	817,806	808,343	-9,463	-1.2%
<b>ADJUSTED ASSESSMENT</b>	<b>\$5,146,111</b>	<b>\$5,282,357</b>	<b>\$136,246</b>	<b>2.65%</b>

<sup>1</sup> Based on CY2018 water use and before prior period adjustments.

<sup>2</sup> Based on CY2019 water use and before prior period adjustments.

<sup>3</sup> Prior period adjustment to account for budget to actual expenses.

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Transmittal of the FY21 Proposed Current Expense Budget

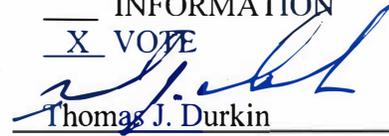


COMMITTEE Administration, Finance & Audit

Michael Cole, Budget Director  
James Coyne, Budget Manager  
Preparer/Title



     INFORMATION  
  X   VOTE



Thomas J. Durkin  
Director, Finance

*MWRA's long-term goal has been to provide sustainable and predictable assessments to its member communities. In the past few years, the Advisory Board challenged MWRA to limit the assessment increases at a level less than 4%. MWRA has continuously been successful in achieving this goal by utilizing a multi-year rates management strategy, which includes controlled spending, the use of historical variable rate assumptions, and the practice of targeted debt defeasance.*

*To ensure that the MWRA's long-term goals will continue to be met in future years, staff recommend continuing conservative, fiscally responsible budgeting practices while addressing all outstanding long-term liabilities.*

*The FY21 Proposed Budget puts forth a 3.63% combined assessment increase and less than 4.0% projected average assessment increases for the next four years.*

*The FY21 Proposed Budget reflects the benefits of a planned \$15.0 million defeasance to be executed in FY20 with targeted savings during FY21-26. Besides the planned defeasances, the Authority is continuing to address the Pension and the Other Post Employment Benefits (OPEB) obligations, which are the largest long-term liabilities after the debt payments.*

**RECOMMENDATION:**

To approve transmittal of the FY21 Proposed Current Expense Budget to the MWRA Advisory Board for its 60 day review and comment period.

## **DISCUSSION:**

This staff summary presents an overview of the FY21 Proposed Current Expense Budget (CEB) and projects the Rate Revenue Requirement for the next five years.

### **Summary**

The FY21 Proposed Budget recommends a combined increase in rates and charges of 3.63%. Capital Financing costs remain the largest component of the CEB and account for 61.7% of total expenses. Total expenses are \$816.7 million, an increase of \$24.4 million or 3.1% over the FY20 Budget. There are no offsets from Debt Service Assistance (DSA) assumed for FY21 or in any future years.

Total expenses include \$504.0 million for Capital Financing costs and \$312.7 million for operating expenses, of which \$255.0 million is for Direct Expenses and \$57.6 million is for Indirect Expenses. The total expense increase over FY20 was driven by the following:

- Higher Capital Financing costs of \$10.9 million due to the structure of the existing debt and the projected issuance.
- Higher Direct Expenses of \$6.7 million due to Wages & Salaries which includes five additional positions for the Tunnel Redundancy Department, Utilities due to increased Electricity and Diesel Fuel costs, and Fringe Benefits due to increased Health Insurance premiums.
- Higher Indirect Expenses of \$6.7 million due to increased pension contributions and higher costs for the new cross-harbor electrical cable.

The FY21 Proposed Budget revenues, excluding rate revenue, totals \$27.3 million, a decrease of \$3.2 million or 10.5% from the FY20 Budget. The FY21 Proposed Budget non-rate revenue budget includes \$15.1 million in Other User Charges and Other Revenue and \$12.2 million for Investment Income. The projected decrease is due primarily to a reduction of 75 basis points to the short-term investment rate assumption.

The FY21 Proposed Rate Revenue Requirement is \$789.4 million, an increase of \$27.6 million or 3.63% over the FY20 Budget.

*Table 1 on the following page provides a comparison of the FY21 Proposed CEB and FY20 Budget by major categories. Additional detail by line item and by Division is provided in Attachments A and B.*

<b>Table 1</b>					
<b>MWRA Current Expense Budget</b>					
<b>FY21 Proposed versus FY20 Approved Budget</b>					
(\$ in Millions)	FY20 Approved Budget	FY21 Proposed Budget	\$ Change	%	Change
Directs	\$ 248.3	\$ 255.0	\$ 6.7		2.7%
Indirects	50.9	57.6	6.7		13.3%
<b>Sub-Total Operating Expenses</b>	<b>\$ 299.2</b>	<b>\$ 312.7</b>	<b>\$ 13.5</b>		<b>4.5%</b>
Capital Financing (before Offsets)	494.0	504.0	10.0		2.0%
<i>Offsets: Bond Redemption</i> <sup>1</sup>	-	-	-		
Variable Debt Savings	-	-	-		
Debt Service Assistance	(0.9)	-	0.9		-100.0%
<b>Sub-Total Capital Financing</b>	<b>\$ 493.1</b>	<b>\$ 504.0</b>	<b>\$ 10.9</b>		<b>2.2%</b>
<b>Total Expenses</b>	<b>\$ 792.2</b>	<b>\$ 816.7</b>	<b>\$ 24.4</b>		<b>3.1%</b>
Investment Income	\$ 15.5	\$ 12.2	\$ (3.3)		-21.6%
Non-Rate Revenue	15.0	15.1	0.1		1.0%
Rate Stabilization <sup>1</sup>	-	-	-		
<b>Sub-Total Non-Rate Revenue</b>	<b>\$ 30.5</b>	<b>\$ 27.3</b>	<b>\$ (3.2)</b>		<b>-10.5%</b>
Rate Revenue	761.8	789.4	27.6		3.6%
<b>Total Revenue &amp; Income</b>	<b>\$ 792.2</b>	<b>\$ 816.7</b>	<b>\$ 24.4</b>		<b>3.1%</b>
<b>FY21 Rate Revenue Increase</b>					<b>3.63%</b>
<b>Combined Use of Reserves</b>	<b>\$ -</b>	<b>\$ -</b>			

<sup>1</sup> MWRA has two reserve funds (Bond Redemption and Rate Stabilization) which can be used at the discretion of the Authority to manage the rate revenue requirement. Use of the Bond Redemption Fund reduces total expenses and Rate Stabilization Fund increases total revenue. Under the terms of the General Bond Resolution the annual use of Rate Stabilization funds cannot exceed 10% of the year's senior debt service. Bond Redemption funds can be used only to retire or prepay outstanding debt. There is no annual limit on the amount of Bond Redemption funds used in a year; however, the use is tied to the bonds' maturity dates and it is utility specific.

**EXPENSES:**

Direct Expenses

FY21 Direct Expenses total \$255.0 million, an increase of \$6.7 million, or 2.7%, from the FY20 Budget.

<b>FY21 PROPOSED CURRENT EXPENSE BUDGET</b>				
<b>MWRA DIRECT EXPENSES BY LINE ITEM</b>				
Line Item	FY20 Approved Budget	FY21 Proposed Budget	Change FY21 vs FY20	
WAGES AND SALARIES	\$109,953,483	\$113,673,999	\$3,720,516	3.4%
OVERTIME	\$4,898,965	\$5,079,296	\$180,331	3.7%
FRINGE BENEFITS	\$21,717,533	\$22,492,274	\$774,741	3.6%
WORKERS' COMPENSATION	\$2,354,256	\$2,476,655	\$122,399	5.2%
CHEMICALS	\$11,811,222	\$12,182,677	\$371,455	3.1%
ENERGY AND UTILITIES	\$24,454,796	\$25,541,081	\$1,086,285	4.4%
MAINTENANCE	\$32,726,954	\$32,618,569	(\$108,385)	-0.3%
TRAINING AND MEETINGS	\$504,394	\$505,264	\$870	0.2%
PROFESSIONAL SERVICES	\$8,295,315	\$8,377,283	\$81,968	1.0%
OTHER MATERIALS	\$6,867,239	\$7,091,071	\$223,832	3.3%
OTHER SERVICES	\$24,683,370	\$24,975,119	\$291,749	1.2%
<b>TOTAL</b>	<b>\$248,267,527</b>	<b>\$255,013,288</b>	<b>\$6,745,761</b>	<b>2.7%</b>

- *Wages and Salaries* – The budget includes \$113.7 million for Wages and Salaries as compared to \$110.0 million in the FY20 Budget, an increase of \$3.7 million or 3.4%. Regular Pay which is 98.4% of total Wages and Salaries, increased by \$3.7 million primarily for COLA increases and additional staff. The FY21 Proposed Budget includes 1,163 FTEs, five more than the FY20 Budget. The five additional FTEs represent the third year of hiring to support the Metropolitan Tunnel Redundancy capital project, bringing that staff to a total of 13.
- *Overtime* – The budget includes \$5.1 million for Overtime, an increase of \$180,000 or 3.7% from the FY20 Budget. Overtime was increased to reflect wage increases and recent trends in planned overtime for off-hours maintenance, emergency, and planned projects that include construction.
- *Fringe Benefits* – The budget includes \$22.5 million for Fringe Benefits, an increase of \$775,000 or 3.6% from the FY20 Budget. Health Insurance premiums total \$19.0 million, an increase of \$775,000 or 3.6% from the FY20 Budget largely due to an anticipated 6% increase in rate structure offset by a change to the number and mix of plans based on FY20 enrollment changes.

- *Workers' Compensation* – The budget includes \$2.5 million for Workers' Compensation. This is \$122,000 or 5.2% above the prior year's level and is based on historical average spending and reserve adjustments for Worker's Compensation.
- *Chemicals* – The budget includes \$12.2 million for Chemicals, an increase of \$371,000 or 3.1% from the FY20 Budget. Higher prices drove the budget increase, partially offset by lower volumes for some chemicals. Ferric Chloride increased by \$230,000 reflecting higher prices and dosing at Deer Island and Clinton. Sodium Hypochlorite increased by \$162,000 or 5.3% due to higher pricing and dosing at CWTP and BWTF based on multi-year trends, higher pricing at Deer Island, partially offset by elimination of wet scrubbers at Chelsea Creek Headwork. Soda Ash budget decreased by \$142,000 or 4.0% as reduced volume offset higher prices. The FY21 Budget does not include any funding for the new Deer Island National Pollutant Discharge Elimination System (NPDES) permit, which is projected to have more stringent requirements for enterococcus treatment compliance.
- *Utilities* – The budget includes \$25.5 million for Utilities, which is an increase of \$1.1 million or 4.4% over the FY20 Budget. The budget funds \$19.4 million for Electricity, an increase of \$679,000 or 3.6% over the FY20 budget. Wachusett Pump Station is driving an increase in kWh usage, partially offset by lower purchased power at the Deer Island Treatment Plant based on expected trends. The diesel budget of \$2.8 million is \$255,000 above the prior year's level as higher projected usage based on recent trends at Deer Island are only partially offset by lower projected fuel prices. Deer Island assumes multiple days of emergency CTG use due to wet weather events.
- *Maintenance* – The budget includes \$32.6 million for Maintenance projects, a decrease of \$108,000 or 0.3% from the FY20 budget. The Operations Division had an increase of \$122,000 or 0.4% from FY20.
- *Training and Meetings* – The budget includes \$505,000 for Training and Meetings, essentially level funded with FY20.
- *Professional Services* – The budget includes \$8.4 million for Professional Services, an increase of \$82,000 or 0.2% over the FY20 Budget. The increase is driven by Computer System Consultant in MIS which increased by \$137,000 or 8.2%, offset by a reduction to Engineering Services of \$57,000 or 7.5%.
- *Other Materials* – The budget includes \$7.1 million for Other Materials, an increase of \$224,000 or 3.3% from the FY20 Budget. The increase reflects vehicle purchases, \$400,000 above the prior year's level, and quantity and price increases for Clinton landfill gravel adding \$351,000, partially offset by a drop in computer hardware and software purchases of \$417,000.
- *Other Services* – The budget includes \$25.0 million for Other Services, an increase of \$292,000 or 1.2% from the FY20 Budget. The increase in the budget reflects \$233,000 for Space Lease/Rentals driven by the rock core storage shed for the tunnel redundancy

project for nine months totaling \$185,000 and an increase for grit screen removal of \$103,000 based on trended quantities and expected price increase for the next contract, partially offset by inflation adjustments to the pelletization contract of \$230,000.

### Indirect Expenses

Indirect Expenses for FY21 total \$57.6 million, an increase of \$6.7 million or 13.3% over the FY20 Budget. Below are the highlights of major changes:

- The budget includes \$3.1 million for Insurance, an increase of \$448,000 or 17.2% from the FY20 Budget. This reflects anticipated premium increases based on current market conditions. Claim payments are based on a 3-year average.
- The budget includes \$26.3 million for the Watershed Management budget, a decrease of \$502,000 or 1.9% below the FY20 Budget. The budget includes \$17.8 million for reimbursement of operating expenses net of revenues, and \$8.5 million for Payment in Lieu of Taxes (PILOT). The budget reduction is driven by a vacancy adjustment to reflect the timing of hiring. The PILOT payments remained flat at \$8.5 million.
- The budget includes \$7.2 million for the Harbor Energy Electric Company (HEEC), an increase of \$2.8 million or 62.9% over the FY20. This increase is due to the new cable placed into service in August 2019 (four months earlier than expected). The budget reflects the latest cost estimates, but the final costs will be determined by the Department of Public Utilities (DPU) once they have completed their review of the project.
- The budget includes \$1.7 million for Mitigation payments to the City of Quincy and Ttown of Winthrop in accordance with mitigation agreements, which expire in FY25.
- Funding for the Operating Reserve for FY21 is \$2.3 million. The Operating Reserve balance is in compliance with MWRA General Bond Resolution which requires a balance of one-sixth of annual operating expenses. Based on the FY21 Proposed Budget, the required balance is \$46.3 million versus the \$44.0 million required in FY20.
- The budget includes \$11.0 million for the Retirement Fund which is level to planning estimates, but an increase of \$3.7 million or 50.4% over the FY20 budget. The increase reflects the impact of lower than forecast investment returns in 2018 and the reduction of the projected rate of return of the Fund from 7.5% to 7.25%. MWRA's pension fund is at the 89.0% funding level and projected to be fully funded by June 30, 2030. Improved investment performance in 2019 should reduce the retirement fund contribution for FY21 and will be reviewed in the Spring with the next Retirement System Assessment.

- The Authority has complied with the GASB 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other than Pensions (OPEB)*, by disclosing this liability in the year-end Financial Statements. As part of the multi-year strategy to address its unfunded liabilities for OPEB and pension holistically, the Board approved a plan to pay down the pension liability and upon reaching full funding, move to address the OPEB obligation. Based on the latest actuarial evaluation, MWRA's pension fund is at a 89.0% funding level. To maximize the benefits in terms of returns and accounting treatment, an irrevocable OPEB Trust was established with Board approval and funding started on April 23, 2015. The OPEB Trust balance was \$39.1 million as of December 31, 2019. Starting in FY18, GASB 75 is the governing regulation for employee OPEB contributions. The proposed \$6.1 million budget is based on 50% of the contribution determined in the January 1, 2018 actuarial report.

### Capital Financing

As a result of the Authority's Capital Improvement Program, capital financing as a percent of total expenses (before offsets) has increased steadily from 36% in 1990 to 61.7% in the FY21 Proposed Current Expense Budget. Much of this debt service is for completed projects, primarily the Boston Harbor Project, the Integrated Water Supply Improvement Program, and the Combined Sewer Overflow (CSO) projects. MWRA's capital spending, from its inception, has been dominated by projects mandated by court ordered or regulatory requirements, which in total have accounted for ~72% of capital spending to date. Going forward, the majority of spending will be focused on asset protection and water redundancy initiatives.

The Authority has actively managed its debt structure to take advantage of favorable interest rates. Tools used by MWRA to lower borrowing costs and manage rates include current and advanced refunding of outstanding debt, maximizing the use of the subsidized State Revolving Fund (SRF) debt, issuance of variable rate debt, swap agreements, and the use of surplus revenues to defease debt. MWRA also uses tax exempt commercial paper to minimize the financing cost of construction in process.

The FY21 Proposed Budget capital financing costs total \$504.0 million and remains the largest portion of the MWRA's budget.

The FY21 Proposed Budget includes a planned defeasance of \$15.0 million in late FY20 which will reduce debt service by approximately \$623,100 in FY21, \$623,100 in FY22, \$3.9 million in FY23, \$1.9 million in FY24, \$403,700 in FY25, and \$8.5 million in FY26.

The FY21 Budget assumes a 3.50% interest rate for variable rate debt which is the same as the FY20 rate. The Authority's variable rate debt assumption is comprised of three separate elements: the interest rate for the daily and weekly series; liquidity fees for the Standby Bond Purchase Agreement, Letter of Credit, and Direct Purchase providers; and remarketing fees. While MWRA continues to experience low interest rates, they are not reflective of historical averages and there is some uncertainty as to which direction interest rates are heading in light of current market conditions.

The FY21 Proposed Budget capital financing costs increased by \$10.9 million or 2.2% compared to the FY20 Budget. This increase in the MWRA's debt service is the result of projected FY21 borrowings and the structure of the existing debt, partially offset by the impact of the projected defeasance.

The FY21 capital financing budget includes:

- \$273.8 million in principal and interest payments on MWRA's senior fixed rate bonds. This amount includes \$11.4 million to support issuances of \$160 million in May 2020 and \$7.4 million to support issuances of \$160 million of new money in December 2020;
- \$96.3 million in principal and interest payments on subordinate bonds;
- \$97.8 million in principal and interest payments on SRF loans. This amount includes \$10.6 million to support issuances of \$75 million of loans during 2020 and \$65 million 2021;
- \$16.2 million to fund ongoing capital projects with current revenue and to meet coverage requirements;
- \$11.0 million in debt prepayment;
- \$5.7 million to fund the interest expense related to the Local Water Pipeline Assistance Program; and,
- \$3.2 million for the Chelsea Lease.

## **Revenue**

FY21 non-rate revenue totals \$27.3 million, which is a decrease of \$3.2 million or 10.5% versus the FY20 Budget. The FY21 non-rate revenue budget includes:

- \$9.2 million in Other User Charges, including \$5.3 million for the Chicopee Valley Aqueduct (CVA) communities, \$2.0 million for Deer Island water usage, \$208,000 for entrance fees from member communities, and \$500,000 for the Commonwealth's partial reimbursement for Clinton Wastewater Treatment Plant expenses. Other User Charges are \$28,000 or 0.3% less than the FY20 Budget.
- \$5.9 million in Other Revenue, an increase of \$174,000 from the FY20 Budget. Other Revenue includes \$2.3 million from the sale of the Authority's Renewable Portfolio Credits, revenue from participating in load response programs, and the sale of generated power to the grid. Energy related revenue increased \$88,000 reflecting increased power sales revenue and improved pricing for Renewable Portfolio Credits that were partially offset by lower pricing for demand response program participation. The balance of Other

Revenue includes \$2.6 million in permit fees and penalties, an increase of \$162,000 over the FY20 Budget.

- \$12.2 million in Investment Income, a decrease of \$3.3 million or 21.6% from the FY20 Budget, reflecting lower interest rate assumptions. The short-term interest rate assumption is 1.50%, which is 75 basis points below the FY20 Budget.

The Rate Revenue Requirement for FY21 is \$789.4 million, an increase \$27.6 million or 3.63% over the FY20 Budget. The Rate Revenue Requirement is the difference between total expenses of \$816.7 million and non-rate revenue of \$27.3 million.

### Planning Estimates and Future Rate Projections

MWRA’s planning estimates are projections based on a series of assumptions about future spending (operating and capital), interest rates, inflation, and other factors. MWRA uses the planning estimates to model and project what future rate increases might be based upon these assumptions, as well as to test the impact of changes to assumptions on future rate increases. The planning estimates are not predictions of what rate increases will be but rather they provide the context and framework for guiding MWRA financial policy and management decision making that ultimately determine the level of actual rate increases on an annual basis. Historically, the planning estimates were based on conservative financial assumptions. Conservative projections of future rate increases benefit the MWRA by providing assurance to all stakeholders, including the rating agencies that MWRA anticipates raising revenues sufficient to pay for its operations and outstanding debt obligations now and over the long-term. Additionally, conservative forecasts of rate revenue requirements enable member communities to adequately plan and budget for future payments to MWRA.

Table 3 below presents the combined estimated future rate increases and household charges based on the Proposed FY21 Budget. The planning estimates shown below assume no Debt Service Assistance from the Commonwealth and use no of Rate Stabilization and Bond Redemption reserves through FY25.

**Table 3**

<b>Rates &amp; Budget Projections</b>						
<b>Proposed FY21 CEB</b>	<b>FY2020</b>	<b>FY2021</b>	<b>FY2022</b>	<b>FY2023</b>	<b>FY2024</b>	<b>FY2025</b>
Total Rate Revenue (\$000)	\$ 761,767	\$ 789,386	\$ 815,503	\$ 840,100	\$ 865,127	\$ 890,188
Rate Revenue Change from Prior Year (\$000)	\$ 22,725	\$ 27,619	\$ 26,117	\$ 24,598	\$ 25,027	\$ 25,061
Rate Revenue Increase	3.1%	3.6%	3.3%	3.0%	3.0%	2.9%
Use of Reserves (\$000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

#### *Estimated Household Bill*

Based on annual water usage of 61,000 gallons	\$1,177	\$1,229	\$1,282	\$1,336	\$1,393	\$1,451
Based on annual water usage of 90,000 gallons	\$1,737	\$1,814	\$1,892	\$1,972	\$2,055	\$2,141

## **CEB Review and Adoption Process**

The Advisory Board has a minimum of 60 days from the transmittal of the FY21 Proposed Budget to review the budget and prepare comments and recommendations. During the review period, Advisory Board and MWRA staff will continue to meet and evaluate the impact of changing circumstances as they arise. Following the receipt of the Advisory Board's comments and recommendations, MWRA presents its official responses to the Board of Directors at budget hearings. Staff will present the final budget and the final assessments and for Fiscal Year 2021 to the Board for approval in June 2020.

### **ATTACHMENTS:**

- Attachment A      FY21 Proposed Current Expense Budget compared to FY20 Budget
- Attachment B      FY21 Proposed Current Expense Budget by Division vs. FY20 Budget
- Attachment C      FY21 Proposed Current Expense Budget compared to FY20 Projection

## ATTACHMENT A

### FY21 Proposed Budget vs. FY20 Approved Budget

TOTAL MWRA	FY19 Actuals	FY20 Approved Budget	FY21 Proposed Budget	Change FY21 Proposed Budget vs FY20 Approved Budget	
				\$	%
<b>EXPENSES</b>					
WAGES AND SALARIES	\$ 102,331,904	\$ 109,953,483	\$ 113,673,999	\$ 3,720,516	3.4%
OVERTIME	5,208,556	4,898,965	5,079,296	180,331	3.7%
FRINGE BENEFITS	19,982,221	21,717,533	22,492,274	774,741	3.6%
WORKERS' COMPENSATION	2,717,568	2,354,256	2,476,655	122,399	5.2%
CHEMICALS	10,891,948	11,811,222	12,182,677	371,455	3.1%
ENERGY AND UTILITIES	24,446,278	24,454,796	25,541,081	1,086,285	4.4%
MAINTENANCE	30,650,570	32,726,954	32,618,569	(108,385)	-0.3%
TRAINING AND MEETINGS	499,836	504,394	505,264	870	0.2%
PROFESSIONAL SERVICES	6,194,703	8,295,315	8,377,283	81,968	1.0%
OTHER MATERIALS	6,987,854	6,867,239	7,091,071	223,832	3.3%
OTHER SERVICES	23,769,299	24,683,370	24,975,119	291,749	1.2%
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 233,680,737</b>	<b>\$ 248,267,527</b>	<b>\$ 255,013,288</b>	<b>\$ 6,745,760</b>	<b>2.7%</b>
INSURANCE	\$ 2,748,983	\$ 2,611,222	\$ 3,059,218	\$ 447,996	17.2%
WATERSHED/PILOT/DEBT	23,411,908	26,833,600	26,331,209	(502,391)	-1.9%
HEEC PAYMENT	1,191,990	4,429,316	7,215,200	2,785,884	62.9%
MITIGATION	1,614,263	1,654,618	1,692,344	37,726	2.3%
ADDITIONS TO RESERVES	1,881,797	2,094,284	2,283,728	189,444	9.0%
RETIREMENT FUND	7,000,000	7,315,000	11,000,000	3,685,000	50.4%
POSTEMPLOYMENT BENEFITS	5,574,152	5,962,457	6,065,490	103,033	1.7%
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 43,423,093</b>	<b>\$ 50,900,497</b>	<b>\$ 57,647,189</b>	<b>\$ 6,746,692</b>	<b>13.3%</b>
STATE REVOLVING FUND	\$ 84,227,800	\$ 92,797,295	\$ 97,811,162	\$ 5,013,867	5.4%
SENIOR DEBT	287,497,793	202,299,609	273,795,833	71,496,224	35.3%
SUBORDINATE DEBT	84,788,872	169,609,844	96,339,599	(73,270,245)	-43.2%
LOCAL WATER PIPELINE CP	2,540,172	5,846,827	5,686,864	(159,963)	-2.7%
CURRENT REVENUE/CAPITAL	14,200,000	15,200,000	16,200,000	1,000,000	6.6%
CAPITAL LEASE	3,217,060	3,217,060	3,217,060	-	0.0%
DEBT PREPAYMENT	7,100,000	5,000,000	10,961,000	5,961,000	119.2%
DEBT SERVICE ASSISTANCE	(1,834,965)	(890,239)	-	890,239	-100.0%
<b>TOTAL DEBT SERVICE</b>	<b>\$ 481,736,731</b>	<b>\$ 493,080,395</b>	<b>\$ 504,011,517</b>	<b>\$ 10,931,122</b>	<b>2.2%</b>
<b>TOTAL EXPENSES</b>	<b>\$ 758,840,561</b>	<b>\$ 792,248,420</b>	<b>\$ 816,671,994</b>	<b>\$ 24,423,575</b>	<b>3.1%</b>
<b>REVENUE &amp; INCOME</b>					
RATE REVENUE	\$ 739,042,200	\$ 761,767,000	\$ 789,386,000	\$ 27,619,000	3.6%
OTHER USER CHARGES	9,346,469	9,216,425	9,188,728	(27,697)	-0.3%
OTHER REVENUE	6,947,076	5,761,022	5,935,482	174,460	3.0%
RATE STABILIZATION	-	-	-	-	0.0%
INVESTMENT INCOME	16,985,523	15,503,973	12,161,784	(3,342,189)	-21.6%
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 772,321,268</b>	<b>\$ 792,248,420</b>	<b>\$ 816,671,994</b>	<b>\$ 24,423,574</b>	<b>3.1%</b>
<b>Rate Revenue Increase over FY20</b>	<b>3.63%</b>				

## ATTACHMENT B

### FY21 Proposed Direct Expense Budget by Division

Division	FY20 Approved Budget	FY21 Proposed Budget	Change FY21 Proposed Budget vs. FY20 Final Approved Budget	
			\$	%
Executive	\$1,440,170	\$1,519,290	\$79,120	5.5%
Emergency Preparedness	3,620,065	2,889,908	-\$730,157	-20.2%
Administration	52,225,556	53,071,259	\$845,703	1.6%
Finance	4,421,411	4,352,001	-\$69,410	-1.6%
Law	2,083,362	2,222,728	\$139,366	6.7%
Affirmative Action	683,252	709,167	\$25,915	3.8%
Internal Audit	715,649	735,773	\$20,124	2.8%
Public Affairs	1,144,090	1,126,335	-\$17,755	-1.6%
Operations/Planning	181,933,971	188,386,827	\$6,452,855	3.5%
<b>Total Authority</b>	<b>\$248,267,527</b>	<b>\$255,013,288</b>	<b>\$6,745,760</b>	<b>2.7%</b>

**Note:** Some OEP costs have been transferred to the Operations Division.

**Attachment C  
FY21 Proposed vs. FY20 Projection**

TOTAL MWRA	FY20 Budget	FY20 Projection	FY21 Proposed	Change	
				FY21 Proposed Budget vs FY20 Projection	
				\$	%
<b>EXPENSES</b>					
WAGES AND SALARIES	\$ 109,953,483	\$ 106,463,279	\$ 113,673,999	\$ 7,210,720	6.8%
OVERTIME	4,898,965	4,977,878	5,079,296	101,418	2.0%
FRINGE BENEFITS	21,717,533	20,631,657	22,492,274	1,860,618	9.0%
WORKERS' COMPENSATION	2,354,256	2,354,256	2,476,655	122,399	5.2%
CHEMICALS	11,811,222	11,518,199	12,182,677	664,478	5.8%
ENERGY AND UTILITIES	24,454,796	23,757,226	25,541,081	1,783,855	7.5%
MAINTENANCE	32,726,954	32,001,220	32,618,569	617,349	1.9%
TRAINING AND MEETINGS	504,394	462,592	505,264	42,672	9.2%
PROFESSIONAL SERVICES	8,295,315	6,559,062	8,377,283	1,818,221	27.7%
OTHER MATERIALS	6,867,239	5,779,741	7,091,071	1,311,330	22.7%
OTHER SERVICES	24,683,370	25,136,763	24,975,119	(161,644)	-0.6%
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 248,267,527</b>	<b>\$ 239,641,872</b>	<b>\$ 255,013,288</b>	<b>\$ 15,371,416</b>	<b>6.4%</b>
INSURANCE	\$ 2,611,222	\$ 2,511,222	\$ 3,059,218	547,996	21.8%
WATERSHED/PILOT	26,833,600	23,423,930	26,331,209	2,907,279	12.4%
HEEC PAYMENT	4,429,316	4,429,316	7,215,200	2,785,884	62.9%
MITIGATION	1,654,618	1,654,618	1,692,344	37,726	2.3%
ADDITIONS TO RESERVES	2,094,284	2,094,284	2,283,728	189,444	9.0%
RETIREMENT FUND	7,315,000	7,315,000	11,000,000	3,685,000	50.4%
POSTEMPLOYMENT BENEFITS	5,962,457	5,962,457	6,065,490	103,033	1.7%
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 50,900,497</b>	<b>\$ 47,390,827</b>	<b>\$ 57,647,189</b>	<b>\$ 10,256,362</b>	<b>21.6%</b>
STATE REVOLVING FUND	\$ 92,797,295	\$ 92,420,886	\$ 97,811,162	5,390,276	5.8%
SENIOR DEBT	202,299,609	221,069,643	273,795,833	52,726,190	23.9%
SUBORDINATE DEBT	169,609,844	139,672,356	96,339,599	(43,332,758)	-31.0%
LOCAL WATER PIPELINE CP	5,846,827	5,846,827	5,686,864	(159,963)	-2.7%
CURRENT REVENUE/CAPITAL	15,200,000	15,200,000	16,200,000	1,000,000	6.6%
CAPITAL LEASE	3,217,060	3,217,060	3,217,060	-	0.0%
DEBT PREPAYMENT	5,000,000	5,000,000	10,961,000	5,961,000	119.2%
DEBT SERVICE ASSISTANCE	(890,239)	(890,239)	-	890,239	-100.0%
<b>TOTAL DEBT SERVICE</b>	<b>\$ 493,080,395</b>	<b>\$ 481,536,533</b>	<b>\$ 504,011,517</b>	<b>\$ 22,474,984</b>	<b>4.7%</b>
<b>TOTAL EXPENSES</b>	<b>\$ 792,248,419</b>	<b>\$ 768,569,232</b>	<b>\$ 816,671,994</b>	<b>\$ 48,102,762</b>	<b>6.3%</b>
<b>REVENUE &amp; INCOME</b>					
RATE REVENUE	\$ 761,767,000	\$ 761,767,000	\$ 789,386,000	27,619,000	3.63%
OTHER USER CHARGES	9,216,425	9,957,409	9,188,728	(768,681)	-7.7%
OTHER REVENUE	5,761,022	6,049,073	5,935,482	(113,591)	-1.9%
RATE STABILIZATION	-	-	-	-	-
INVESTMENT INCOME	15,503,973	14,575,465	12,161,784	(2,413,681)	-16.6%
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 792,248,420</b>	<b>\$ 792,348,947</b>	<b>\$ 816,671,994</b>	<b>\$ 24,323,047</b>	<b>3.1%</b>

**VARIANCE:**

\$ (23,779,714)

\$ (23,779,714)

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Appointment of Proxy for Fore River Railroad Corporation

COMMITTEE: Administration, Finance & Audit

VOTE  
 INFORMATION

  
Carolyn M. Francisco Murphy  
General Counsel

Sean R. Cordy, Senior Financial Analyst *SRC*  
Matthew R. Horan, Deputy Director, Finance/Treasurer *MH*  
Preparer/Title

  
Thomas J. Durkin  
Director of Finance

**RECOMMENDATION:**

That the MWRA Board of Directors, as holder of all voting rights of all the issued and outstanding shares of stock of the Fore River Railroad Corporation, vote to appoint Bethany A. Card, with the power of substitution, to vote as proxy at the next annual meeting and any special meeting of the stockholders for the Fore River Railroad Corporation in accordance with the form of proxy attached hereto and filed with the records of this meeting. In addition, the MWRA Board of Directors directs the proxy to elect the following board members:

David W. Coppes  
Carolyn M. Fiore  
Frederick A. Laskey  
John J. Walsh

Thomas J. Durkin  
Michele S. Gillen  
Carolyn M. Francisco Murphy

Godfrey O. Ezeigwe  
Lisa R. Grollman  
Brian Peña

**DISCUSSION:**

In 1987, MWRA purchased the Fore River Staging Area from General Dynamics. Included in the sale was the purchase of the Fore River Railroad Corporation (FRRRC). The railroad operates during weekdays and services MWRA's Residuals Plant and Twin Rivers Technologies, Inc. Since July 2001, FRRRC has leased its operating rights to Fore River Transportation Corp., a short-line railroad operator. Pursuant to the by-laws of the FRRRC, an annual meeting of the shareholders must be held in the first quarter of each calendar year to elect the Board of Directors. MWRA is the sole stockholder of the FRRRC.

The primary purpose of the proxy for the stockholders at the Annual Stockholders' meeting is to elect the FRRRC Board of Directors as set forth on the Shareholder's Annual Meeting Agenda. Each Director's term extends until the next annual meeting. The FRRRC by-laws state that the Board

shall consist of a minimum of five members. The current Board Members are listed below:

David W. Coppes  
Carolyn M. Fiore  
Frederick A. Laskey  
John J. Walsh

Thomas J. Durkin  
Michele S. Gillen  
Carolyn M. Francisco Murphy

Godfrey O. Ezeigwe  
Lisa R. Grollman  
Brian Peña

Staff recommend that the current members be reappointed to serve on the FRRC Board in 2020.

**ATTACHMENT:**

Form of Proxy

FORE RIVER RAILROAD CORPORATION  
PROXY

The undersigned, on behalf of MWRA's Board of Directors and duly representing the holder of all the issued and outstanding shares of stock of the Fore River Railroad Corporation hereby appoints Bethany A. Card to vote as proxy for the undersigned at the upcoming Annual Meeting of the Stockholders and at any Special Meeting of the Stockholders of the Fore River Railroad Corporation. The proxy is instructed to vote on all business as may properly come before the stockholder's meetings and to sign any waivers of notice to be taken thereat, with all the powers the undersigned would possess if personally present. In addition, the Board of Directors directs the proxy to elect the following board members:

David W. Coppes  
Carolyn M. Fiore  
Frederick A. Laskey  
John J. Walsh

Thomas J. Durkin  
Michele S. Gillen  
Carolyn M. Francisco Murphy

Godfrey O. Ezeigwe  
Lisa R. Grollman  
Brian Peña

MASSACHUSETTS WATER RESOURCES  
AUTHORITY

By: \_\_\_\_\_  
Kathleen A. Theoharides  
Chairman  
Board of Directors

Dated: Boston, Massachusetts  
February 19, 2020

Massachusetts Water Resources Authority: 1,470 Shares

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Actuarial Services Related to Compliance with GASB No. 74 and 75  
The Segal Company, Inc.  
Contract F254

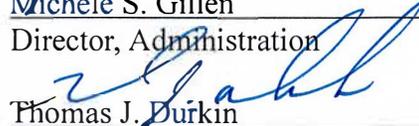
**COMMITTEE:** Administration, Finance & Audit

     INFORMATION  
  X   VOTE

  
Michele S. Gillen  
Director, Administration



Robert Belkin, Project Manager, Controller  
Preparer/Title

  
Thomas J. Durkin  
Director, Finance

**RECOMMENDATION:**

To approve the recommendation of the Consultant Selection Committee to award Contract F254 for Actuarial Services Related to Compliance with GASB No. 74 and 75 to The Segal Company (Eastern States), Inc., d/b/a Segal and to authorize the Executive Director, on behalf of the Authority, to execute a contract in an amount not to exceed \$69,000 for a term of four years from the Notice to Proceed.

**DISCUSSION:**

MWRA requires the services of an actuarial specialist to perform a valuation of benefits and a measurement of Other Post-employment Benefits (OPEB) costs in compliance with Governmental Accounting Standards Board (GASB) No. 74, Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans and Accounting (for the Plan) and GASB No. 75, Financial Reporting for Postemployment Benefits Other Than Pensions (for the Employer). GASB No. 74 and 75 relate primarily to healthcare, and require OPEB costs to be accounted for on an accrual basis, rather than on a pay-as-you-go basis. GASB No. 74 and 75 also require at least a biennial actuarial valuation and annual measurement of OPEB costs.

The Authority's last actuarial valuation of benefits, at January 1, 2018, was performed by Segal. The Authority now requires a valuation of benefits at January 1, 2020 and an OPEB cost measurement at June 30, 2020 and June 30, 2021. The results of this actuarial valuation of benefits will be disclosed in the Authority's FY2020 and FY2021 Audited Financial Statements as well as the MWRA Irrevocable OPEB Trust Audited Financial Statements for the same periods. A second actuarial valuation will then be prepared as of January 1, 2022 under this

contract. This valuation will then be used as the basis for an OPEB cost measurement at June 30, 2022 and June 30, 2023.

**PROCUREMENT PROCESS:**

MWRA utilized a one-step Request for Qualifications/Proposals (RFQ/P) with the following evaluation criteria and assigned points: Cost – 30 pts; Qualifications and Key Personnel – 30 pts; Experience/Past Performance – 30 pts; and Capacity/Organization, Management and Technical Approach – 10 pts. The RFQ/P was publically advertised and issued on January 6, 2020. Additionally, nine firms were directly solicited. On January 24, 2020, MWRA received proposals from the following firms: Hooker & Holcombe and Segal. The Selection Committee reviewed, scored and ranked the proposals, as follows:

PROPOSER	POINTS/ RANK	TOTAL COST	SENIOR ACTUARY HOURLY RATE	JUNIOR ACTUARY HOURLY RATE	SUPPORT STAFF HOURLY RATE
Segal	443.5/1	\$69,000	\$400/350	\$290	Not applicable
Hooker & Holcombe	379/2	\$68,500	\$485	\$295	\$165

Segal was unanimously ranked first by the Selection Committee. While the two proposers possess the basic qualifications to perform these services, Segal presented the strongest overall proposal with the best value to the Authority. In addition to preparing the most recent OPEB valuation, Segal performs the pension valuation and analysis for the MWRA Retirement System. As part of that work, Segal provides schedules used by staff for the pension disclosure in the Authority’s Audited Financial Statements. Segal has performed exceedingly well in the past, providing added value to the MWRA Retirement System through consultation relative to current legislation, potential funding strategies and future reporting requirements. This work is always timely and complete, and very similar to the nature of the work required by the OPEB pronouncements (GASB 75 and 74). Three references were contacted for Segal; all were extremely positive, noting Segal’s knowledge, thoroughness and responsiveness. Additionally, the proposed key personnel assigned to the project all have significant years of experience. Segal’s proposed price was marginally higher; however, its hourly rates were significantly lower than the other proposer.

Hooker & Holcombe, a smaller firm than Segal, was the second ranked proposer. It proposed the lowest total price, but the highest hourly rates. It provided a solid proposal with qualified staff. However, it’s references, although favorable, included only one reference from Massachusetts and that one reference indicated that they had not worked with the principal named in the proposal. The proposal also did not include reference to clients similar to MWRA. There was also no mention of knowledge of, or experience with, the Group Insurance Commission, which provides the health insurance plans to the Authority.

The Selection Committee determined that Segal possesses the experience, skills, abilities and integrity necessary to perform the work under this contract and is the best overall value to the

Authority. Therefore, Selection Committee recommends award of this contract to Segal Company (Eastern States), Inc.

**BUDGET/FISCAL IMPACT:**

Funding for this service has been budgeted in the FY2020 Current Expense Budget (CEB). Appropriate funding will be included in subsequent Proposed CEB requests for the remaining term of the contract.

**MBE/WBE PARTICIPATION:**

There were no MBE/WBE participation requirements established for this contract due to limited opportunities for subcontracting.

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Fuel Storage and Day Tank System Replacements at the Gillis and Lexington Street Pumping Stations and Hayes Pump Station  
NRC East Environmental Services, Inc.  
Contract 7554

**COMMITTEE:** Administration, Finance & Audit

John P. Colbert, P.E., Chief Engineer  
Debra E. Farmelant, Sr. Staff Engineer, Mechanical  
Preparer/Title

       INFORMATION

  X   VOTE

  
Michele S. Gillen

Director of Administration

  
David W. Coppes, P.E.

Chief Operating Officer

### RECOMMENDATION:

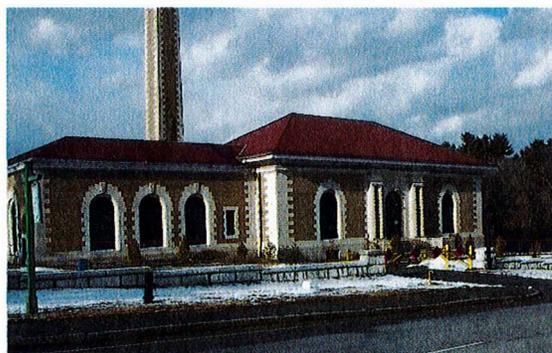
To approve the award of Contract 7554, Fuel Storage and Day Tank System Replacement at the Gillis and Lexington Street Pumping Stations and Hayes Pump Station, to the lowest responsible and eligible bidder, NRC East Environmental Services, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the bid amount of \$1,432,799 for a contract term of 561 calendar days from the Notice to Proceed.

### DISCUSSION:

This contract is for the first phase of a fuel storage tank replacement project, aimed at replacing tanks prior to failure. Thirteen tanks were reviewed and prioritized based on their age and condition.

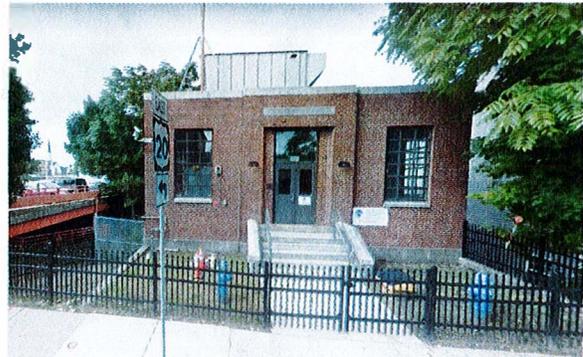
The fuel tanks at Gillis Pumping Station in Stoneham, the Lexington Street Pumping Station in Waltham, and Hayes Pump Station in Reading were ranked highest priority because these tanks are greater than 25 years old. In addition, the tank at the Hayes Pump Station is the last remaining single-wall fuel tank and must be removed.

The Gillis Pumping Station is a water pumping station that supplies the Northern Intermediate High and the Northern High Service/Fells service areas. The new Spot Pond Pumping Station serves as a backup to this facility. There are two 6,000-gallon, double-wall, fiberglass reinforced plastic (FRP)-wrapped diesel storage tanks, installed in 1995,



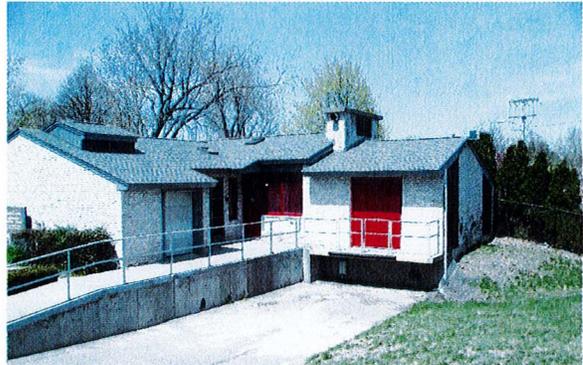
Gillis Pumping Station

located in buried precast concrete fuel tank vaults at the rear of the building. One of the two tanks is out of service due to a leak in the inner tank wall. The two tanks provide fuel to the two 1,250 kW diesel generators for backup power and to an oil-fired hot water boiler. The two tanks will be replaced with two 5,000-gallon, double-wall FRP tanks in the existing concrete vaults.



Lexington Street Pumping Station

The Lexington Street Pumping Station pumps High Service water to Waltham’s Prospect Hill Tanks. The 1,500-gallon, underground, double-wall steel storage tank, installed in 1990, is located in the front left of the entrance to the building and provides fuel to the 350 kW diesel generator for backup power. The tank will be replaced with a 1,500-gallon, steel-wrapped FRP direct bury storage tank.



Hayes Pump Station

The Hayes Pump Station lifts wastewater from an upstream portion of the Reading Extension Relief Sewer and upstream community-owned sewers to the Reading Extension Relief Sewer. The 2,000-gallon, single-wall, fiberglass diesel storage tank, installed in 1987, is located in a buried precast concrete fuel tank vault. The tank provides fuel to the 365 kW diesel generator for backup power and to an oil-fired hot water boiler. The below grade tank at Hayes will be replaced with a 3,000-gallon, above-grade insulated secondary containment ConVault style storage tank.

In addition to the tanks, the Contractor will replace the fuel systems at each facility including the day tanks, transfer pumps, and associated piping, and installation of new controls and fuel monitoring (Veeder Root) systems.

**Procurement Process**

Contract 7554 was advertised in the Central Register, Boston Herald, Banner Publications, El Mundo newspapers, COMMBUYS, and MWRA’s e-procurement system (Event 4124-3), and bid in accordance with Massachusetts General Laws, Chapter 149. One pre-bid meeting was held on November 13, 2019. Bids were received and opened on December 20, 2019 from three contractors as follows:

<u>Bidders</u>	<u>Bid Amount</u>
<b>NRC East Environmental Services, Inc.</b>	<b>\$1,432,799.00*</b>
MECO Environmental Services, Inc.	\$1,688,888.00
<i>Engineer’s Estimate</i>	<i>\$1,729,000.00</i>
IPC Lydon, LLC	\$2,345,678.90

\*The general bid of NRC East Environmental Services, Inc. has been adjusted to reflect corrections to the electrical filed sub-bid amount (Fall River Electrical Associates). This adjustment was confirmed by NRC East Environmental Services, Inc.

Staff interviewed representatives from NRC East Environmental Services, Inc. and reviewed its bid in detail, which is approximately 17.1% less than the Engineer's Estimate and 15.2% less than the next lowest bidder. It was determined that the difference between NRC East Environmental Services bid and the Engineer's Estimate was primarily due to NRC East Environmental Services' lower costs for general conditions, fuel tank installation and mechanical work, and lower electrical sub bid costs. Based on the bid review and interview with the Contractor, staff have determined that the bid is complete, reasonable, and includes the payment of prevailing wage rates, as required.

References were checked and found to be acceptable. Staff were satisfied with the work performed by NRC East Environmental Services in upgrading the fuel storage system at Union Park Pump Station under Contract OP-374.

The Division of Capital Asset Management and Maintenance Contractor Certification Office has Numerical Rating Summary Sheets for 14 projects for NRC East Environmental Services at an average numerical rating of 91 out of 100. Staff conducted an OSHA Safety Violations check on NRC East Environmental Services and found that it was not involved in any safety violations during the last five years.

After reviewing the bid and interviewing the Contractor's representative, staff have concluded that NRC East Environmental Services, Inc. possesses the skill, ability, and integrity necessary to perform the work under this contract and is qualified to do so. Therefore, staff recommend that Contract 7554 be awarded to NRC East Environmental Services, Inc. as the lowest responsible and eligible bidder.

**BUDGET/FISCAL IMPACT:**

The FY2020 CIP includes \$1,361,197 for Contract 7554. The award amount is \$1,432,799 or \$71,602 over budget. This amount will be absorbed within the five-year CIP spending cap.

**MBE/WBE PARTICIPATION:**

The MBE and WBE participation requirements for this contract have been established at 7.24% and 3.6%, respectively.

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Security Equipment Maintenance and Repair Services  
Viscom Systems, Inc.  
Contract EXE-043

---

**COMMITTEE:** Administration, Finance & Audit

Kathryn White, Manager, Security Services  
Preparer/Title

           INFORMATION

  X   VOTE

  
Michele S. Gillen  
Director of Administration

---

### RECOMMENDATION:

To approve the award of Contract EXE-043, Security Equipment Maintenance and Repair Services, to the lowest responsible and eligible bidder, Viscom Systems, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the amount of \$2,198,681.00, for a contract term of 1,095 calendar days from the Notice to Proceed.

### DISCUSSION:

Protecting critical water and wastewater facilities is one of MWRA's highest priorities. MWRA currently employs a comprehensive security system to monitor and control access to these facilities. The security system is comprised of a broad network of intrusion alarms, motion detection sensors, card access readers, closed-circuit television surveillance cameras, routers, a public address intercom network, panic strobe lighting, identification badge classifying and printing equipment, and the software, recorders, and servers that make up the "head end" of the system.

Contract EXE-043 is a three-year contract that will provide preventive and scheduled maintenance as well as needed repair services for all components of MWRA's extensive security system. Provisions for software integration and response to unforeseen emergencies are also included in the contract. Staff have developed an appropriate preventive maintenance schedule for each piece of equipment and will determine on a case-by-case basis when to call the contractor in to repair critical equipment outside of normal business hours.

### Procurement Process

Contract EXE-043 was publicly advertised in the Boston Herald, Banner Publications, El Mundo, Central Register, and COMMBUYS, and bid in accordance with Chapter 149 of Massachusetts General Laws. In addition, bids were made available for public downloading on MWRA's e-procurement system (Event #4074-0). A pre-bid meeting was held on October 16, 2019. Bids were opened on December 20, 2019 with the following results:

<b>Bidders</b>	<b>Total Bid Amount</b>
<b>Viscom Systems, Inc.</b>	<b>\$2,198,681.00</b>
<i>Engineers Estimate</i>	<i>\$1,917,700.00,</i>

The bid specifications included mandatory requirements that each bidder employ field service technicians that are currently certified to maintain the security system in use at MWRA. Bidders were also required to have at least five years of experience servicing three contracts of a similar size and scope to this contract.

Staff reviewed Viscom's bid to confirm that it included all required elements of the work. The bid amount of \$2,198,681.00 is 14.65% higher than the Engineer's Estimate and \$323,975.58 higher than the existing contract (EXE-038). Part of this increase is attributable to a \$75,000 increase in the allowance for spare/replacement parts over the existing contract. There are eight bid items included in this contract; seven of those bid items are based on wage rates and account for \$1,786,181.40 of the total bid amount of \$2,198,681. This contract is subject to the payment of prevailing wages which was the basis for the engineer's estimate of labor costs. However, Viscom's employees are unionized and are compensated at a higher rate accounting for an increase in cost over the engineer's estimate of approximately \$215,000 over the contract term.

References were checked and found to be favorable. Viscom Systems, Inc. is a local security systems integrator and maintenance provider with numerous clients in the greater Boston area. Viscom holds the current contract for these services, and staff have been very satisfied with the Contractor's performance.

Because only one bid was received, Staff contacted McDonald Electrical Corporation, Schneider Electric, and FTG Security, the three other DCAMM - certified, eligible firms who had the capacity to bid, and who had obtained bid documents from MWRA's Supplier Portal, to determine why these firms had not submitted bids. All three responded that existing business requirements precluded them from bidding.

Staff have determined that Viscom Systems' bid price is reasonable, complete, and includes the payment of prevailing wage rates, as required. Staff have further determined that Viscom Systems' bid meets all of the requirements of the specifications, and that Viscom possesses all of the required certifications and manufacturers' authorizations. Staff are of the opinion that Viscom possesses the skill, ability, and integrity necessary to successfully complete the work under this contract and is qualified to do so.

Therefore, staff recommend the award of this contract to Viscom Systems, Inc. as the lowest responsible and eligible bidder.

**BUDGET/FISCAL IMPACTS:**

The FY2020 Current Expense Budget contains sufficient funds to fund this contract. Funding will be included in future CEB requests for the remaining term of the contract.

**MBE/WBE PARTICIPATION:**

There were no MBE/WBE participation requirements established for this contract due to limited opportunities for subcontracting.



# MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

## WASTEWATER POLICY & OVERSIGHT COMMITTEE MEETING

to be held on

Wednesday, February 19, 2020

*Chair:* P. Flanagan  
*Vice-Chair:* J. Walsh  
*Committee Members:*  
J. Carroll  
C. Cook  
J. Foti  
A. Pappastergion  
B. Peña  
H. Vitale

Location: 100 First Avenue, 2nd Floor  
Charlestown Navy Yard  
Boston, MA 02129

Time: Immediately following AF&F Committee

### AGENDA

#### **A. Information**

1. Update on Long-Term CSO Control Plan

#### **B. Contract Awards**

1. Oxygen Generation Facility Services, Deer Island Treatment Plant: Solutionwerks, Inc., Contract S587
2. Siphon and Junction Structure Rehabilitation, Design and Engineering Services During Construction: Kleinfelder Northeast, Inc., Contract 6224

## **MASSACHUSETTS WATER RESOURCES AUTHORITY**

### Meeting of the

### Wastewater Policy and Oversight Committee

January 15, 2020

A meeting of the Wastewater Policy and Oversight Committee was held on January 15, 2020 at the Authority headquarters in Charlestown. Committee Vice Chair Walsh presided. Present from the Board were Ms. Wolowicz and Messrs. Carroll, Cook, Cotter, Foti, Pappastergion, Peña, and Vitale. Mr. Flanagan was absent. Among those present from the Authority staff were Frederick Laskey, Carolyn Francisco Murphy, David Coppes, Thomas Durkin, Carolyn Fiore, Michele Gillen, Kathleen Murtagh, David Duest, John Colbert, David Pottle, Stephen Cullen, Charles Ryan, Jenna Silva and Kristin MacDougall. The meeting was called to order at 10:09 a.m.

### CONTRACT AWARDS

\* Janitorial Services at the Deer Island Treatment Plant: Star Building Services, Inc., Bid WRA-4775

Staff made a verbal presentation. There were questions and answers.

The Committee recommended approval. (ref. WW A.1)

\* Supply and Delivery of Hydrogen Peroxide to the Deer Island Treatment Plant: Brenntag Northeast, LLC, Contract Bid WRA-4784

Staff made a verbal presentation. There was brief discussion and questions and answers.

The Committee recommended approval. (ref. WW A.2)

\* Nut Island Headworks Odor Control and HVAC Improvements: Walsh Construction Co. II, LLC, Contract 7548

Staff made a presentation. There was discussion and questions and answers.

The Committee recommended approval. (ref. WW A.3)

### CONTRACT AMENDMENTS/CHANGE ORDERS

---

\* Committee recommendation approved by the Board on January 15, 2020.

\* Nut Island Headworks Odor Control and HVAC Improvements – Inspections, Evaluation, Design, Construction Administration and Resident Engineering Services: Hazen and Sawyer, P.C., Contract 7517, Amendment 1

Staff made a presentation. (Mr. Carroll joined the meeting during the presentation.) There was discussion and questions and answers.

The Committee recommended approval, with Mr. Foti opposed. Mr. Foti stated that his opposition to the amendment was not a reflection on the consultant. (ref. WW B.1)

\* Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations: Woodard & Curran, Inc., Contract S559, Amendment 2

Staff made a verbal presentation. There was discussion and questions and answers. Mr. Vitale stated that the Boston Water and Sewer Commission supports this contract amendment.

The Committee recommended approval. (ref. WW B.2)

\* Remote Headworks and Deer Island Shafts Study: Mott MacDonald, LLC, Contract 7237, Amendment 2

Staff made a presentation.

The Committee recommended approval. (ref. WW B.3)

The meeting adjourned at 10:56 a.m.

---

Documents used for this meeting, referenced above, can be found here:  
<http://www.mwra.com/monthly/bod/boardmaterials/2020/o-2020-01-15.pdf>

---

\* Committee recommendation approved by the Board on January 15, 2020.

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Update on Long-Term CSO Control Plan



**COMMITTEE:** Wastewater Policy & Oversight

INFORMATION  
VOTE



David W. Coppes, P.E.

Chief Operating Officer

Brian Kubaska, P.E., Assistant Director of Engineering  
Beth Card, Director of Env. and Regulatory Affairs  
Preparer/Title



Carolyn Francisco-Murphy

General Counsel

### RECOMMENDATION:

For information only.

### BACKGROUND:

MWRA is required to mitigate the impacts of combined sewer overflows (CSOs) on the Boston Harbor watershed pursuant to a Court ordered Long-Term CSO Control Plan (LTCP). To date, the Authority's CSO efforts have included over \$900 million invested in 35 projects designed to eliminate dry weather overflows, and the development and implementation of more than 100 system optimization improvements that drastically reduced average annual CSO discharge volumes. MWRA has continuously tracked the effect of these improvements on system performance and CSO discharges. The cleanup of Boston Harbor and its CSO control component have routinely been deemed an environmental success story. MWRA has worked closely with the Mass DEP and US EPA throughout this important work.

### DISCUSSION:

In January 2018, MWRA began a three-year performance assessment intended to evaluate whether the goals of the court approved LTCP have been met. This demonstration is required to be completed by the end of 2021, and is the last Court-required milestone. The performance assessment includes, in part, use of extensive CSO monitoring data to recalibrate MWRA's hydraulic model, which will predict whether Typical Year CSO activations and volumes are consistent with the LTCP goals. At the time of its December 16, 2019 biannual report submittal to the Court, certain elements of the hydraulic model calibration were incomplete and required further investigation. MWRA committed to and the Court confirmed that a supplemental report would be provided. MWRA and its consultant completed the investigations (with one exception) and finalized the hydraulic model calibrations. MWRA filed the attached supplemental progress report with the Court on February 14, 2020.

UNITED STATES DISTRICT COURT  
for the  
DISTRICT OF MASSACHUSETTS

.....

UNITED STATES OF AMERICA,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,  
et al.,

Defendants.

.....

CONSERVATION LAW FOUNDATION OF  
NEW ENGLAND, INC.,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,

Defendants.

.....

CIVIL ACTION  
No. 85-0489-RGS

CIVIL ACTION  
No. 83-1614-RGS

MWRA SUPPLMENTAL PROGRESS REPORT AS OF FEBRUARY 14, 2020

The Massachusetts Water Resources Authority (the “Authority”) submits the following supplemental information in accordance with the Court's order of December 30, 2019.

I. Performance Assessment of Long-Term CSO Control Plan

On December 16, 2019, the Authority filed its Biannual Compliance and Progress Report. As described in that filing, the performance assessment of the CSO Long-Term Control Plan (“LTCP”) is underway, with a final report due to the Court by December 31, 2021. In its December filing, the Authority reported on the preliminary results of its calibrated hydraulic model. With the calibrated model, the Authority predicted CSO discharges for storms during the temporary metering period of April 15, 2018 through June 30, 2019. The preliminary Typical Year model predictions showed consistency with or improvement upon the targeted LTCP levels of control at twenty locations and higher than predicted annual discharge activation and/or volume at sixteen locations. There were also some discrepancies in the results, specifically ten outfalls for which the Authority had less confidence in the preliminary Typical Year model results. This supplemental report updates the Court on the Authority’s progress since its December filing, including its investigation into the model/meter discrepancies at the ten outfalls and its investigation into the outfalls for which preliminary analysis has been showing greater frequency and/or volume discharges than the LTCP targets.

A. Ten Outfalls Where There Were Discrepancies

As of December 16, 2019, there were ten outfalls where meter and model data were inconsistent, resulting in low confidence in the model results. In general, the model either under- or over-predicted volume and/or activation frequency at these locations during the measurement period between April 15,

2018 and June 30, 2019. The Authority, through its consultant, has performed additional inspections; reviewed rainfall, overflow, and various system meter data; and prepared model results for storms in 2018 and half of 2019. Through this detailed and intensive process, the Authority has come to understand the cause of the discrepancies at nine of the ten locations.

The reasons for the discrepancies varied by regulator or outfall. For example, at one location the diameter of a pipe connecting the regulator to the interceptor was incorrectly measured during the initial site inspection, affecting the model results. At other locations, the model was found to be inconsistent with actual operational conditions. At some outfalls, differences between the model and meter data were found to be attributable to variations in rainfall across large tributary areas. The Authority has prepared a detailed assessment for each of these ten locations, including the model corrections that have been made. See Attachment A. Attachment B presents the metered CSO activation frequencies and volumes along with the calibrated model predictions for the April 15, 2018 – December 31, 2018 and January 1, 2019 – June 30, 2019 periods.<sup>1</sup>

For nine of the ten locations where the model and actual metering results were not consistent, the model has been adjusted to the Authority's satisfaction, and the calibration is deemed complete. The remaining outfall that the Authority is still investigating is MWR003, located in the Alewife Brook. At this location,

---

<sup>1</sup> As of the December filing with the Court, the Authority had not yet finalized the model results for comparison with the metered activations and volume for calendar year 2018, which began for comparison purposes on April 15, 2018, after the project meters were installed. Those results are now finalized and included in Attachment B along with the model versus meter results for the first half of 2019.

the actual metering data showed lower activation frequencies and volumes than the model predicted. According to the Authority's modeling consultant, it appears that the model needs further refinement to "decrease the hydraulic head loss simulated in the interceptors" downstream of this overflow. Preliminary adjustments to the modeling parameters have been made to better match measurements. In addition, in the weeks ahead, the model will be evaluated against meter data generated in late summer/early fall 2019 – when CSO activations were measured at MWR003 – to compare the results using the adjusted model parameters with known CSO activations. The Authority expects that it will be able to resolve the calibration deficiencies for MWR003.

B. Outfalls Where Higher Than Expected Activations and/or Volumes of CSO Are Observed

1. How Far We Have Come – Improvements and Investments Made

The significant efforts of the Authority over the last several decades have resulted in substantial decreases in CSO discharges and yielded enormous water quality benefits. In the late 1980s, when the Authority accepted responsibility for control of specific CSOs region-wide, 3.3 billion gallons of partially treated or raw sewage was discharged from CSOs annually. Those volumes have been substantially reduced. Since 1992, total annual CSO volume has been reduced from 1,457 million gallons ("MG") to 445MG, of which 393MG is now treated prior to discharge. The fact that 88% of the remaining volume is treated is consistent with the water quality improvements that have been documented to date and illustrates the results of the \$911 million in investments that have been

made at key locations in the system. Attachment C is a table that compares the Typical Year model simulation results for baseline year 1992 with the 2019 system conditions and the LTCP and shows the changes resulting from the recalibration of the model. The pre-calibration hydraulic model showed that the Authority achieved the overall grand total LTCP goal and achieved individual LTCP goals at a majority of the locations. However, at some locations the newly calibrated model identifies challenges that the Authority is working to assess and understand. Attachment C also includes the current status of Typical Year discharges for each outfall and details the overall improvements in each receiving water segment since 1992 conditions.

2. Preliminary Review of Locations Where Current Model Results Predict Higher Activation Frequency and Volume Than the LTCP

With the analyses, model modifications, and refined model outputs, as described above, the model currently predicts CSO activations and/or volumes at levels higher than the LTCP at the locations highlighted in Attachment C. There are a number of factors that may explain these deviations from the earlier predicted results. The hydraulic model utilized by the Authority has been refined over the years, with additional data incorporated and improvements made. While the Typical Year remains constant, the flow metering configurations used in the recent model calibration work were better suited to capture the impacts of high intensity wet weather events that occurred during the calibration period. For many outfalls, this resulted in increases in parameters included in the hydraulic model to simulate how much and how quickly stormwater landing in an area

tributary to a CSO regulator gets to the regulator. These modeling parameters include percent impervious, infiltration rate, and catchment width – which impact stormwater volumes and rates.

Further, the physical system today differs significantly from that of fourteen years ago when the LTCP was finalized. In a number of locations, the flow metering data indicate that tributary flows to the regulators have increased over the previously modeled values. Extensive growth throughout Boston, Somerville, and Cambridge has increased residential and employment populations and changed the amount of sanitary flow in those areas.

Growth, system demand, climate change, and stormwater management needs all influence the way the Authority and its member communities operate their systems in order to meet environmental goals, as well as to protect wastewater infrastructure assets. Yet, at times those obligations are at odds. For example, there are locations where raising a weir would help meet the LTCP levels; however, a community may be reluctant to do so given the risk of basement or surface flooding caused by a higher water level during large storms. While meaningful progress and significant investments have been made, questions remain as to whether environmental and developmental changes in the greater Boston area could be influencing the CSO program.

Nevertheless, the Authority recognizes that its efforts at some CSO locations are not complete. System review and optimization work are ongoing and are expected to yield additional improvements related to volumes and activations. In addition, the water quality standards variances issued by DEP

call for additional study and potential action subject to water quality and cost/benefit reviews.

3. Preliminary Efforts to Address the Higher Activations and Volumes

The Authority, in consultation with Boston Water and Sewer Commission (“BWSC”), Cambridge, Chelsea, and Somerville, has been carefully studying the locations where the current model predicts higher volumes and activations. Efforts are underway to assess measures that may improve CSO performance. For example, the Authority will perform additional model investigations to determine whether CSO performance will improve with ongoing maintenance activities (*e.g.*, sediment removal) and planned changes to the collection system (sewer and partial separation projects). Further modeling analyses will also be performed to determine if raised weir elevations can improve CSO performance without causing adverse impacts to the upstream systems. In advance of submitting the December 2021 final report, the Authority intends to implement additional system adjustments (weir changes, flow redirection, modification to facility operation, etc.) aimed at improving CSO performance.

Three areas of particular focus include East Boston, the Cottage Farm Facility, located on the Lower Charles, and the Somerville Marginal Facility located within the Mystic/Chelsea confluence. Within East Boston, although substantial progress has been made in CSO reductions from 1992 levels, six of the eight CSO discharges in this part of the system are predicted to have higher activations and volumes than the LTCP. The Authority and BWSC are working to determine whether sewer separation projects planned by BWSC in this region

will sufficiently improve the situation. Evaluations are also underway to determine the extent to which connections from the CSO regulators to the interceptors can be increased and to determine if existing weir elevations can be raised in order to reduce CSO discharges in these areas.

As reported in the December 16, 2019 filing, the City of Cambridge is moving forward on a trial basis with a partial sewer separation pilot project to remove peak stormwater flows that contribute to CSO discharges at the Authority's Cottage Farm facility (MWR201). Cambridge has advised that, in the very near term, it will install trial 6-inch orifice restrictions<sup>2</sup> on existing 10-inch and 18-inch Cambridgeport stormwater connections and will activate its new stormwater outfall to the Charles River. At the Authority's request, Cambridge has committed to installing meters on these connections to measure flows before and after installation of the 6-inch orifices. The data will support the Authority's modeling and related analyses to assess the benefits and any impacts of partial sewer separation on sewer system and CSO performance, especially relative to the LTCP levels of control.

The Somerville Marginal CSO facility discharges through outfall MWR205. Under high tide conditions, treated flow that passes through the facility can also discharge through SOM007A/MWRA205A. While the frequency of the MWR205

---

<sup>2</sup> The orifice restriction will consist of a steel plate with a 6-inch diameter hole installed over the entrance to the larger pipes (10-inch & 18-inch) currently connecting the Cambridge separate storm system to the Authority's sewer. The orifice restriction is expected to reduce the stormwater flows to the Authority's sewer, while causing stormwater levels upstream of the orifice restriction to rise to a level that results in stormwater discharging to the receiving water in larger storm events.

discharge is in-line with the LTCP, the volume discharged is predicted to exceed the LTCP level of control. The Authority will perform modeling simulations to determine the benefit of raising stop logs<sup>3</sup> upstream of the facility to hold more CSO in the tributary system and force more flow into the downstream interceptor. Stop log modifications will be implemented if the benefit is significant without creating unacceptable upstream wastewater elevations. In addition, in accordance with the water quality standards variance for the Alewife Brook/Upper Mystic River, MWRA will further evaluate alternatives to minimize CSOs. This evaluation will include relieving the dry weather connection to the Somerville-Medford Branch Sewer and relocating the MassDOT I-93 drainage from upstream to downstream of the Somerville-Marginal facility.

#### 4. Impact of CSO Discharges on Water Quality

The decades of investment and infrastructure improvements in the Boston Harbor watershed have resulted in demonstrated water quality improvement. These improvements are well documented by the Authority's water quality monitoring program.<sup>4</sup> While encouraged by the water quality data, the Authority remains mindful of the importance of the performance assessment to determine

---

<sup>3</sup> Stop logs are long rectangular sections of wood or metal beams typically 4-10 inches in height that are inserted into vertical slots to form a dam across a channel set to a particular height. At the Somerville Marginal CSO facilities, stop logs are inserted in the channels just upstream of the influent gates to the facility.

<sup>4</sup> Goodwin C, Wu D. 2019. *Summary of CSO Receiving Water Quality Monitoring in Upper Mystic River/Alewife Brook and Charles River, 2018*. Boston: Massachusetts Water Resources Authority Report 2019-05 (available at <http://www.mwra.state.ma.us/harbor/enquad/pdf/2019-05.pdf>), and Taylor DI. 2018. *Boston Harbor Water Quality Update, 1995-2017*. Boston: Massachusetts Water Resources Authority Report 2018-06 (available at <http://www.mwra.state.ma.us/harbor/enquad/pdf/2018-06.pdf>).

whether goals of the LTCP have been met. An important component of the performance assessment is the receiving water model and its prediction of the water quality impacts from CSO and non-CSO sources. Protection of public health and the environment is paramount, and the Authority expects that the regulatory agencies will rely heavily on this model when they evaluate the Authority's final report on the performance assessment in 2021.

Although the final receiving water models results will not be available until 2021, the Authority and its consultant team are making substantial progress. Key achievements to date include a preliminary review of newly collected stormwater monitoring data, development of sub-catchment areas for stormwater flows, and identification of land uses in the sub-catchment areas. Specifically in the Charles River, sources of the inflows for various stormwater outfalls have been identified from community models, and the U.S. Geological Survey model has been used to obtain the inflows at other outfalls not covered by those models. For Alewife Brook/Mystic River, a hydrologic calibration has been completed. The Authority will continue to update the Court on the important progress being made on the receiving water models in future reports.

## II. Implementation of CSO Variances

The Water Quality Standards Variances issued by DEP on August 30, 2019 included several conditions which were a result, in part, of the July 18, 2019 agreement between the Authority and the regulatory agencies. The Authority has described those conditions in previous filings; however, there are two conditions that are particularly noteworthy in this update.

The variances call for the Authority to take other actions to mitigate CSO discharges, which are described in an exhibit to the variances entitled: “Additional System Optimization Measures.” The tasks required in the variances overlap with and expand upon some of the current Authority efforts related to locations where LTCP goals are not predicted to be met. In addition, the variances require notification to the public of CSO discharges and impacts. This requirement, while outside of the performance assessment, is still of critical importance as it relates to public health, including ensuring that our communities are aware of the details of CSO discharges. Here again, the Authority is already implementing certain aspects of this work and is ahead of schedule in expanding the notification details consistent with the variances. The Authority will purchase existing temporary meters and keep them in place to supplement staff resources to provide the details needed to accurately and quickly notify the public about any CSO discharges. The notifications, along with the thoughtful and in-depth scrutiny of the model calibrations and results, are consistent with the Authority’s aim for transparency regarding its operations.

### III. Conclusion

Future semiannual progress reports will continue to update the Court on the Authority’s progress in post assessment, including its continued study and investigation of, and actions to address, the locations where the preliminary model predictions for activations and volumes exceed the LTCP. The Authority will also report on the progress of the receiving water quality models and the

collection of CSO and stormwater quality data for the Lower Charles River and the Alewife Brook/Upper Mystic River.

Respectfully submitted,

By its attorney,

/s/ Jonathan M. Ettinger  
Jonathan M. Ettinger (BBO #552136)  
Foley Hoag LLP  
155 Seaport Boulevard  
Boston, Massachusetts 02210  
(617) 832-1000  
jettinger@foleyhoag.com

Of Counsel:

Carolyn Francisco Murphy (BBO #567090)  
General Counsel  
Christopher L. John (BBO #559550)  
Senior Staff Counsel  
Massachusetts Water Resources Authority  
100 First Avenue  
Boston, Massachusetts 02129  
(617) 242-6000

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of this document, which was filed via the Court's ECF system, will be sent electronically by the ECF system to the registered participants as identified on the Notice of Electronic Filing (NEF) and paper copies will be sent to those indicated as non-registered participants on February 14, 2020.

/s/ Jonathan M. Ettinger  
Jonathan M. Ettinger (BBO #552136)  
Jettinger@foleyhoag.com

Dated: February 14, 2020

# Attachment A

**Attachment A**

**Detailed Assessments into Meter/Model Differences at Ten Locations**

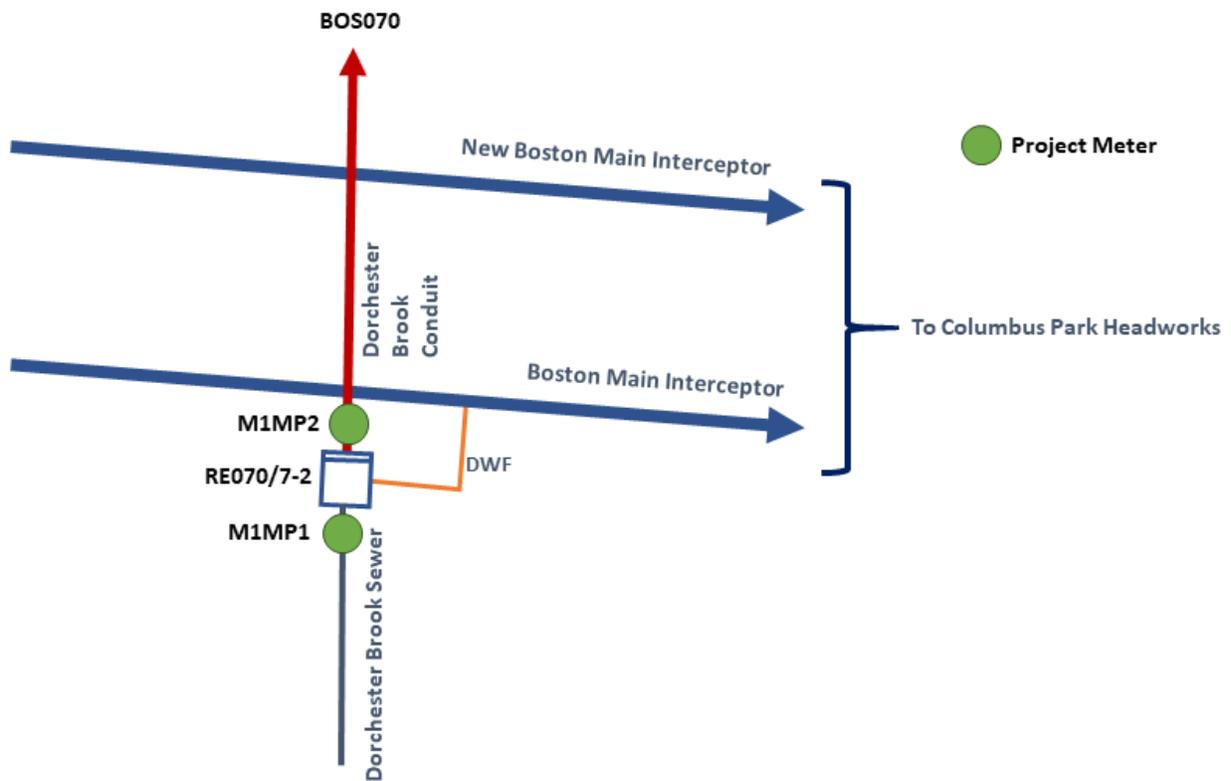
BOS070: RE070/7-2	Page 2
CAM401B	Page 6
CHE004	Page 9
MWR201 (Cottage Farm Facility)	Page 14
MWR018, MWR019, MWR020	Page 17
MWR203 (Prison Point Facility)	Page 24
BOS060: RE60-7	Page 32
MWR003	Page 36*

\*Investigations and model calibration refinements for Outfall MWR003 are ongoing, as described in this report.

**BOS070: RE070/7-2**

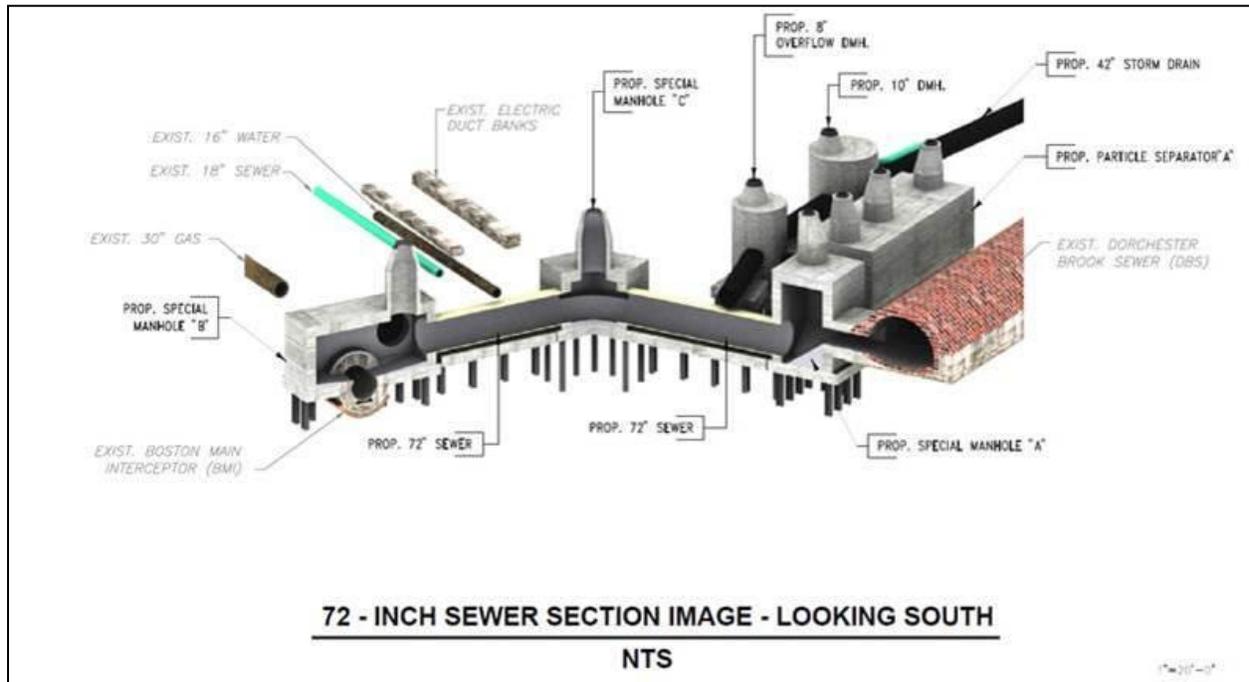
***Regulator Information***

Regulator RE070/7-2 directs flow from BWSC’s Dorchester Brook Sewer to BWSC’s Boston Main Interceptor. Overflow from the regulator enters BWSC’s Dorchester Brook Conduit for discharge to the head of Fort Point Channel at Outfall BOS070 (Figure 1). This regulator was reconstructed as part of BWSC’s Lower Dorchester Brook Sewer Separation project, and it essentially replaces former regulator 070/11-2, which had directed flow to the New Boston Main Interceptor. With the sewer separation work completed, separate stormwater was re-routed from the Dorchester Brook Sewer around RE070/7-2 and into the Dorchester Brook Conduit to reduce CSO discharges at BOS070. The Dorchester Brook Conduit also receives overflows from regulators located along the South Boston Interceptor. Project flow meters were installed in the influent to RE070/7-2, and in the overflow downstream of the regulator weir.



**Figure 1. Schematic of Regulator RE070/7-2**

Figure 2 presents a schematic detailing the connection between Regulator RE070/7-2 and the Boston Main Interceptor. As indicated in Figure 2, Regulator RE070/7-2 is a complex structure.



**Figure 2. Detail of Connection from RE-070/7-2 to the Boston Main Interceptor**

***Reason for Further Investigation***

After initial calibration, the model over-predicted activation frequency and volume at RE070/7-2 in both the April-December 2018 period and in the January-June 2019 period (Table 1).

**Table 1. Comparison of Model vs. Meter for RE070/7-2**

April 15-December 31, 2018			
Metered		Modeled (Original Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
25	1.81	38	6.84
January 1-June 30, 2019			
Metered		Modeled (Original Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
7	0.04	18	0.77

**Regulator Calibration Investigation**

The data in Table 1 indicated that for both the model prediction and the meter data, the average volume per activation was relatively small (0.14 MG/activation for the model, and 0.06 MG/activation for the meter). Thus, for the extra activations in the model compared to the meter data, it is likely that the model's depth of flow in the regulator was just barely exceeding the weir elevation for a relatively short period. The largest metered overflow volume for the period of April 2018 to June 2019 was 0.6 MG, and 23 of the 32 metered activations were recorded as "volume too small to measure." Many of these very-low volume activations may be due to turbulence or wave action in the regulator causing the flow to "slosh" over the weir.

Table 2 presents a list of all of the storms that occurred in the April 2018 to June 2019 period. Storms that caused a metered activation are indicated by either a value for the volume of activation, or a "\*\*\*" symbol, indicating an exceedance of the trigger elevation but metered volume was too small to be quantified.

**Table 2. Metered Activations from April 15, 2018 through June 30, 2019**

Date	Metered Activations (MG)	Date	Metered Activations (MG)	Date	Metered Activations (MG)
4/16/2018	0.600	9/25/2018	0.580	1/24/2019	**
4/25/2018	**	9/26/2018	**	2/6/2019	
4/27/2018	**	9/28/2018		2/12/2019	
5/15/2018	0.139	10/3/2018		3/4/2019	
6/4/2018		10/11/2018	**	3/22/2019	**
6/18/2018	**	10/23/2018		4/8/2019	
6/28/2018	**	10/27/2018	**	4/15/2019	**
7/6/2018		10/29/2018	**	4/22/2019	0.034
7/11/2018	0.075	11/3/2018	**	4/26/2019	**
7/17/2018	0.299	11/6/2018	**	5/13/2019	
7/26/2018	**	11/9/2018	**	5/26/2019	
8/4/2018	**	11/13/2018		5/31/2019	
8/8/2018	0.051	11/16/2018	**	6/11/2019	
8/11/2018		11/25/2018	**	6/13/2019	
8/12/2018	0.066	11/26/2018		6/20/2019	**
8/13/2018		12/2/2018		6/21/2019	**
8/22/2018		12/16/2018		6/29/2019	0.001
9/10/2018	**	12/31/2018			
9/13/2018		1/5/2019			
9/18/2018	**	1/20/2019			

Calibration plots for this location showed that for several storm events, the modeled flow and depth at the influent to the regulator were higher than the metered flow and depth. A series of model runs was conducted adjusting the percent impervious area (to attempt to increase wet weather flow to the regulator), but these adjustments did not improve the calibration plots. A review of other parameters associated with the upstream tributary areas identified an area where the Horton infiltration rate was different from surrounding areas. The Horton infiltration rate is a factor that addresses the change in rate of soil infiltration over time. Once this rate was adjusted to match the surrounding areas, the model results were much closer to the meter results.

In the model, the Horton Infiltration rate was changed from “1a” to “1e”.

The updated calibration results are presented in comparison to the original calibration and the meter data in Table 3.

**Table 3. Comparison of Model vs. Meter for RE070/7-2**

April 15- December 31, 2018					
Metered		Modeled (Original Calibration)		Modeled (Revised Calibration- CAL040)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
25	1.81	38	6.84	25	2.13
January 1-June 30, 2019					
Metered		Modeled (Original Calibration)		Modeled (Revised Calibration- CAL040)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
7	0.04	18	0.77	11	0.01

As indicated in Table 3, the model matches the metered activations for the April-December 2018 period, and the model is slightly high on the volume. For the January-June 2019 period, the model is slightly high on the activation frequency, but the average volume/activation is less than 0.01 MG.

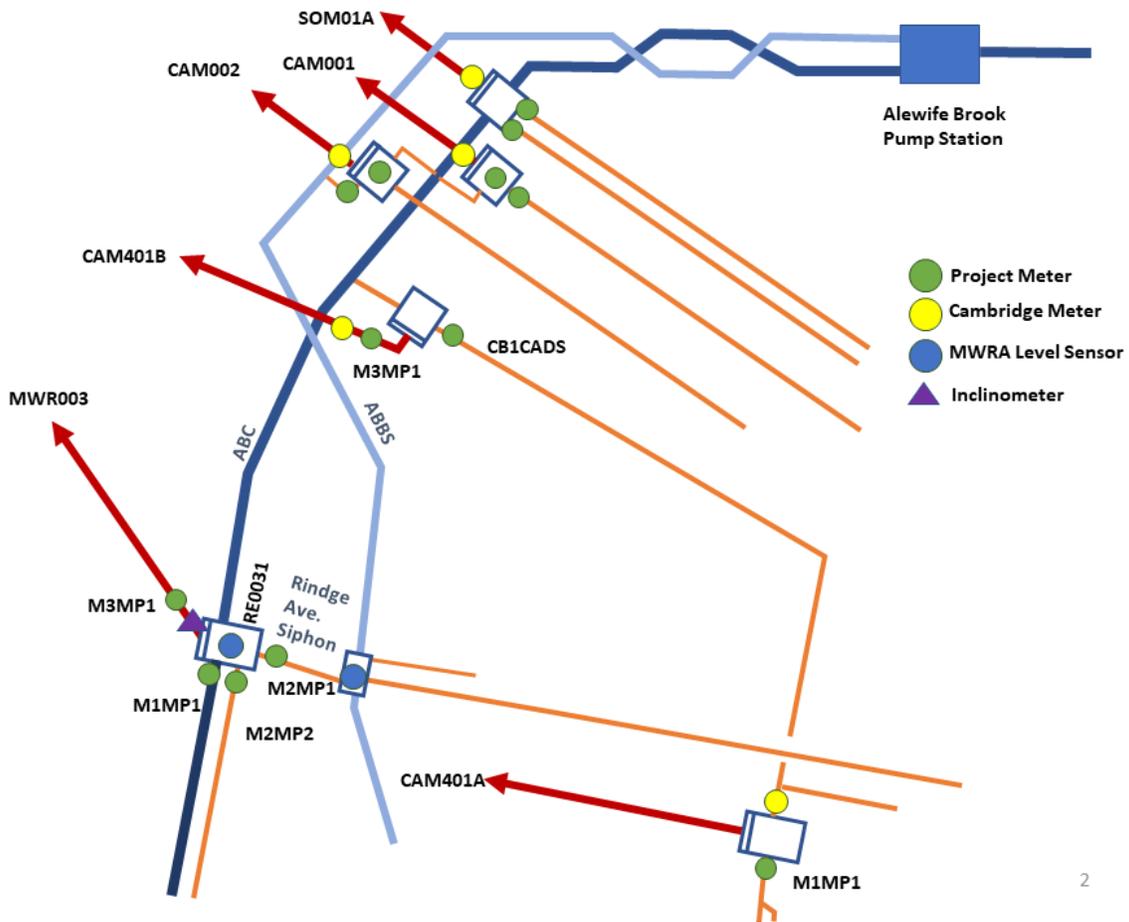
### ***Investigation Conclusions***

Based on the results of this analysis, with the change to the Horton’s infiltration rate, the model is considered to be adequately calibrated for evaluation of CSO performance.

**CAM401B**

***Regulator Information***

Outfall CAM401B's sole regulator, RE-401B, directs flow to MWRA's Alewife Brook Conduit (ABC) through an 18-inch dry weather flow (DWF) pipe connection, as shown in Figure 3 below. Project flow meters were installed on the influent sewer and the overflow conduit from the regulator, and Cambridge has a meter on the overflow pipe. Regulator RE01A (Outfall SOM01A) also directs flow to the Alewife Brook Conduit downstream of regulator RE-401B, while regulator RE011 (Outfall CAM001) directs flow to the Alewife Brook Branch Sewer (ABBS) downstream of RE401B. Regulator RE021 (Outfall CAM002) discharges to both the ABC and the ABBS, downstream of RE401B. Regulator RE031 (MWR003) is located on the ABC upstream of the RE401B connection. Regulator RE401A is located along a Cambridge combined sewer that carries flow to RE401B. The ABC and ABBS are interconnected at multiple locations.



**Figure 3. Schematic of Alewife System**

***Reason for Further Investigation***

The initially calibrated model predicted a higher activation frequency and volume than the observed metering data for both the 2018 and 2019 monitoring periods as shown in Table 4 below, and as a result was further reviewed.

**Table 4. Comparison of Model vs. Meter for CAM401B**

April 15- December 31, 2018			
Modeled (Original Calibration)		Metered	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
17	0.95	3	0 *

\* Metered volume too small to be quantified

January 1-June 30, 2019			
Modeled (Original Calibration)		Metered	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
2	0.13	0	0

***Regulator Calibration Investigation***

The City of Cambridge's hydraulic model, which also models CSO activation frequency and volume at CAM401B, was used as a reference in the calibration investigation. The Cambridge model predicted 3 activations with a discharge volume of 0.177 MG for all of 2018. Differences between the MWRA and Cambridge models include differences in upstream subcatchment representation as well as variation in rainfall and other model input files. For example, the MWRA model uses Fresh Pond rain gauge data, while Cambridge replaces the Fresh Pond data with data from the Cambridge DPW gauge when those data are available. In terms of the configuration of regulator RE401B, the weir elevations in the MWRA and Cambridge models were the same, at 108.75 ft MDC. This overflow elevation was similar to the weir elevation of 108.97 ft MDC measured in the field during this investigation. However, differences were observed in the hydraulic losses through the DWF connection between the MWRA and Cambridge models. The Cambridge model had a relatively low Manning's n on the DWF connection (n= 0.01) while the MWRA model had a higher Manning's n on the DWF connection (n= 0.03). No additional entrance or exit losses were modeled in either the Cambridge or MWRA models.

The MWRA model was overpredicting activations compared to the MWRA meter data and the Cambridge model predictions even though the weir elevation is the same in both models, which suggests that there may be too much headloss in the 18-inch DWF pipe in the MWRA model, restricting flow through the 18-inch DWF pipe to the Alewife Brook Conduit. To assess the losses in the regulator structure, the MWRA model was rerun with lower Manning's n values for the 18-inch DWF pipe. Decreasing the headloss in the DWF connection resulted in anticipated decreases in activation frequency. Table 5 below presents the original model calibration results, as well as the results after

lowering the Manning's n value on the DWF connection. As indicated in Table 5, a Manning's n of 0.019 resulted in 3 overflows, with a total volume of 0.22 MG. While the predicted volume is still a little high compared to the meter data, the average per-storm modeled volume is only 0.07 MG.

**Table 5. Results of Varying Manning's n in DWF Connection for CAM401B**

April 15- December 31, 2018		
Manning's n value on DWF connection	Modeled Activation Frequency	Modeled Discharge Volume (MG)
<b>Original Calibration</b>		
0.03	13	0.78
<b>Model Iterations</b>		
0.012	2	0.08
0.015	2	0.14
0.017	2	0.18
0.018	2	0.20
0.019	3	0.22
0.020	4	0.25
<b>Target from Meter</b>		
	3	0 *

\* Metered volume too small to be quantified

A comparison of the original calibration to the revised calibration and meter data for the April-December 2018 period and the January-June 2019 period is summarized in Table 6. For the January-June 2019 period, the model matches the meter, with no activations predicted or measured.

**Table 6. Comparison of Model vs. Meter for CAM401B**

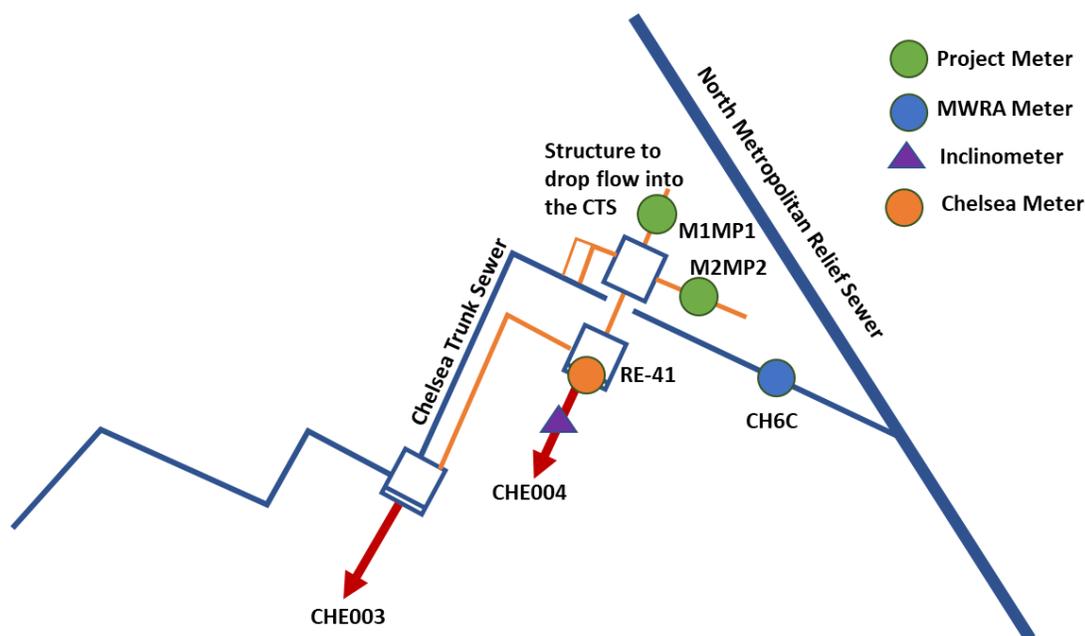
	April 15- December 31, 2018					
	Metered		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Regulator	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
CAM401B	3	0.00	17	0.95	3	0.22
	January 1 – June 30, 2019					
	Metered		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Regulator	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
CAM401B	0	0.00	2	0.13	1	<0.01

### ***Investigation Conclusions***

Based on the results of this analysis, it is recommended the Manning's n value of 0.019 be used on the RE401B DWF connection to provide a better match to the metered activations. With this change, the model is considered to be adequately calibrated for evaluation of CSO performance.

**CHE004*****Regulator Information***

Outfall CHE004's sole regulator, RE-41, directs flow into the City of Chelsea's Chelsea Trunk Sewer at a location just upstream of its connection to the North Metropolitan Relief Sewer (Figure 4). Project flow meters were installed on each of two influent lines into the regulator, and an inclinometer was installed on the tidegate downstream of the overflow weir. MWRA's permanent meter CH6C is located on the Chelsea Trunk Sewer between the RE-41 connection and the North Metropolitan Relief Sewer. The City of Chelsea maintains a flow meter located directly on the overflow weir in RE-41.



**Figure 4. Schematic of CHE004 System**

***Reason for Further Investigation***

The initially calibrated model was predicting a higher activation frequency and volume than the observed metering data for both the 2018 and 2019 monitoring periods as shown in Table 7, and as a result was further reviewed.

**Table 7. Comparison of Model vs. Meter for CHE004**

<b>April 15- December 31, 2018</b>			
<b>Modeled (Orig. Calib.)</b>		<b>Metered</b>	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
34	9.44	19	1.79
<b>January 1-June 30, 2019</b>			
<b>Modeled (Orig. Calib.)</b>		<b>Metered</b>	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
11	4.48	13	0.29

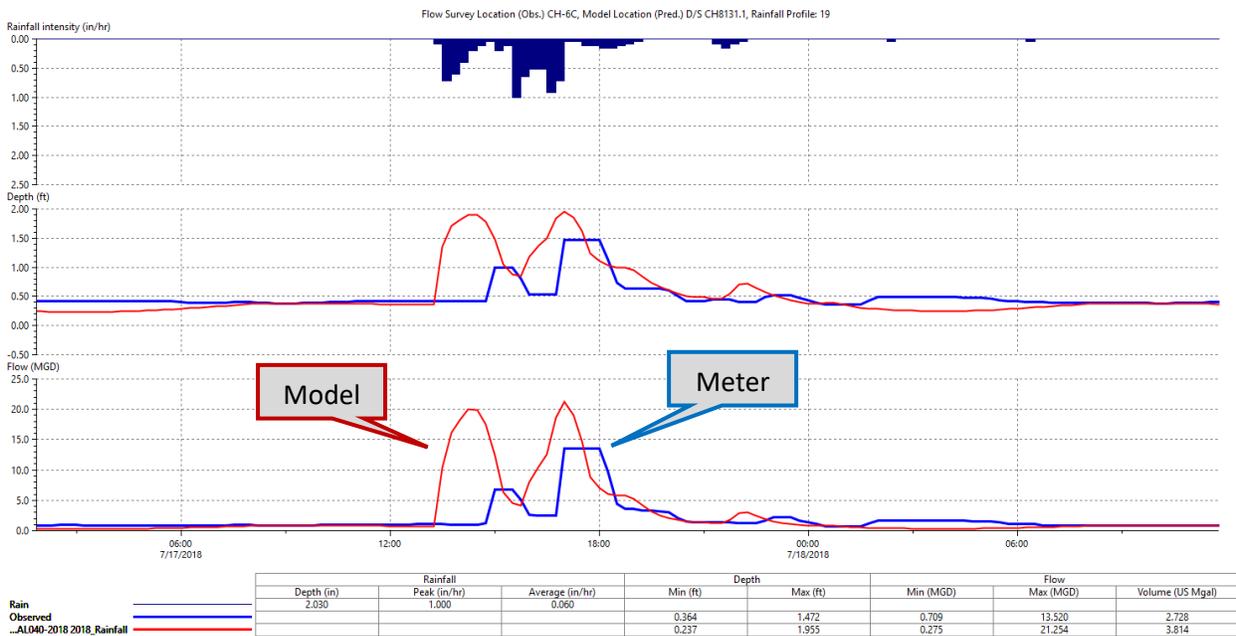
***Regulator Calibration Investigation***

Record drawings of Regulator RE-41 indicate that the DWF connection at the regulator is a 24-inch diameter pipe that splits to an 18-inch drop connection and 24-inch relief connection, both connected to the Chelsea Trunk Sewer. However, during installation of the meter, the inspection crew reported that the size of the DWF connection leaving the regulator was 12-inch diameter. Thus, the original calibration was based on a 12-inch connection, with a Manning's n value of 0.025. The size of the connection leaving the regulator was re-measured in the field, and was confirmed to be 24-inch diameter, matching the record drawing. It is suspected that the original inspection may have measured a different pipe in the regulator that was not the DWF connection. During the more recent field measurement, flow into the dry weather flow connection did not appear to be impeded. To improve the match to the meter data, the size of the opening to the DWF connection was set to 24-inch diameter, and the roughness coefficient was adjusted to  $n = 0.033$ . With this adjustment, the modeled activations and volume both dropped to more closely match the meter data (Table 8).

Figure 5 shows a plot of model versus metered depth and flow at MWRA meter CH-6-C on the Chelsea Trunk Sewer downstream of the RE-41 connection for the 7/18/2018 storm. This storm caused an activation (metered and modeled) at CHE004. The model appears to somewhat over-predict the depth and volume at meter CH-6-C, but the metered depth and flow data show plateaus at the peaks, and may not be representing the actual peaks.

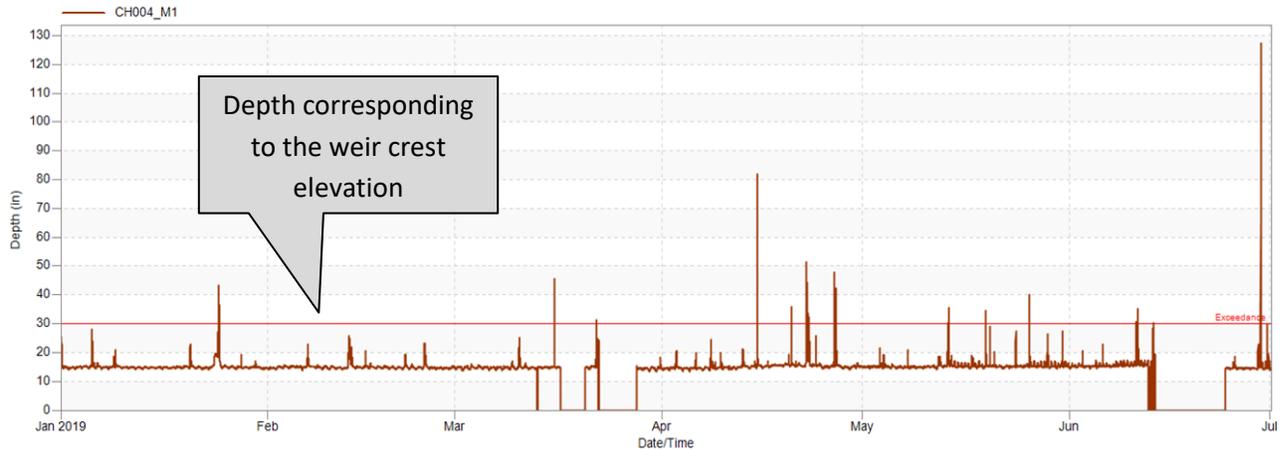
**Table 8. Summary of Impacts of Calibration Changes to Activations and Volume at CH004, RE-41**

April 15- December 31, 2018					
Metered		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
19	1.79	34	9.44	10	1.63
January 1-June 30, 2019					
Metered		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
13	0.29	11	4.48	4	1.09



**Figure 5. Model vs Metered Plot at MWRA Meter CH-6C**

As another point of comparison, it was noted that during the January-June 2019 period, when the project meter (M1MP1, shown in Figure 4) indicated a total of 13 activations, the City of Chelsea’s meter on the weir reported only two activations. The project-meter activations were determined when the depth at the project meter on the influent pipe into RE-41 exceeded the weir elevation. Since that influent meter was located approximately 30 feet upstream of the weir (as well as upstream of a drop connection structure), there was some concern that the depth measured at the influent meter might not represent the actual depth at the weir. To assess the potential impact of headlosses between the project meter and the weir on metered activations, the depth at the influent meter was plotted for the January-June 2019 period, with the trigger depth (corresponding to the weir elevation) indicated (Figure 6). The data from Figure 6 are presented in tabular format in Table 9.



**Figure 6. Depth vs. Time at RE-41 Influent Meter for January-June 2019**

**Table 9. Depth and Duration of Outfall CHE004 Metered Events for Jan-June 2019**

Event	Date	Maximum Depth (in)	Depth above Trigger (in)	Duration of Exceedances (min)
1	1/24/2019 15:10	43.4	13.4	97
2	3/15/2019 21:30	45.5	15.5	15
3	3/22/2019 4:30	31.3	1.3	10
4	4/15/2019 6:00	81.9	51.9	59
5	4/20/2019 9:25	35.7	5.7	10
6	4/22/2019 13:10	51.4	21.4	275
7	4/26/2019 19:20	48.0	18.0	113
8	5/13/2019 20:55	35.5	5.5	35
9	5/19/2019 11:45	34.5	4.5	13
10	5/26/2019 0:55	40.1	10.1	13
11	6/11/2019 0:35	35.2	5.2	23
12	6/13/2019 13:15	30.3	0.3	1
13	6/29/2019 15:10	127.3	97.3	51

As indicated in Figure 6 and Table 9, out of the 13 metered activations, the depth at meter M1MP1 was more than 50 inches above the trigger elevation for two events, and the depth was at least 10 inches above the trigger elevation for five other events. For these seven events, at least, it would seem likely that the depth over the weir was also exceeded. When flow first starts to back up against the weir, the velocity between the location of the dry weather flow connection and the weir would tend to be relatively low, as the regulator is filling up “like a bathtub.” Headloss between these points would

similarly tend to be low. Once the elevation of the weir is exceeded and flow starts to move over the weir, velocities in the chamber, and headloss, would increase, and there would be a higher likelihood of a difference between the influent depth and the depth at the weir.

Based on the evaluation of the depth data relative to the trigger elevation, it appears that most of the 13 “metered” activations in the January-June 2019 timeframe would be considered legitimate activations. The two storm events where the depth exceeded the weir elevation by less than two inches, and for relatively short durations, are less certain and were not counted as activations.

As noted above, the metered and modeled activations matched best with the Manning’s n value of the DWF connection set to  $n=0.033$ . The cause of this relatively high headloss was not apparent from inspections conducted in the regulator. It is possible that unusual hydraulic conditions in the regulator during wet weather are causing this high apparent headloss.

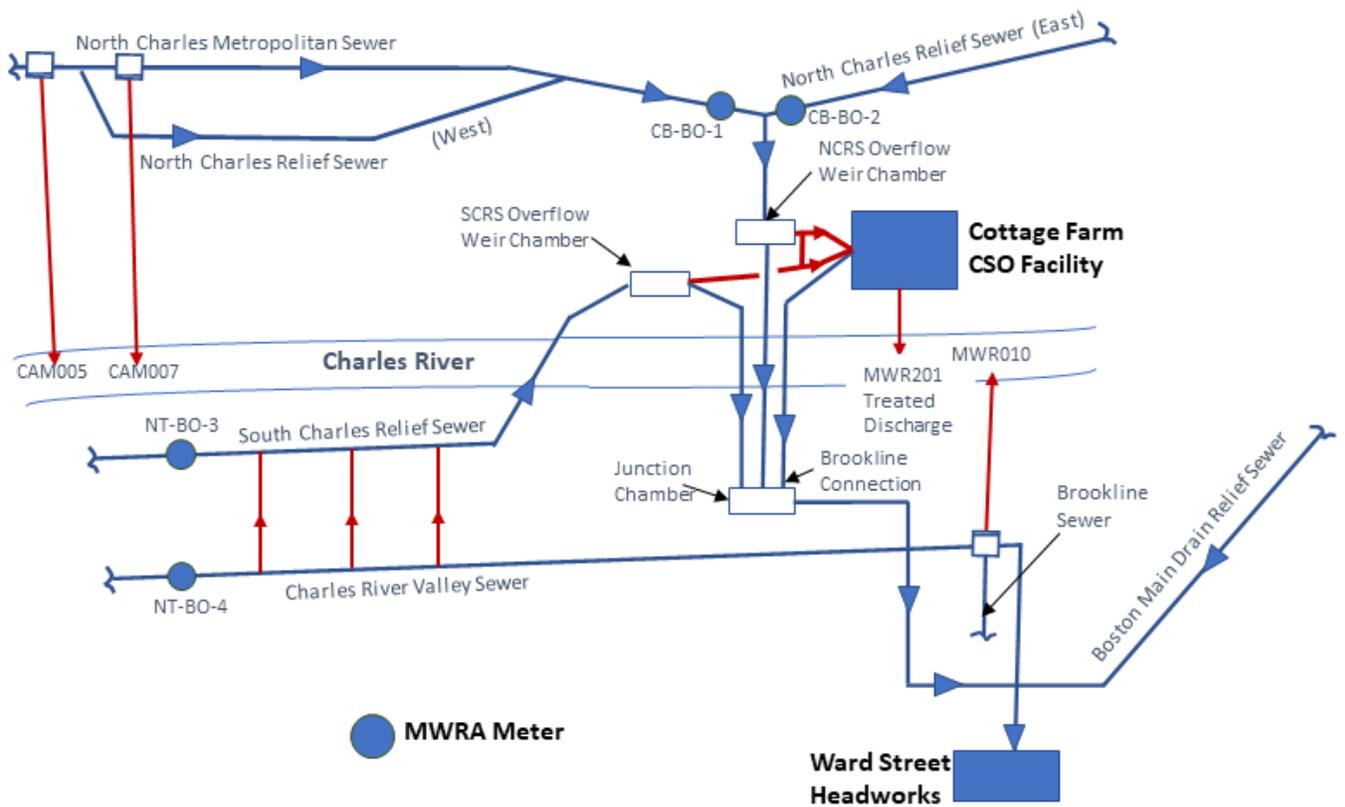
### ***Investigation Conclusions***

Based on these revised results, with the parameters of the dry weather flow connection adjusted to better reflect actual field conditions, the model is considered to be adequately calibrated for evaluation of CSO performance.

**MWR201 (Cottage Farm Facility)**

***Facility Information***

The Cottage Farm CSO Facility receives overflow from the North Charles Metropolitan Sewer, the North Charles Relief Sewer (East and West), and the South Charles Relief Sewer (SCRS) (Figure 7). The Cottage Farm CSO Facility provides relief for interceptors on the north and south sides of the Charles River, and is the primary upstream relief point when Ward Street Headworks capacity is exceeded and the Headworks must choke incoming flow. Overflow enters the Cottage Farm Facility when flow from the interceptors overtops the interconnected NCRS and/or SCRS weir chambers and a high level set point is reached at the facility influent structure, triggering the influent gates to open. A gate on the Brookline Connection (which runs directly from the Cottage Farm Facility to the junction chamber on the other side of the river) is manually operated to maximize flow to Ward Street Headworks in the open position and prevent flow from Ward Street Headworks from backing up into the facility in the closed position.



**Figure 7. Schematic of System Upstream of Cottage Farm CSO Facility**

***Reason for Further Investigation***

For the April 2018 to June 2019 metering period, the facility data indicated a total of 6 facility activations with 38.58 MG of discharge, and the initially calibrated model predicted a total of 3 activations with 17.4 MG of discharge. Since the model appeared to be under-predicting both activations and volume, further investigation was conducted.

***Calibration Investigation***

Table 10 presents a storm-by-storm comparison of modeled vs. metered activations at Cottage Farm for the April 2018 to June 2019 period. As indicated in Table 10, the model missed the activations on 9/18/18, 11/10/18, and 4/15/19. The model predicted a discharge for the storm on 4/16/2018; however, the predicted discharge volume was less than half of the measured discharge volume. For the 4/22/2019 storm, the predicted discharge volume was only 0.13 MG as compared to a measured volume of 5.01 MG. The 7/17/2018 storm was the only storm where the model reasonably matched the measured discharge volume.

**Table 10. Metered vs Measured Activation Volumes in Original Model for Cottage Farm**

<b>Date</b>	<b>Metered Activations</b>	<b>Original Calibration Modeled Activations</b>	<b>Updated Calibration Modeled Activations</b>
	<b>(MG)</b>	<b>(MG)</b>	<b>(MG)</b>
4/16/2018	8.5	3.54	4.92
7/17/2018	11.19	13.87	14.87
9/18/2018	4.28		3.04
11/10/2018	6.17		4.42
4/15/2019	3.43		
4/22/2019	5.01	0.13	3.60

Facility operations for each storm event were reviewed, and it was found that the facility activation for the 04/22/2019 storm was missed due to a gate being closed too early in the model. Correcting this led to an overflow of 3.6 MG in the model for the 4/22/18 storm, compared to the 5.01 MG measured volume. To address the other activations not predicted by the model, the amount of flow coming into the facility was investigated. It was noted that the missed storms tended to occur during periods of high groundwater. The interceptor meter data showed evidence of the influence of groundwater on the flow, and groundwater had previously been incorporated into some of the runoff areas upstream of the facility. However, an area without the groundwater component was identified adjacent to other areas that had the groundwater component. To be consistent, groundwater was added to this area. In addition, the model was found to be under-predicting the wet weather flow at MWRA interceptor flow meter CB-BO-1, which measures flows from the North Charles Metropolitan Sewer and the North

Charles Relief Sewer (West). Runoff parameters were adjusted to increase the wet weather flow to better match this meter.

With the increase in flow due to the added groundwater, and the increase in flows from CB-BO-1, the model predicted activations for the 9/18/2018 and the 11/10/2018 storms. The model, however, still did not predict a facility activation for the 4/15/2019 storm. The characteristics and rainfall distribution for that storm were reviewed, but rainfall variation did not seem to be a contributing factor for this storm event. The facility operations during this storm also appeared to be normal, so the facility activation could not be attributed to unique operating conditions. It is not entirely clear why the model did not predict an activation for the 4/15/19 storm. However, since the model predicted the other five events during this period, and the predicted activation volumes were reasonably close, the model was considered to be sufficiently calibrated.

### ***Investigation Conclusions***

With the additional groundwater and adjustment of flows to meter CB-BO-1, the model is sufficiently calibrated for use in post-monitoring evaluations. Table 11 presents the meter and revised model activation frequency and volume for the 2018 and 2019 period.

**Table 11. Comparison of Model vs. Meter for Cottage Farm**

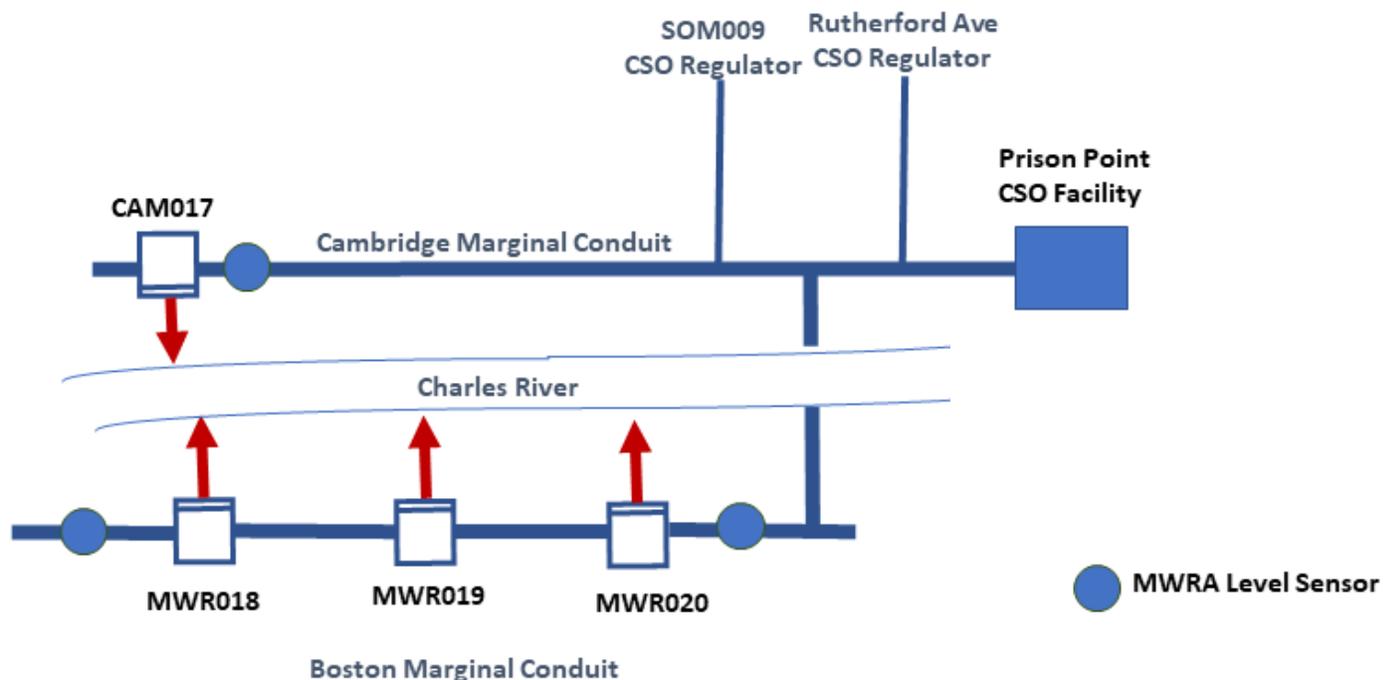
<b>April 15-December 31, 2018</b>					
<b>Metered</b>		<b>Modeled (Original Calibration)</b>		<b>Modeled (Revised Calibration- CAL034)</b>	
Activation Frequency	Activation Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
4	30.14	2	17.41	4	27.26

<b>January 1-June 30, 2019</b>					
<b>Metered</b>		<b>Modeled (Original Calibration)</b>		<b>Modeled (Revised Calibration- CAL034)</b>	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
2	8.44	1	0.13	1	3.60

**MWR018, MWR019 and MWR020*****Regulator Information***

Outfalls MWR018, MWR019 and MWR020 can discharge overflows from MWRA's Boston Marginal Conduit (BMC) to the Charles River Basin in large storms. Otherwise, the BMC conveys combined sewer flows to MWRA's Prison Point CSO treatment facility (Figure 8). MWRA identifies the overflow events at these outfalls using measurements at level sensors in the BMC upstream of MWR018 and downstream of MWR020. Discharge volumes are not measured. During the 2018 calibration period, the level data at the MWRA meter downstream of MWR020 was determined to be faulty, and those data were not used for identifying overflow activations at MWR018 to MWR020, nor were they used in the calibration.



**Figure 8. Schematic of Boston Marginal Conduit System**

**Justification for Further Investigation**

The initially calibrated model was predicting a higher activation frequency than the meter data for the 2018 monitoring period as shown in Table 12, and as a result was further reviewed. No measured or model predicted CSO activations occurred for the January 1 through June 30, 2019 period.

**Table 12. Comparison of Meter vs. Model for MWR018/019/020**

April 15- December 31, 2018				
Modeled (Orig. Calib.)			Metered	
Regulator	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
018	4	5.72	2	Not Measured
019	4	2.33	2	Not Measured
020	4	1.71	2	Not Measured
January 1-June 30, 2019				
Modeled (Orig. Calib.)			Metered	
Regulator	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
018	0	0	0	Not Measured
019	0	0	0	Not Measured
020	0	0	0	Not Measured

**Regulator Calibration Investigation**

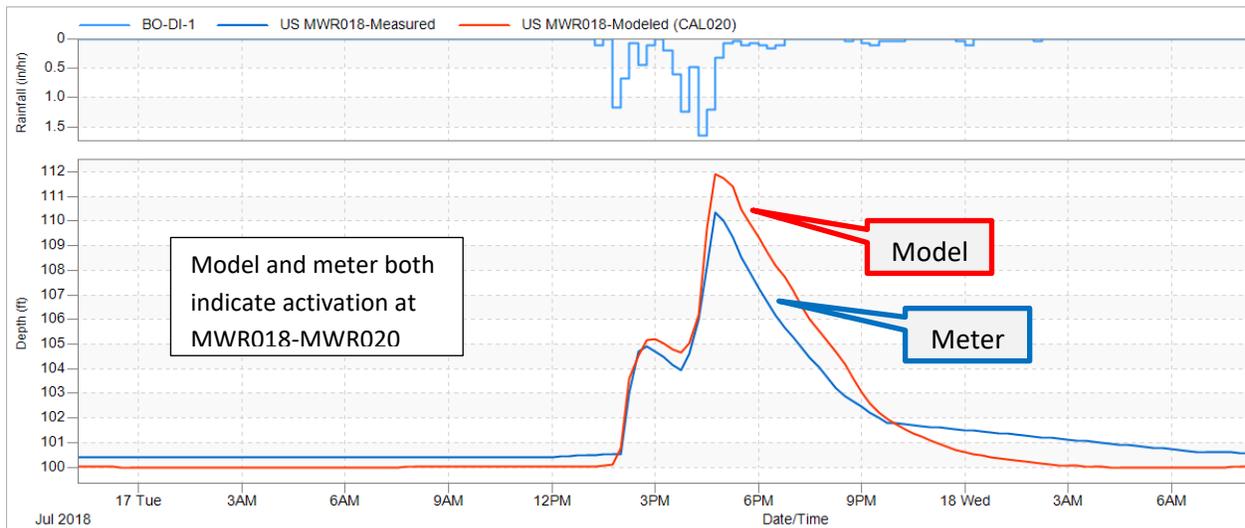
Calibration adjustments related to Prison Point resulted in elimination of one of the modeled 2018 overflows. Previously, the model predicted no activation of Prison Point for the 11/03/2018 storm, while the facility data indicated an activation. When the Prison Point influent gate closing time for the 11/03/2018 storm was adjusted, the model predicted the Prison Point facility to activate, consistent with the measured data. The modeled activation of the Prison Point facility reduced the peak hydraulic grade line in the Boston Marginal Conduit for the 11/03/2018 storm, eliminating the modeled overflow at outfalls MWR018/019/020 for that storm, and improving the match between modeled and metered depth at the MWRA level sensor upstream of MWR018.

Calibration plots were then created for each remaining storm where the model indicated an activation, as well as for three storms where the model did not predict an activation. The peak elevations in the BMC at the MWRA meter upstream of MWR018 for each of these storms is shown in Table 13. Plots of modeled vs. metered elevations in the BMC at the meter upstream of MWR018 are shown in Figures 9 to 14.

**Table 13. Summary of Modeled and Metered Activations**

Date	MWR018 Metered Activations @ MWR018			Modeled Activation	
	Storm Report Activations (2018 NPDES reported)	Max. Level	Activation Indicated >108.85 for MWR018, >109.1 for MWR019/020	Max. Level	Modeled Activation?
7/17/2018	✓	110.4	✓	112	✓
8/12/2018	✓	110.7	✓	111.2	✓
9/18/2018		106.4		110.2	✓
11/3/2018		106.8		107.1	
2/13/2019		101.9		104.7	
6/20/2019		107.3		107.1	

The plots in Figures 9 to 14 indicate that the model and meter match reasonably well for each of the storms except for the 9/18/2018 storm, where the model over-predicts the depth by about four feet, resulting in a modeled activation at MWR018/019/020. Investigating the 9/18/2018 storm further, it was determined that this storm had highly variable rainfall over the large area that contributes flows to the BMC. The description of calibration for the Prison Point CSO Facility, presented below, includes examples of the impacts of variable rainfall on the Prison Point tributary area, and the MWR018/019/020 tributary area overlaps with the Prison Point tributary area up through the Stony Brook system.



**Figure 9. July 17, 2018 Storm**

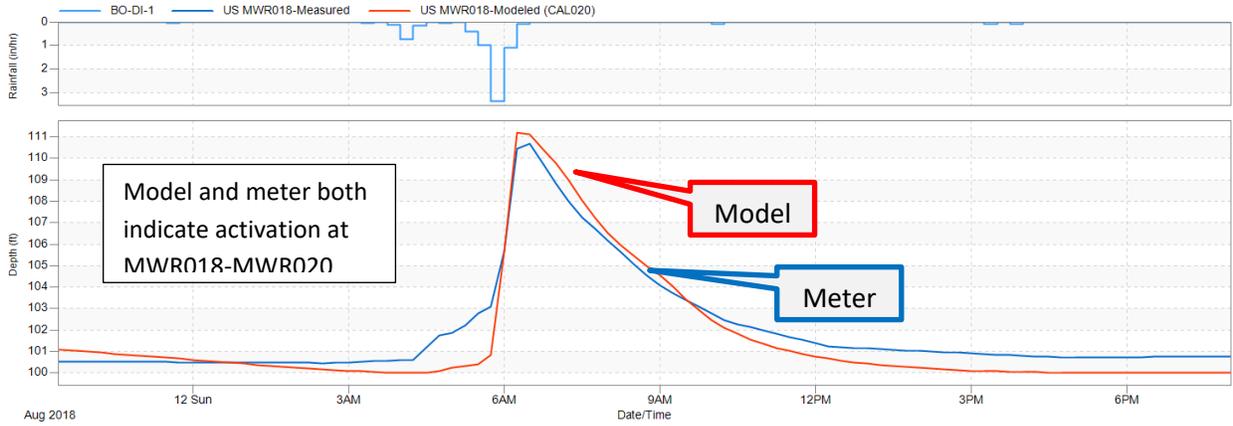


Figure 10. August 12, 2018 Storm

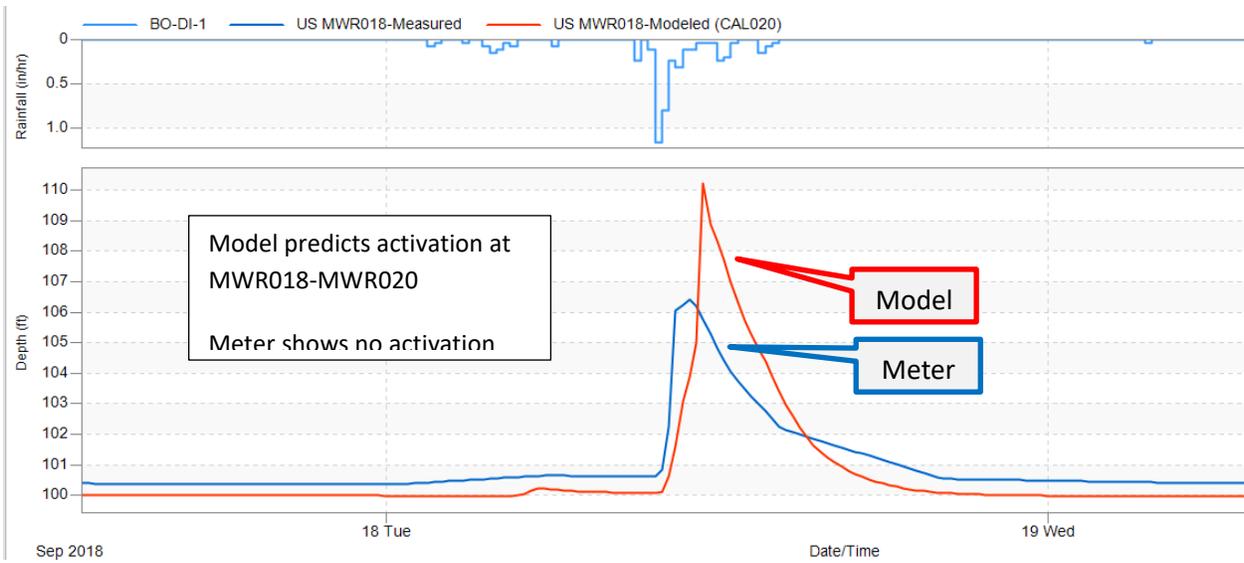


Figure 11. September 18, 2018 Storm

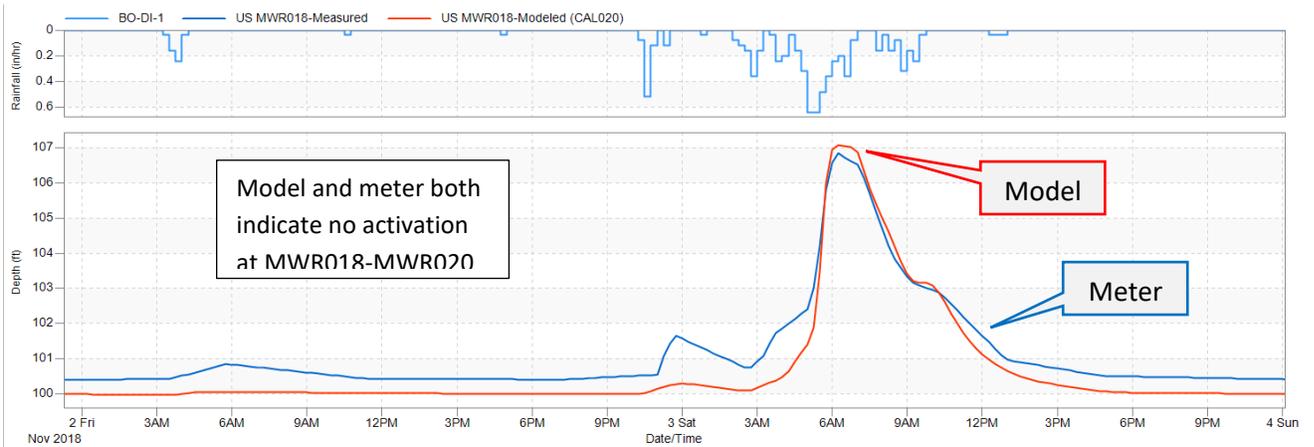
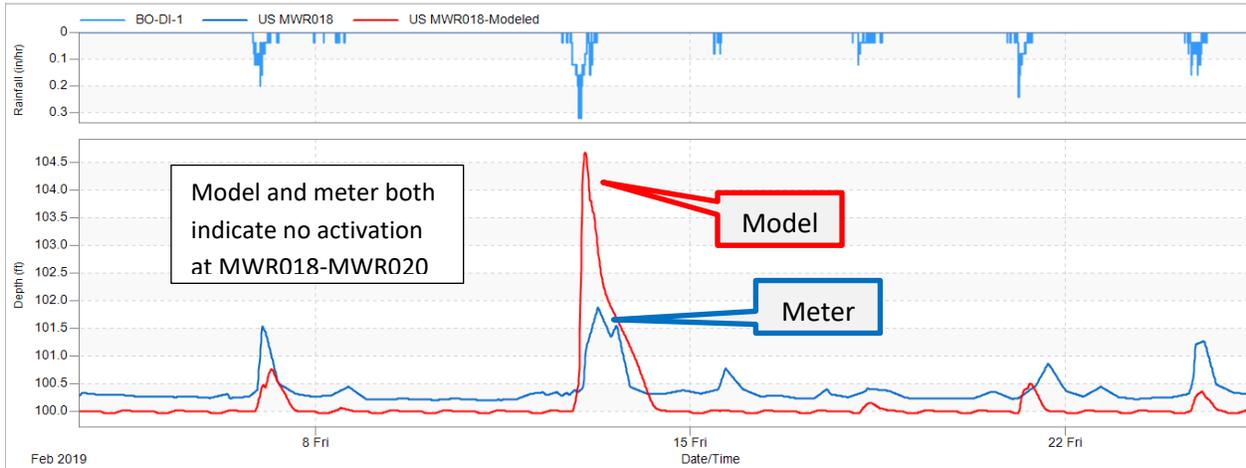
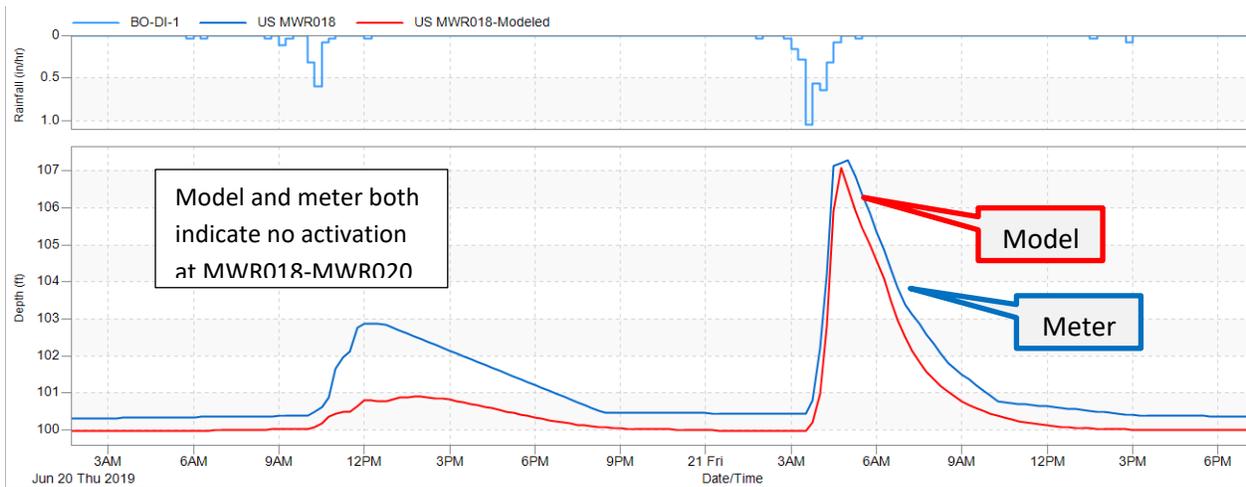


Figure 12. November 3, 2018 Storm



**Figure 13. February 7-22, 2019 Storm**



**Figure 14. June 20, 2019 Storm**

Figure 15 presents a screen shot of radar imagery from the 9/18/2018 storm. As indicated in Figure 15, a band of intense rainfall moved through the tributary area. The rain gage data used as input to the model would not fully represent the spatial variability of this type of rainfall pattern. Therefore, the calibration for MWR018/019/020 is now considered to be good, since the model does replicate the meter data for storms where the rain gage data represents the actual rainfall that fell throughout the tributary area (i.e., storms with less spatially variable rainfall). The model therefore can adequately predict Typical Year flows and discharges, because Typical Year rainfall is uniform over the MWRA service area.

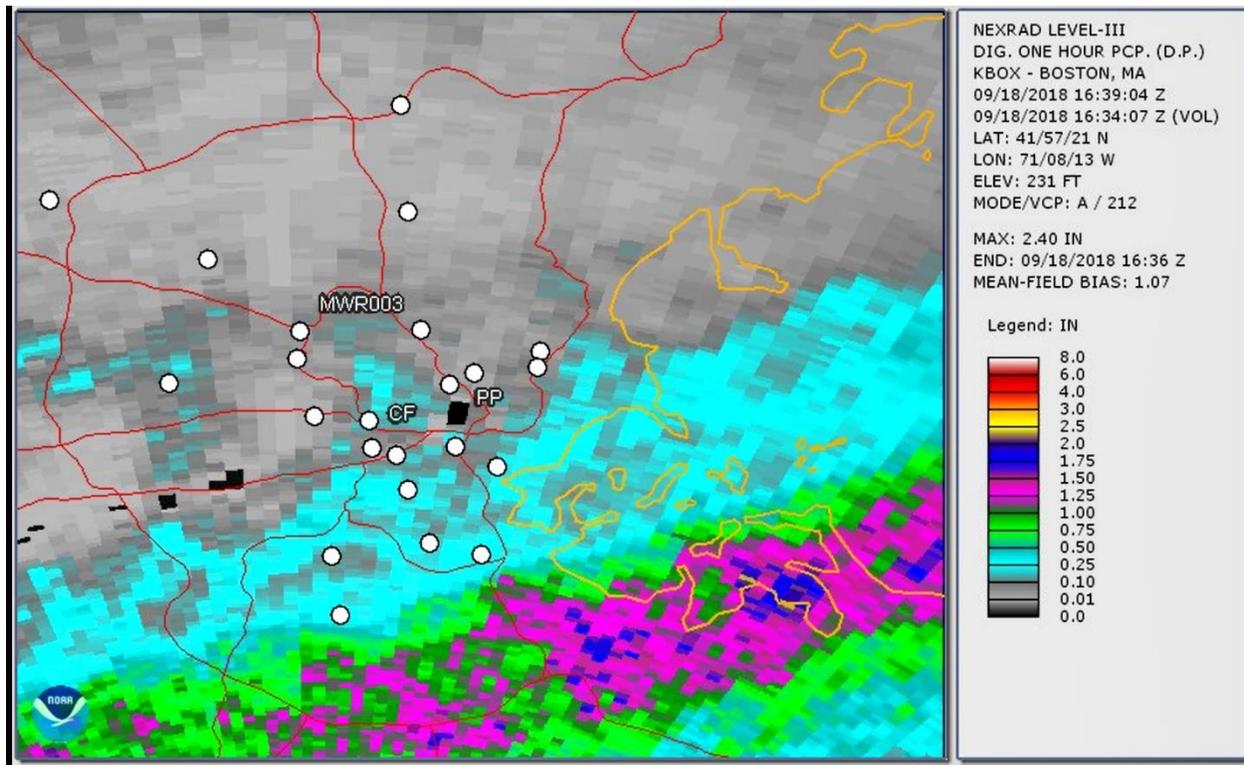


Figure 15. Rainfall Variation during the 9/18/2018 Storm

A comparison of the original calibration to the revised calibration and meter data for the April-December 2018 period and the January-June 2019 period is summarized in Table 14. For the January-June 2019 period, the model matches the meter, with no activations predicted or measured.

Table 14. Comparison of Model vs. Meter for MWR018/MWR019/MWR020

April 15- December 31, 2018						
Regulator	Measured		Modeled (Original Calibration)		Modeled (Revised Calibration)	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
018	2	Not Measured	4	5.72	3	4.30
019	2	Not Measured	4	2.33	3	1.68
020	2	Not Measured	4	1.71	3	1.14
January 1-June 30, 2019						
Regulator	Metered		Modeled		Modeled (Revised Calibration)	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)

**Table 14. Comparison of Model vs. Meter for MWR018/MWR019/MWR020**

018	0	Not Measured	0	Not Measured	0	0.00
019	0	Not Measured	0	Not Measured	0	0.00
020	0	Not Measured	0	Not Measured	0	0.00

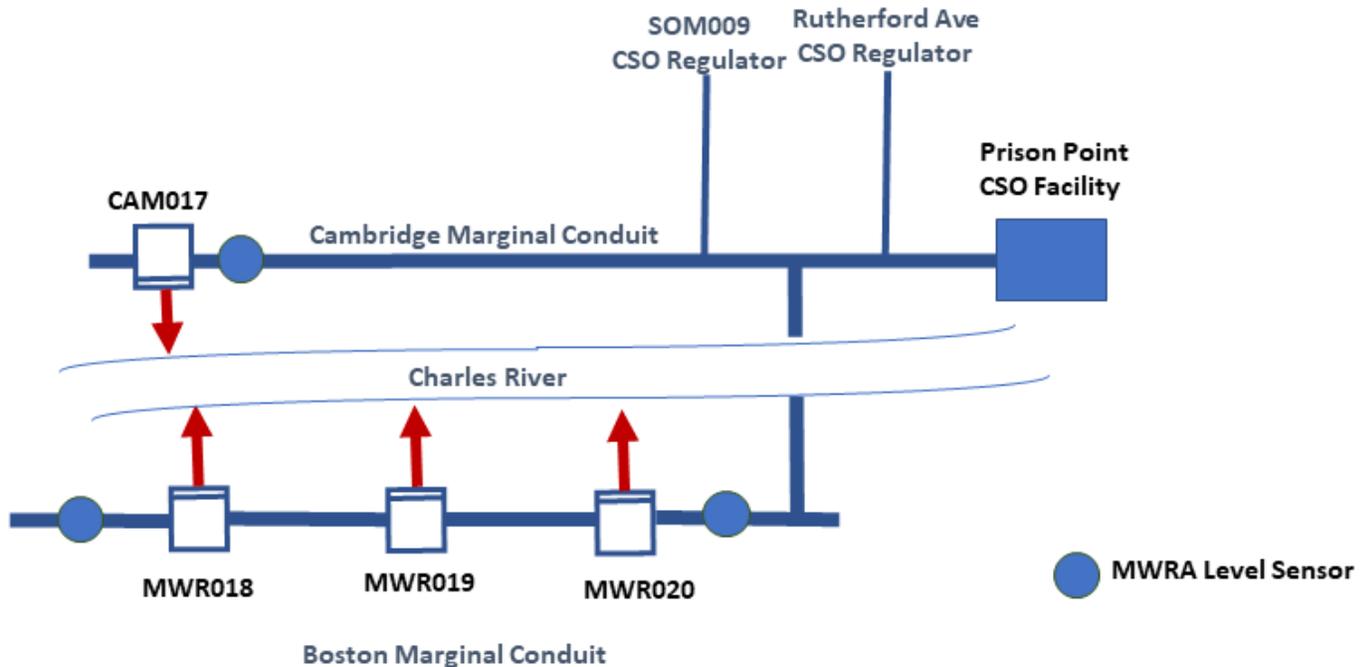
*Investigation Conclusions*

Based on the results of this analysis, no further changes to the calibration for outfalls MWR018/019/020 is needed, beyond the adjustment that was made at Prison Point for the 11/03/2018 storm. The model is considered to be adequately calibrated for evaluation of CSO performance.

## Prison Point

### ***Facility Information***

The Prison Point CSO Facility receives flow from the Cambridge Marginal Conduit and the Boston Marginal Conduit, as well as from the SOM009 and Rutherford Ave. regulators on the Cambridge Branch Sewer in Somerville and the Charlestown Branch Sewer in Charlestown, respectively (see Figure 16). In dry weather, flows are pumped to the Rutherford Avenue sewer. In wet weather, the gates to the wet weather tanks open on high level in the influent chamber. For storms in the flow metering periods, available facility data included the discharge volume, and the timing and influent chamber level associated with the opening and closing of the wet weather influent gates.



**Figure 16. Schematic of System Upstream of Prison Point CSO Facility**

### ***Reason for Further Investigation***

For the April 2018 to June 2019 metering period, the facility data indicated a total of 25 facility activations with 461 MG of discharge, and the model predicted a total of 19 activations with 334 MG of discharge. Since the model appeared to be under-predicting both activations and volume, further investigation was conducted.

**Calibration Investigation**

A storm-by-storm comparison of modeled vs. metered activations at Prison Point showed that for many storms, the model was reasonably close to the facility data on activation volume (Table 15). The storms where the model missed an actual activation were then investigated further.

**Table 15. Metered vs Measured Activations in Original Model for Prison Point**

Date	Metered Activations	Metered Open Elevation	Modeled Activations
	(MG)	(ft)	(MG)
4/16/2018	38.13	104	30.09
5/15/2018	17.52	98	16.17
6/25/2018	0.42	101	
6/28/2018	13.38	101	13.15
7/17/2018	29.46	98.5	46.26
7/26/2018	5.72	102.5	2.29
8/4/2018	3.26	102.5	4.04
8/11/2018	3.95	102	
8/12/2018	28.52	103	24.11
9/18/2018	12.46	95.5	23.69
9/25/2018	11.5	103	18.74
10/27/2018	16.96	104	11.14
10/29/2018	5.91	103	
11/3/2018	24.2	103.7	
11/9/2018	23.59	104	24.40
11/13/2018	4.31	104	3.58
11/16/2018	14.03	104	10.65
11/27/2018	18.48	104	4.77
1/24/2019	23	102.7	
4/15/2019	8.15	104	7.49
4/22/2019	41.21	104	39.66
4/27/2019	19.91	104/104.98	10.35
6/21/2019	11.74	93.3	6.65
6/29/2019	9.53	98	8.00
6/30/2019	4.72	99	

The 11/03/2018 storm was missed due to a gate being closed too early in the model, compared to the actual gate operation. Correcting this led to an overflow of 23.16 MG in the model, compared to the 23.2 MG metered volume. For the remaining storms, facility activations and overflow volumes the model missed were due to rainfall variation not being captured by the rain gage network (see the MWR018, MWR019 and MWR020 discussion, above). Figure 17 shows the portion of the modeled system that can contribute flow to Prison Point. The area in red represents a large portion of the MWRA

system. Large tributary areas such as this are more sensitive to the exact spatial distribution of rainfall. For example, Figure 18 shows rainfall at two gages for the 10/29/18 storm, which is a storm where activation of Prison Point was missed by the model. While the BO-DI-1 gage shows a peak intensity of around 0.5 in/hr, the rainfall recorded at the Fresh Pond gage had a peak intensity of 1 in/hr. The timing of rainfall peaks was also different at the two gages. Radar imagery during this storm also showed wide variation. Figure 19 shows a radar image of the rainfall during the 10/29/18 storm. This image shows a band of rainfall, with relatively little rainfall at Cottage Farm, but extensive rainfall north and west of Prison Point. This is an example of rainfall hitting the tributary area in real life, but the modeled rainfall for the tributary area represented by the Cottage Farm gage showed much less rainfall.

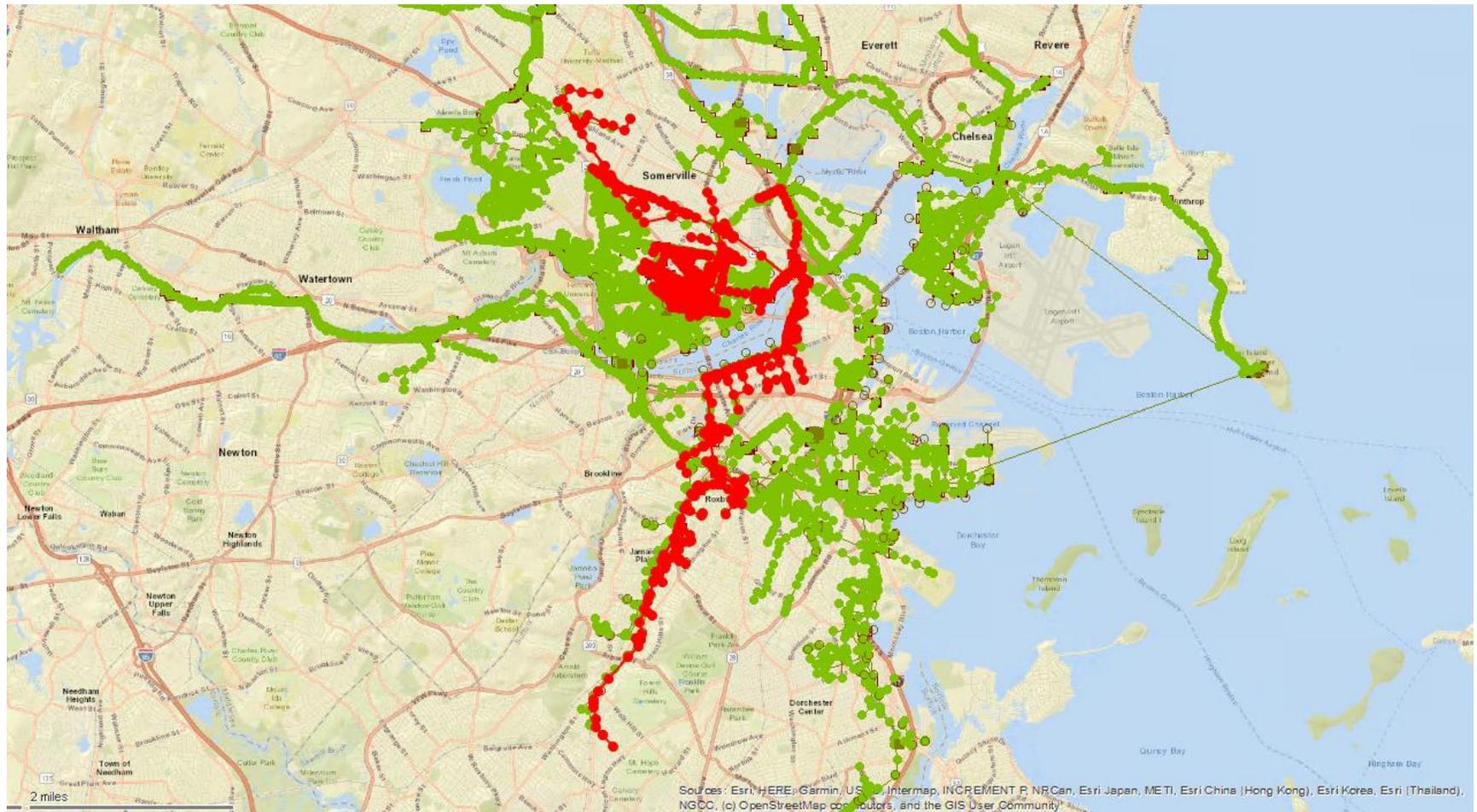


Figure 17. Model Schematic of System Tributary to Prison Point

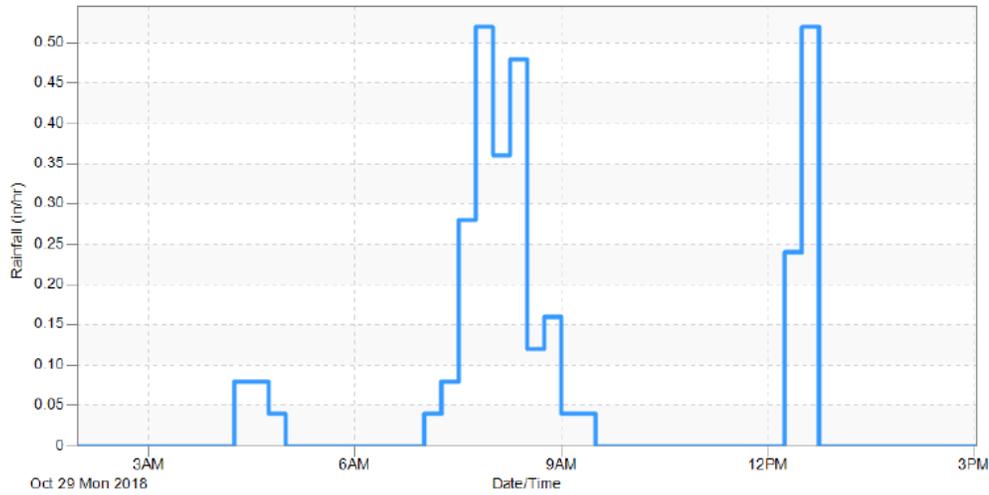


Figure 26. BO-DI-1 October 29, 2018

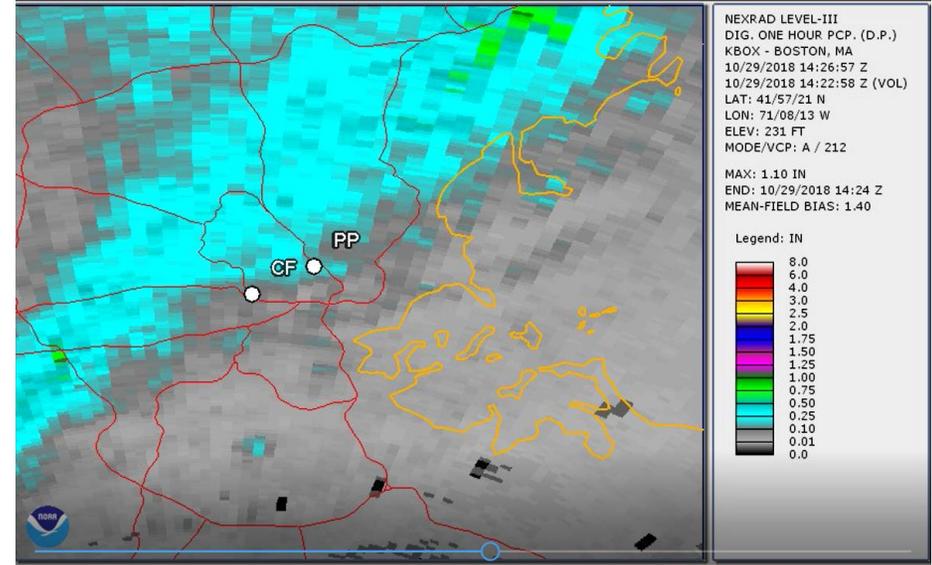


Figure 19. NEXRAD Radar during 10/29/19 storm.

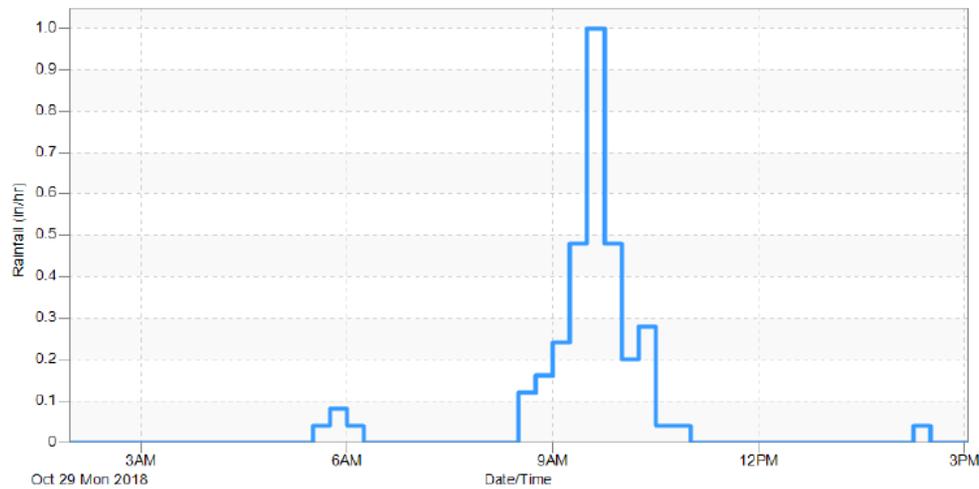


Figure 27. USGS Fresh Pond October 29, 2018

Figure 18. Rainfall Variation – 10/29/2018 Storm (Meter = 5.91 MG, Model = 0 MG at Prison Point)

Figure 20 shows rainfall data at two gages for the 11/9/2018 storm, where the model closely matched the metered volume (24.4 MG model vs. 23.6 MG meter). As indicated in Figure 20, the hyetographs at the two gage locations are fairly similar in terms of shape and peak intensity. Figure 21 shows a radar image from the 11/9/2018 storm, confirming the relatively uniform rainfall over a large area, compared to the distribution shown for the 10/29/18 storm in Figure 19.

Radar imagery from the other storms where the model missed a measured activation at Prison Point showed similar variability in the distribution of rainfall over the Prison Point tributary area. As a sensitivity test, a model run was conducted that modified the rainfall for certain storms. From Table 15, the model missed activations for six storms, but the missed activation on 11/3/18 was resolved by adjusting the gate opening time. For the remaining five storms, rather than apply rainfall from the closest gage to a location, the largest recorded rainfall that fell at any one gage was applied for all locations. The resulting overflows are not a true estimate of overflow, but rather show the potential impact rainfall variation can have on overflow volumes. As a check, the rainfall for three other storms where the model had closely predicted the metered volume were similarly adjusted, to provide a sense of the impact of this rainfall adjustment during more uniform rainfall events. The results of this sensitivity analysis are presented in Table 16.

**Table 16: Sensitivity Test with Adjusted Rainfall at Prison Point**

<b>Date of Storms with Modified Rainfall</b>	<b>Volume from Metered Activations (MG)</b>	<b>Volume from Original Modeled Activations (MG)</b>	<b>Volume from Model Activations with adjusted rainfall (MG)</b>
6/25/2018	0.42	0 (no activation)	12.82
8/11-12/2018	32.5	0 (no activation)	41.31
10/29/2018	5.91	0 (no activation)	9.89
11/9/2018	23.59	24.4	32.92
1/24/2019	23	0 (no activation)	--
4/22/2019	41.21	39.7	38.68
4/27/2019	19.91	10.35	9.63
6/30/2019	4.72	0 (no activation)	0.004

As indicated in Table 16, adjusting the rainfall caused modeled activations for four of the five storms where the model had previously missed the activation. For the three storms in Table 16 that the model had previously predicted an activation (11/9/18, 4/22/19 and 4/27/19), the rainfall adjustment had a relatively modest impact on the predicted volume. This finding is consistent with a more uniform rainfall pattern throughout the tributary area for those storms.

For the 1/24/19 storm, where no activation was predicted with the adjusted rainfall, and for the 6/30/19 storm, where the predicted volume was only 0.004 MG, rainfall variation is still believed to be a factor in the difference between the modeled and metered values. For example, Figure 22 shows a radar rainfall image at the peak of the 06/30/2019 storm. In addition to the location of both Cottage Farm and Prison Point, this figure shows all rain gages used for the study. As represented by the radar image, none of the available gages are capturing the pockets of peak rainfall intensities indicated in the pink color. Similar rainfall variation was also present during the 01/24/2019 storm.

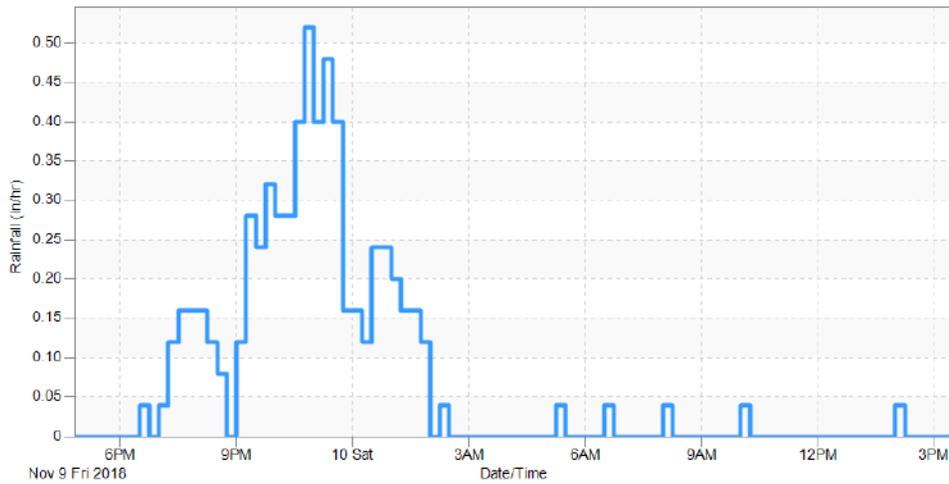


Figure 32. BO-DI-1 November 9, 2018

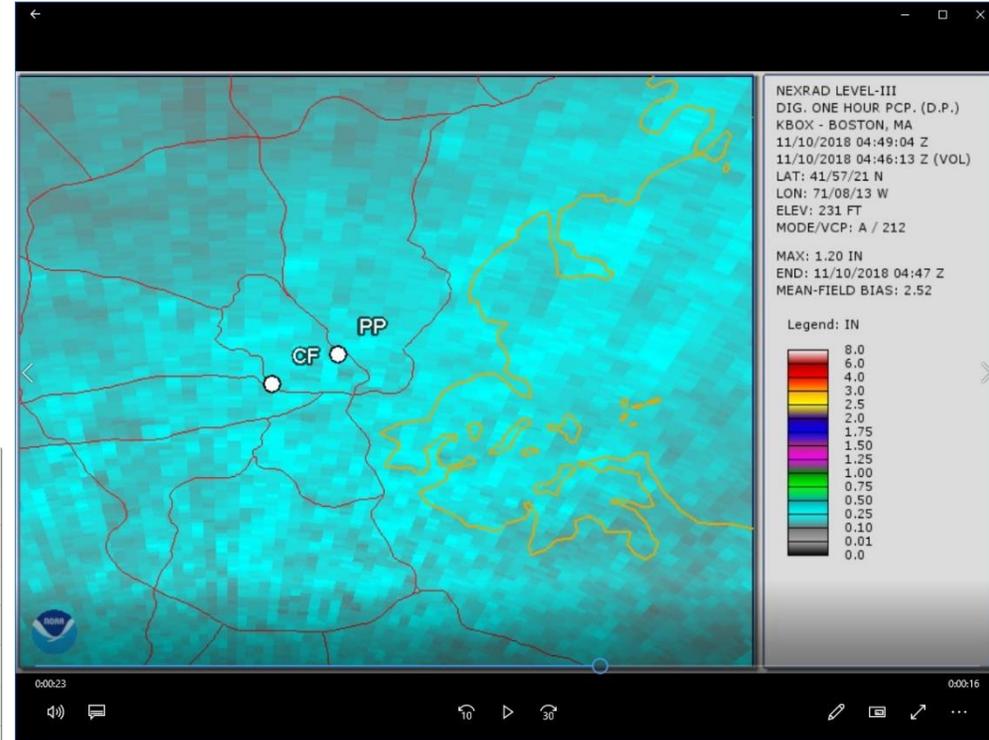


Figure 21. NEXRAD Radar during approximate peak of 11/09/19 storm.

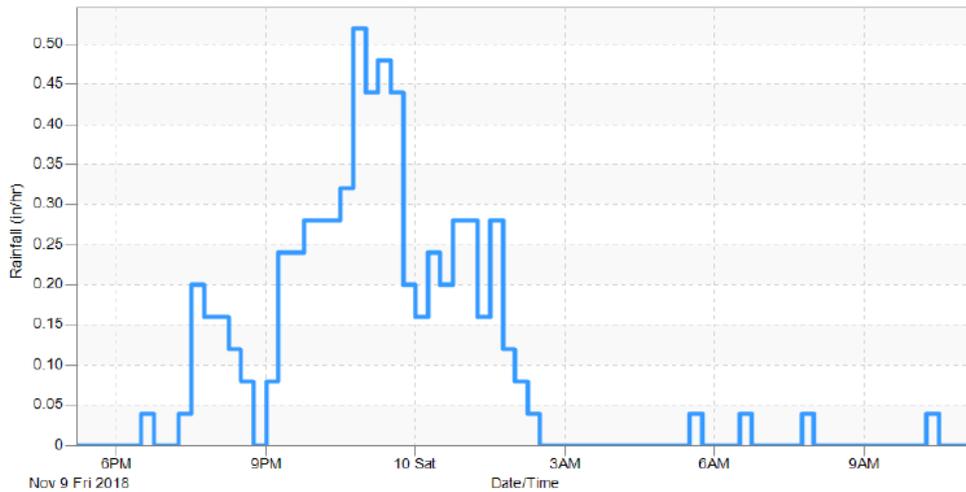
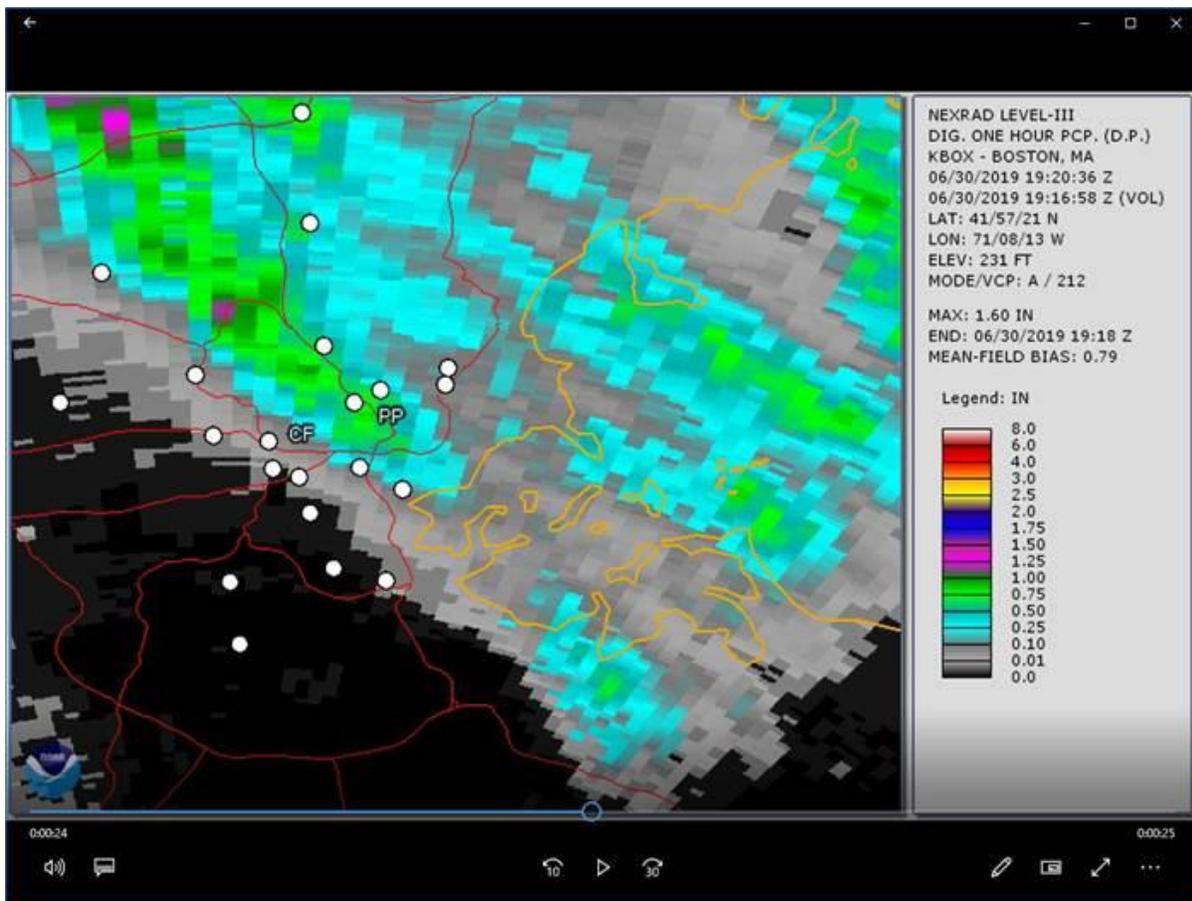


Figure 34. CH-BO-1 November 9, 2018

Figure 20. Rainfall Variation – 11/9/2018 Storm (Meter = 23.59 MG, Model = 24.40)



**Figure 22. Rainfall Variation at Peak of 06/30/2019 Storm**

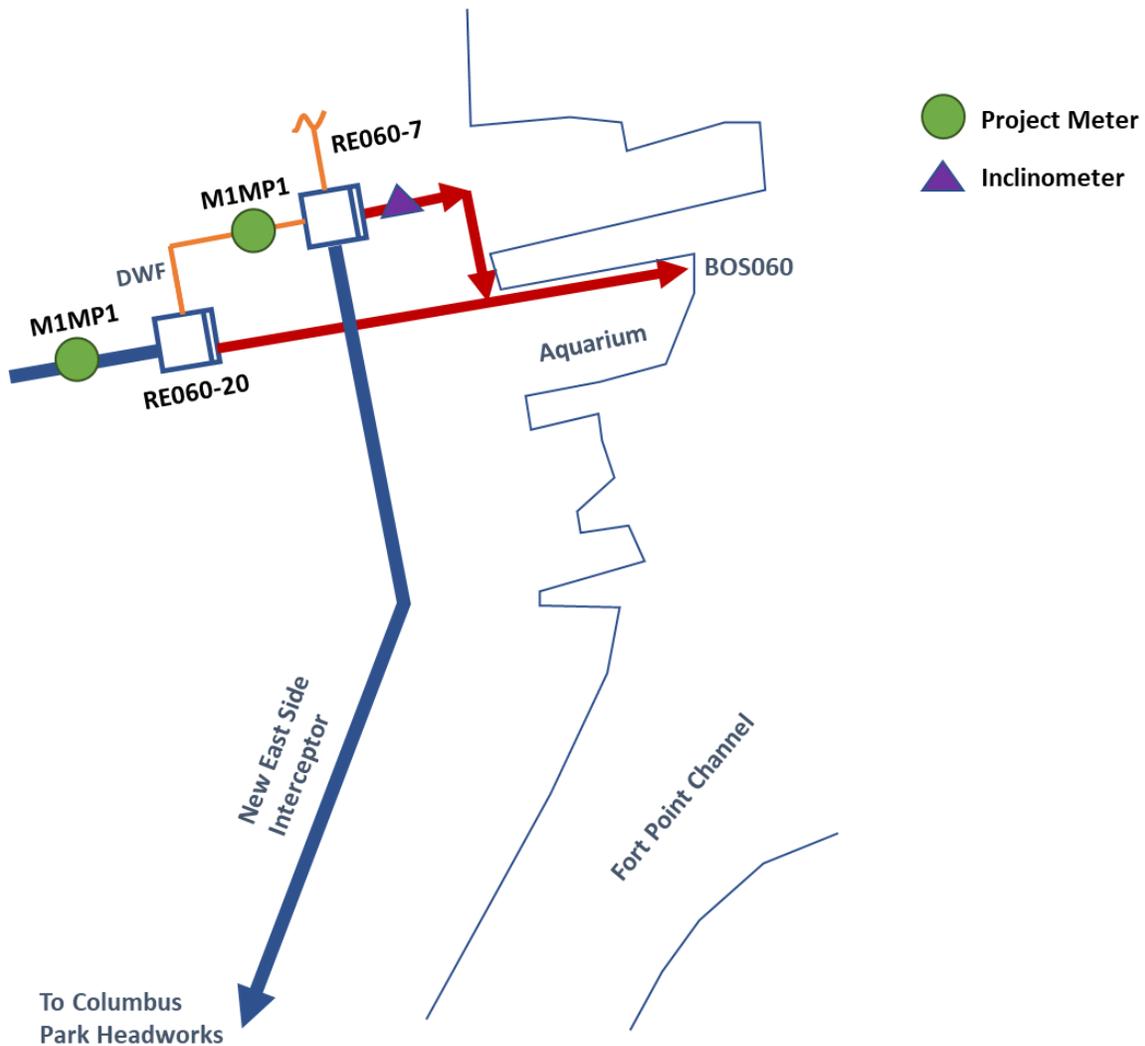
### ***Investigation Conclusions***

Based on the analysis presented above, it is concluded the model can accurately reflect the performance at Prison Point when the rain gages used to represent rainfall in the model accurately reflect actual rainfall that fell throughout the tributary area. The calibration of the model tributary to Prison Point is therefore considered to be good. Where actual rainfall is highly variable spatially, and may not be accurately reflected by the available rain gage data, the model may not represent performance at Prison Point as well. However, CSO activations are being evaluated against the Typical Year that is applied uniformly across the system. CSO activations match well for storms where the rainfall was uniform throughout the system. Therefore the model is adequately calibrated for use in post-monitoring evaluations.

**BOS060: RE060-7**

***Regulator Information***

Regulator RE060-7 is located at the upstream end of the New East Side Interceptor (Figure 23). This regulator receives combined sewer flow from the DWF connection from regulator RE060-20. Outfall BOS060 receives overflows from both RE060-7 and RE060-20. Project flow meters were installed on the influent line to RE060-20, and on the influent line to RE060-7 from RE060-20. An inclinometer was installed on the tidegate immediately downstream of RE060-7.



**Figure 23. Schematic of Regulator 060-7**

***Reason for Further Investigation***

The model was thought to be under predicting volume and activation frequency for the April-December, 2018 calibration period, and under predicting volume for the January-June 2019 period, as shown in Table 17.

**Table 17. Comparison of Model vs. Meter for RE060-7**

	<b>April 15- December 31, 2018</b>			
	<b>Modeled (Orig. Calib.)</b>		<b>Metered</b>	
<b>Regulator</b>	<b>Activation Frequency</b>	<b>Volume (MG)</b>	<b>Activation Frequency</b>	<b>Volume (MG)</b>
060-7	5	0.28	9	4.22
	<b>January 1-June 30, 2019</b>			
	<b>Modeled (Orig. Calib.)</b>		<b>Metered</b>	
<b>Regulator</b>	<b>Activation Frequency</b>	<b>Volume (MG)</b>	<b>Activation Frequency</b>	<b>Volume (MG)</b>
060-7	2	0.08	2	0.32

***Regulator-Calibration Investigation***

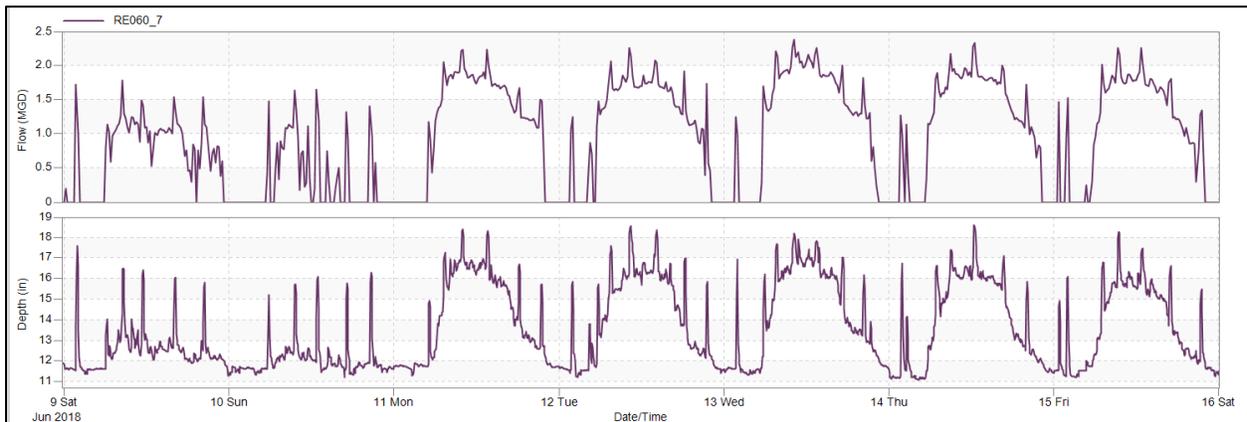
As shown in Table 17, during the initial calibration process, the metered volume for RE060-7 was reported to be 4.22 MG for the April-December 2018 period, and thus it appeared that the modeled volume was noticeably under-predicted. However, upon further review of the meter data, an issue was discovered with both the methodology of the overflow volume calculation, and the trigger elevation. When those issues were resolved, the metered activations and volumes for the April to December 2018 and January to June 2019 period went down, as shown in Table 18.

To further improve the calibration at RE060-7, the configuration of the connection between the regulator and the interceptor was revised to better reflect the physical configuration of the regulator. The model had previously represented the interceptor connection as a pipe, but the actual connection is through an opening in the wall of the regulator. This opening functions as an orifice, so the model was revised to remove the old pipe connection and replace it with an orifice. With this change, the revised model predictions relative to the meter data are shown in Table 18.

**Table 18. Summary of Impacts of Calibration Changes to Activations and Volume at RE060-7**

April 15- December 31, 2018					
Metered (Updated)		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
4	0.98	5	0.28	6	0.68
January 1-June 30, 2019					
Metered (Updated)		Modeled (Original Calibration)		Modeled (Revised Calibration)	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
1	0.09	2	0.08	1	0.49

As a separate issue for RE060-7, the meter data for the influent flow into RE060-7 showed a recurring pattern of flow and depth spikes during dry weather. These spikes were not clearly apparent during wet weather, but they may have been masked by the wet weather flows. The specific pattern of the spikes is irregular, and is suspected to be related to the discharge of localized dewatering pumps. Figure 24 shows an example of the spikes occurring during a dry weather period.



**Figure 24. Metered Dry Weather Flow at RE060-7 Influent**

As indicated in Figure 24, during periods of low dry weather flow (weekends, evenings), the magnitude of the flow spikes is about 1.5 MGD, and the depth spike is about 4-5 inches. During peak dry weather flow periods, the magnitude of the flow spike is about 0.5 MGD and the depth spike about 2 inches. Based on the meter depth versus time plots for storms where the meter indicated an overflow occurred, the measured water surface was generally high enough over the trigger elevation that the impact of these flow spikes was not likely significant in terms of causing the overflow. MWRA has obtained dewatering pump discharge data that may shed more light on the location, capacity and timing of the dewatering flows. However, it is not anticipated that this flow data would significantly affect the wet weather calibration at RE060-7.

***Investigation Conclusions***

Based on the revised configuration of the regulator in the model and the revised metered volumes, the model now slightly over-predicts activations and volumes in the April-December 2018 calibration period, while slightly overpredicting the volume in the January-June 2019 period. Given the relatively small differences in activations and volumes, the model is considered to be adequately calibrated for evaluation of CSO performance.

**MWR003*****Regulator Information***

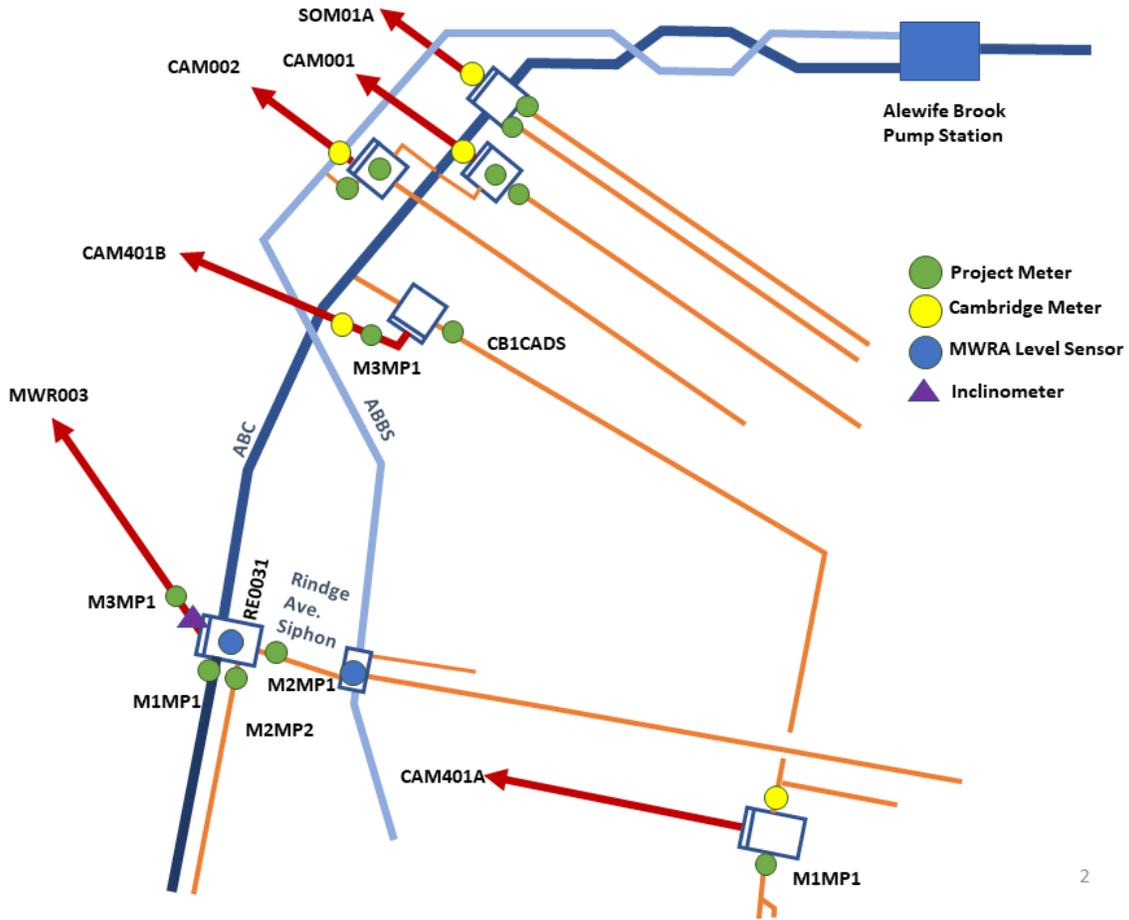
The MWR003 regulator structure (RE031) is situated directly on the MWRA's Alewife Brook Conduit (ABC). It receives flow collected from parts of Cambridge and Belmont by the ABC, as well as overflow from MWRA's Rindge Avenue Siphon, which provides relief for MWRA's Alewife Brook Branch Sewer (ABBS) and City of Cambridge's Rindge Avenue Sewer at MWRA internal regulator RE032 (Figure 25). Dry weather flow is carried by the ABC to the Alewife Brook Pump station. When the hydraulic grade line in regulator RE031 exceeds the elevation of the top of the weir gate, excess flow is discharged to Alewife Brook. Project flow meters were installed in the three influent lines into the regulator, and in the overflow pipe downstream of the weir gate. An inclinometer was installed on the flap gate on the outfall. The MWRA maintains level elements in the MWR003 regulator, and in the Rindge Avenue siphon chamber. These MWRA level elements are in part used to automatically lower the weir gate for greater system relief in extreme storms.

***Reason for Further Investigation***

The model was predicting a higher activation frequency and volume than the observed metering data for the 2018 monitoring period (Table 19), and as a result was further reviewed. For the January-June 2019 period, activations were not measured by the meter or predicted by the model

**Table 19. Comparison of Model vs. Meter for MWR003**

<b>April 15- December 31, 2018</b>			
<b>Metered</b>		<b>Modeled (Original Calibration)</b>	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
0	0	2	0.36
<b>January 1-June 30, 2019</b>			
<b>Metered</b>		<b>Modeled (Original Calibration)</b>	
Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
0	0	0	0.00



2

**Regulator Calibration Investigation**

**Figure 25. Schematic of Alewife System**

MWR003 is hydraulically interconnected to outfalls SOM01A and CAM002 through the ABC. In early 2019, physical changes were implemented at the regulators associated with these outfalls which could affect flows in the ABC and the hydraulics at MWR003. At SOM01A, a structure that could potentially impede flow into the orifice connection to the ABC was removed, and a plate restricting the size of the orifice was also removed. At CAM002, a plate blocking a connection between the regulator and the ABC was removed. These actions would allow more flow into the ABC from the SOM01A and the CAM002 regulators.

The model calibration for the April-December 2018 period, prior to the implementation of the changes at SOM01A and CAM002, overpredicted the activation frequency and volume at MWR003. No activations at MWR003 were measured by the meters or predicted by the model for the January 1 to June 30, 2019 period. Since no activations were predicted or modeled after the period when the changes were made at SOM01A and CAM002, the calibration of meter to model discharges after those

changes cannot be confirmed at this time. Preliminary meter data indicate that two activations occurred at MWR003 in the late summer and early fall of 2019, but the model has not yet been set up to run for that period. Rainfall, SCADA and tide data have recently been obtained for the July-December 2019 period, so the next step for the MWR003 model calibration is to run the model for that period and evaluate the results.

Analysis of the data from the April-December 2018 period showed that the model was overpredicting the hydraulic grade line in the ABC at the MWR003 regulator structure. Potential causes of the higher hydraulic grade line would include either too much flow into the regulator, too much headloss in the interceptor downstream, incorrect representation of the operation of the Alewife Brook Pump Station, or a combination of these issues. The operation of the Alewife Brook Pump station was reviewed for the two storm events where the model predicted activations at MWR003. The facility operations were found to be consistent with the model representation, so variations in the operations of Alewife Brook Pump Station did not appear to be causing the two modeled activations.

In reviewing modeled versus metered flows into the MWR003 regulator, the model did not appear to be consistently over-predicting the flows. Reducing the upstream flows caused the model to under-predict the influent flows compared to the meters. The next step was to investigate the modeled roughness of the downstream sections of the ABC. The model had Manning's n values ranging from 0.015 to 0.020 for the ABC, and from 0.013 to 0.020 for the ABBS. As a sensitivity test, the model was run with the Manning's n for both the ABC and ABBS decreased to a uniform 0.015, and again with the Manning's n reduced to a uniform 0.013. The model still predicted two activations with the Manning's n at 0.015, but only one activation with the Manning's n of 0.013.

Although lowering the Manning's n of the interceptors appeared to improve the calibration at MWR003 for the April-December 2018 period, it is unclear what the effect would be on the 2019 period after the physical changes at SOM01A and CAM002 were implemented. In particular, it is unclear whether the model would still predict the two metered activations that occurred after July 2019. Because of the physical changes to the system that occurred in early 2019, the calibration of MWR003 cannot be considered complete until the model can be assessed for the late summer/early fall 2019 period where the meter indicated that activations occurred.

### ***Investigation Conclusions***

The model needs to be assessed against meter data from late summer/early fall 2019 in order to check the calibration of the physical changes that were implemented in early 2019.

## Attachment B

**Attachment B**  
**Meter and Model CSO Activation and Volume Estimates**  
**April 15, 2018 - December 31, 2018 and January 1 - June 30, 2019**

Outfall	Regulator	Level Only	Meter Removed 3/1/19	April 15, 2018 - December 31, 2018				January 1, 2019 - June 30, 2019			
				Model		Meter		Model		Meter <sup>3</sup>	
				Activation Frequency	Volume (MG)	Activation Frequency	Volume <sup>2</sup> (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume <sup>2</sup> (MG)
<b>Alewife Brook</b>											
CAM001	RE-011	Y		2	0.01	3		0	0.00	0	
CAM002	RE-021			4	0.63	4		0	0.00	1	
MWR003	RE-031			2	0.47	0	0.00	0	0.00	0	0.00
CAM401A	RE-401			15	4.92	18		2	0.63	7	
CAM401B	RE-401B			3	0.22	3	0.00	1	0.00	0	0.00
SOM001A	RE-01A			16	10.53	14	14.64	0	0.00	2	0.67
<b>Upper Mystic River</b>											
SOM007A/MWR205A		Y		12	35.78	15		3	4.41	5	
<b>Mystic/Chelsea Confluence</b>											
MWR205 (Somerville Marginal Facility)				40	99.64	30	102.20	25	34.17	12	34.89
BOS013	RE013-1		Y	19	1.03	14	0.51	0	0.00	0	0.00
BOS014	RE014-2		Y	19	2.23	11	2.25	0	0.00	0	0.00
BOS017	RE017-3		Y	10	0.46	8	0.74	1	0.03	0	0.00
CHE003	RE-031	Y		0	0.00	0	0.00	0	0.00	0	0.00
CHE004	RE-041			10	1.63	19	1.79	4	1.09	13	0.29
CHE008	RE-081			20	5.06	19	3.46	7	2.76	8	0.87
<b>Upper Inner Harbor</b>											
BOS009	RE009-2		Y	28	0.77	14	0.40	1	0.00	1	0.06
BOS010	RE010-2		Y	10	1.87	7	1.35	0	0.00	0	0.00
BOS012	RE012-2		Y	19	1.93	12	1.15	0	0.00	0	0.00
BOS019	RE019-2	Y		2	0.20	4		0	0.00	2	
BOS057	RE057-6			5	1.58	4	2.98	1	0.17	2	0.17
BOS060	RE060-7			6	0.68	4	0.98	1	0.49	1	0.09
	RE060-20			9	0.42	4		1	0.16	1	
MWR203 (Prison Point Facility)				15	254.21	18	271.80	5	70.23	7	118.26
<b>Lower Inner Harbor</b>											
BOS003	RE003-2		Y	2	0.05	3	0.00	0	0.00	0	0.00
	RE003-7		Y	8	1.89	6	0.52	0	0.00	0	0.00
	RE003-12			31	17.29	30	19.91	11	9.29	18	11.33
BOS004	RE004-6		Y	7	0.01	6	0.10	0	0.00	0	0.00
BOS005	RE005-1	Y		0	0.00	0	0.00	0	0.00	0	0.00
<b>Fort Point Channel</b>											
BOS062	RE062-4		Y	14	1.23	11	0.11	0	0.00	0	0.00
BOS064	RE064-4		Y	2	0.05	2	0.20	0	0.00	0	0.00
	RE064-5	Y	Y	7	0.06	5		0	0.00	0	0.00
BOS065	RE065-2	Y		12	0.42	10		2	0.01	4	
BOS068	RE068-1A	Y	Y	1	0.00	1		0	0.00	0	0.00
BOS070/DBC	RE070/8-3			11	1.71	10	2.14	4	0.34	3	0.33
	RE070/8-6	Y		1	0.00	1		0	0.00	0	0.00
	RE070/8-7	Y		10	0.20	7		2	0.02	2	
	RE070/8-8	Y		1	0.00	1		0	0.00	0	
	RE070/8-13	Y		1	0.00	0		0	0.00	1	
	RE070/8-15	Y		2	0.00	2		0	0.00	0	0.00
	RE070/9-4			11	1.47	12	2.25	4	0.06	5	0.43
	RE070/10-5			3	0.20	2	0.31	0	0.00	1	0.01
	RE070/7-2			25	2.13	25	1.81	11	0.01	7	0.04
MWR215 (Union Park Facility)				11	31.42	7	23.88	5	10.01	4	10.30

Outfall	Regulator	Level Only	Meter Removed 3/1/19	April 15, 2018 - December 31, 2018				January 1, 2019 - June 30, 2019			
				Model		Meter		Model		Meter <sup>3</sup>	
				Activation Frequency	Volume (MG)	Activation Frequency	Volume <sup>2</sup> (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume <sup>2</sup> (MG)
BOS070/RCC	RE070/5-3	Y	Y	4	0.17	2		0	0.00	0	0.00
BOS073	RE073-4			3	0.01	1	0.04	0	0.00	0	0.00
<b>Reserved Channel</b>											
BOS076	RE076/2-3			3	0.06	0	0.00	0	0.00	0	0
	RE076/4-3			5	0.41	1	0.12	0	0.00	0	0
BOS078	RE078-1 RE078-2			3	0.08	1	0.11	0	0.00	0	0
BOS079	RE079-3	Y		1	0.00	0		0	0.00	0	0
BOS080	RE080-2B	Y		1	0.00	1		0	0.00	0	0
<b>Upper Charles</b>											
CAM005	RE-051			13	1.06	15		3	0.08	5	
CAM007	RE-071			3	1.03	2	0.14	0	0.00	0	0.00
<b>Lower Charles</b>											
CAM017	CAM017			0	0.09	3		0	0.00	0	0.00
MWR010	RE036-9	Y		0	0.00	0	0.00	0	0.00	0	0.00
	RE037	Y		0	0.00	0	0.00	0	0.00	0	0.00
MWR018	Charles River			3	4.30	2		0	0.00	0	0.00
MWR019	Charles River			3	1.68	2		0	0.00	0	0.00
MWR020	Charles River			3	1.14	2		0	0.00	0	0.00
MWR201 (Cottage Farm Facility)				4	27.26	4	30.14	1	3.60	2	8.44
MWR023	RE046-19	Y		0	0.00	0	0.00	0	0.00	0	0.00
	RE046-30			0	0.00	0	0.00	0	0.00	0	0.00
	RE046-50	Y		0	0.00	0	0.00	0	0.00	0	0.00
	RE046-54	Y		0	0.00	0	0.00	0	0.00	0	0.00
	RE046-55 1	Y		0	0.00	3		0	0.00	0	0.00
	RE046-62A	Y		0	0.00	0	0.00	0	0.00	0	0.00
	RE046-90	Y		0	0.00	1		0	0.00	0	0.00
	RE046-100			4	0.16	6	0.00	1	0.00	1	0.00
	RE046-105			4	0.07	1	0.10	0	0.00	0	0.00
	RE046-381	Y		2	0.14	2		0	0.00	0	0.00
RE046-192	Y		1	0.02	0		0	0.00	0	0.00	

(1) In locations where the meter was installed April 15, 2018, model results presented only for the period April 15 - December 31, 2018.

(2) Meter volume not reported at level only sites.

(3) In locations where the meter was removed March 1, 2019, model results are presented only for the period the meter was installed.

# Attachment C

## ATTACHMENT C

PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR  
BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS <sup>(1)</sup>		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN <sup>(2)</sup>	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
<b>ALEWIFE BROOK</b>								
CAM001	5	0.15	1	0.03	1	0.02	5	0.19
CAM002	11	2.73	0	0.00	0	0.00	4	0.69
MWR003	6	0.67	4	0.79	3 <sup>(3)</sup>	1.62 <sup>(3)</sup>	5	0.98
CAM004	20	8.19	Closed	N/A	Closed	N/A	Closed	N/A
CAM400	13	0.93	Closed	N/A	Closed	N/A	Closed	N/A
CAM401A	18	2.12	2	0.49	10	3.61	5	1.61
CAM401B			5	0.58	6	0.76	7	2.15
SOM001A	10	11.93	4	2.38	6	4.04	3	1.67
SOM001	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM002	0	0.00	Closed	N/A	Closed	N/A	N/A <sup>(4)</sup>	N/A <sup>(4)</sup>
SOM002A	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM003	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
SOM004	5	0.09	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>26.81</b>		<b>4.27</b>		<b>10.05</b>		<b>7.29</b>
<b>UPPER MYSTIC RIVER</b>								
SOM007A/MWR205A	9	7.61	2	1.85	6	4.85	3	3.48
SOM006 <sup>(4)</sup>	0	0.00	Closed	N/A	Closed	N/A	N/A <sup>(4)</sup>	N/A <sup>(4)</sup>
SOM007	3	0.06	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>7.67</b>		<b>1.85</b>		<b>4.85</b>		<b>3.48</b>
<b>MYSTIC/CHELSEA CONFLUENCE</b>								
MWR205 (Somerville Marginal Facility)	33	120.37	22	67.91	39	110.17	39	60.58
BOS013	36	4.40	4	0.13	10	0.74	4	0.54
BOS014	20	4.91	4	0.45	8	1.38	0	0.00
BOS015	76	2.76	Closed	N/A	Closed	N/A	Closed	N/A
BOS017	49	7.16	0	0.00	7	0.44	1	0.02
CHE002	49	2.51	Closed	N/A	Closed	N/A	4	0.22
CHE003	39	3.39	0	0.00	0	0.00	3	0.04
CHE004	44	18.11	1	0.10	7	1.01	3	0.32
CHE008	35	22.35	7	1.83	11	3.81	0	0.00
<b>TOTAL</b>		<b>185.96</b>		<b>70.42</b>		<b>117.55</b>		<b>61.72</b>
<b>UPPER INNER HARBOR</b>								
BOS009	34	3.60	3	0.10	10	0.70	5	0.59
BOS010	48	11.83	6	0.46	9	1.05	4	0.72
BOS012	41	7.90	7	0.55	13	1.34	5	0.72
BOS019	107	4.48	1	0.20	1	0.09	2	0.58
BOS050	No Data		Closed	N/A	Closed	N/A	Closed	N/A
BOS052	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS057	33	14.71	2	0.58	2	1.37	1	0.43
BOS058	17	0.29	Closed	N/A	Closed	N/A	Closed	N/A
BOS060	64	2.90	1	0.02	2	0.16	0	0.00
MWR203 (Prison Point)	28	261.85	17	239.18	17	244.41	17	243.00
<b>TOTAL</b>		<b>307.56</b>		<b>241.09</b>		<b>249.12</b>		<b>246.04</b>
<b>LOWER INNER HARBOR</b>								
BOS003	28	18.09	18	11.80	25	17.41	4	2.87
BOS004	34	3.43	5	0.28	0	0.00	5	1.84
BOS005	4	10.23	0	0.00	0	0.00	1	0.01
BOS006	17	1.21	Closed	N/A	Closed	N/A	4	0.24
BOS007	34	3.93	Closed	N/A	Closed	N/A	6	1.05
<b>TOTAL</b>		<b>36.89</b>		<b>12.08</b>		<b>17.41</b>		<b>6.01</b>
<b>CONSTITUTION BEACH</b>								
MWR207	24	4.00	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>4.00</b>		<b>N/A</b>		<b>N/A</b>		<b>N/A</b>

## ATTACHMENT C

PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR  
BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS <sup>(1)</sup>		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN <sup>(2)</sup>	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
<b>FORT POINT CHANNEL</b>								
BOS062	8	4.15	0	0.00	4	0.97	1	0.01
BOS064	14	0.99	1	0.02	0	0.00	0	0.00
BOS065	11	3.08	1	0.62	3	0.71	1	0.06
BOS068	4	0.62	0	0.00	0	0.00	0	0.00
BOS070								
BOS070/DBC	4	281.62	4	3.30	7	6.21	3	2.19
MWR215 (Union Park)			11	33.85	10	26.30	17	71.37
BOS070/RCC			0	0.00	0	0.00	2	0.26
BOS072	21	3.62	Closed	N/A	Closed	N/A	0	0.00
BOS073	23	4.73	0	0.00	0	0.00	0	0.00
<b>TOTAL</b>		<b>298.81</b>		<b>37.78</b>		<b>34.19</b>		<b>73.89</b>
<b>RESERVED CHANNEL</b>								
BOS076	65	65.94	6	1.19	2	0.22	3	0.91
BOS078	41	14.84	0	0.00	0	0.00	3	0.28
BOS079	18	2.10	0	0.00	0	0.00	1	0.04
BOS080	33	6.21	3	0.08	0	0.00	3	0.25
<b>TOTAL</b>		<b>89.09</b>		<b>1.27</b>		<b>0.22</b>		<b>1.48</b>
<b>NORTHERN DORCHESTER BAY</b>								
BOS081	13	0.32	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS082	28	3.75	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS083	14	1.05	Closed	N/A	Closed	N/A	0 / 25 year	N/A
BOS084	15	3.22	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS085	12	1.31	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS086	80	3.31	0 / 25 year	N/A	0 / 25 year	N/A	0 / 25 year	N/A
BOS087	9	1.27	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>14.23</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>
<b>SOUTHERN DORCHESTER BAY</b>								
BOS088	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS089 (Fox Pt.)	31	87.11	Closed	N/A	Closed	N/A	Closed	N/A
BOS090 (Commercial Pt.)	19	10.16	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>97.27</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>
<b>UPPER CHARLES</b>								
BOS032	4	3.17	Closed	N/A	Closed	N/A	Closed	N/A
BOS033	7	0.26	Closed	N/A	Closed	N/A	Closed	N/A
CAM005	6	41.56	3	1.36	8	0.73	3	0.84
CAM007	1	0.81	2	0.25	2	0.42	1	0.03
CAM009	19	0.19	Closed	N/A	Closed	N/A	2	0.01
CAM011	1	0.07	Closed	N/A	Closed	N/A	0	0.00
<b>TOTAL</b>		<b>46.06</b>		<b>1.60</b>		<b>1.15</b>		<b>0.88</b>
<b>LOWER CHARLES</b>								
BOS028	4	0.02	Closed	N/A	Closed	N/A	Closed	N/A
BOS042	0	0.00	Closed	N/A	Closed	N/A	Closed	N/A
BOS049	1	0.01	Closed	N/A	Closed	N/A	Closed	N/A
CAM017	6	4.72	1	1.26	0	0.00	1	0.45
MWR010	16	0.08	0	0.00	0	0.00	0	0.00
MWR018	2	3.18	0	0.00	2	1.93	0	0.00
MWR019	2	1.32	0	0.00	2	0.57	0	0.00
MWR020	2	0.64	0	0.00	2	0.32	0	0.00
MWR021	2	0.50	Closed	N/A	Closed	N/A	Closed	N/A
MWR022	2	0.43	Closed	N/A	Closed	N/A	Closed	N/A
MWR201 (Cottage Farm)	18	214.10	3	10.50	4	12.43	2	6.30
MWR023	39	114.60	1	0.02	1	0.14	2	0.13
SOM010	18	3.38	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>342.98</b>		<b>11.78</b>		<b>15.39</b>		<b>6.88</b>

## ATTACHMENT C

PRELIMINARY TYPICAL YEAR MODEL SIMULATION RESULTS FOR  
BASELINE 1992 CONDITIONS, 2019 CONDITIONS AND LONG-TERM CSO CONTROL PLAN (LTCP)

Outfall	1992 SYSTEM CONDITIONS <sup>(1)</sup>		2019 SYSTEM CONDITIONS (Before Model Calibration)		2019 SYSTEM CONDITIONS (After Model Calibration)		LONG TERM CONTROL PLAN <sup>(2)</sup>	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
<b>NEPONSET RIVER</b>								
BOS093	72	1.61	Closed	N/A	Closed	N/A	Closed	N/A
BOS095	11	5.37	Closed	N/A	Closed	N/A	Closed	N/A
<b>TOTAL</b>		<b>6.98</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>
<b>BACK BAY FENS</b>								
BOS046	2	5.25	1	1.57	0	0.00	2	5.38
<b>TOTAL</b>		<b>5.25</b>		<b>1.57</b>		<b>0.00</b>		<b>5.38</b>
<b>Total Treated</b>		<b>698</b>		<b>351</b>		<b>393</b>		<b>381</b>
<b>Total Untreated</b>		<b>759</b>		<b>29</b>		<b>52</b>		<b>23</b>
<b>GRAND TOTAL</b>		<b>1457</b>		<b>380</b>		<b>445</b>		<b>404</b>

- (1) 1992 System Conditions include completion of Deer Island Fast-Track Improvements, upgrades to headworks and new Caruso and DeLauri pumping stations.
- (2) From Exhibit B to Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows, as amended by the Federal District Court on May 7, 2008 (the "Second CSO Stipulation").
- (3) Value under further review pending model calibration of Outfall MWR003.
- (4) N/I: Outfall was closed by MWRA Long-Term Control Plan but is not included in Exhibit B to the Second CSO Stipulation.

### STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 19, 2020  
**SUBJECT:** Oxygen Generation Facility Services, Deer Island Treatment Plant  
Solutionwerks, Inc.  
Contract S587

---

**COMMITTEE:** Wastewater Policy & Oversight

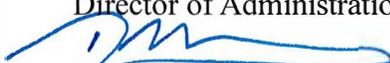
INFORMATION

VOTE

  
Michele S. Gillen

Director of Administration

Ethan Wenger, Deputy Director, Deer Island WWTP  
David Duest, Director, Deer Island WWTP  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

---

### RECOMMENDATION:

To approve the award of Contract S587, Oxygen Generation Facility Services, Deer Island Treatment Plant, to the lowest responsive and eligible bidder, Solutionwerks, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the amount of \$2,220,450, for a contract term of 1,095 calendar days from the Notice to Proceed.

### DISCUSSION:

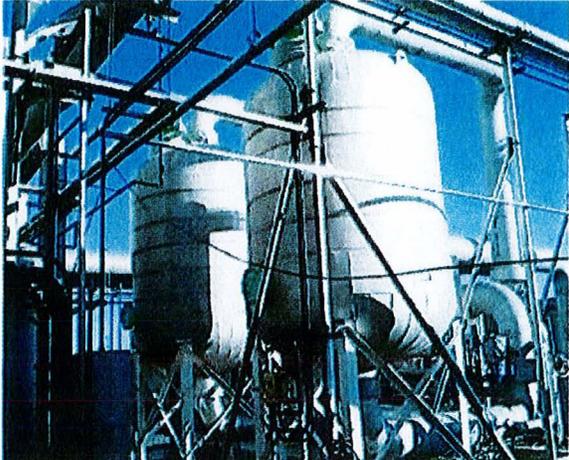
Secondary wastewater treatment at Deer Island employs a pure oxygen activated sludge biological process. A biomass of aerobic aquatic microorganisms is developed and maintained to remove dissolved organics, solids and other undesirable compounds remaining in wastewater after primary treatment. These microorganisms require oxygen to thrive. To minimize the size of the secondary reactors where these microorganisms are cultivated, 97% pure oxygen is used in place of atmospheric air, which contains only 21% oxygen. Large mixers/aerators utilized in the secondary reactors transfer the pure oxygen into the biomass to sustain the microorganisms.

The pure oxygen used in Deer Island's secondary treatment process is produced on site in the Cryogenics "Cryo" Oxygen Generation Plant. The plant is comprised of an air compressor building (which houses two 2,500 hp compressors and two 2,000 hp compressors), and several large integrated internal and external equipment systems (see pictures on Page 2). The total estimated value of the Cryo Plant and all of the associated equipment maintained under this contract is approximately \$30 million.

The Cryo Plant consists of two process trains, individually capable of producing approximately 90-150 tons of 97% pure gaseous oxygen per day via a process known as fractional distillation. This process purifies atmospheric air, liquefies the air below minus 300 degrees Fahrenheit, and then evaporates off the nitrogen component leaving pure oxygen for use in the secondary treatment process. Depending on operating conditions, each train can also produce up to 12 tons per day of liquid oxygen as "excess liquid oxygen" for future use. Any excess liquid oxygen produced during the generation process flows to a transfer tank and then into a 1,000-ton storage tank. Stored liquid oxygen can be vaporized through one of two vaporizers. On average, 120 tons per day of oxygen are required for the wastewater treatment process.



Air Compressor Building with Air Intake Ducts



Two Mole Sieves



Six-Ton Liquid Oxygen (LOX) Transfer Tank



1,000-Ton LOX Storage Tank (in background) and two "Cold Boxes"

Only one process train is typically required to be in operation continuously to meet the oxygen demand of secondary treatment. Occasionally, during short periods of high oxygen demand, both trains might be needed. If a problem arises causing the shutdown of the oxygen generation trains, the 1,000-ton liquid oxygen storage tank can provide enough oxygen for approximately seven days of operation. Startup of an offline Cryo Plant process train can take up to four days to start producing oxygen in sufficient quantities to meet secondary operational needs.

The Cryo Plant is very complex, with unique safety concerns due to the extreme high and low temperatures required to generate liquid oxygen (350°F to -300°F) and the hazards inherent in working with high concentrations of oxygen and nitrogen. There are hundreds of instrumentation and control points, numerous safety valves, and other specialized equipment. The knowledge and experience necessary to keep all of the process monitoring equipment calibrated while continuously operating the facility requires highly trained and skilled technicians.

MWRA requires a service contract with a firm that possesses the expertise necessary to ensure that the Cryo Plant operates safely and reliably at all times. A constant supply of oxygen is necessary for the operation of the wastewater plant and is critical to compliance with Deer Island's National Pollution Discharge Elimination System permit. Operation of the Cryo Plant is also very energy intensive: Cryo is responsible for 10% of Deer Island's total electrical demand. Proper calibration of equipment keeps the process running efficiently, saving thousands of dollars of energy costs annually.

The scope of work under Contract S587 includes two scheduled annual service visits per year (one for each oxygen train), twelve scheduled monthly service visits per year, as-needed training for MWRA staff, emergency and non-emergency on-call assistance, and servicing of ancillary equipment, such as four main air compressors and three air chillers. Allowances have been included for consumable parts, materials, travel, and factory-authorized service technicians. These allowances will only be expended as actual costs are incurred.

During the last year of the prior contract term, one of the 2500 horsepower air compressors began to have mechanical problems. Staff used condition monitoring and other techniques to try to resolve the issue. The last major rebuild on this unit occurred in 2009, after 12 years of operation. After several months of staff and contractor efforts, the unit was sent off-site to the original equipment manufacturer for evaluation and repair in September 2019. Staff originally estimated the work could have been completed under the existing contract, which expires in March 2020. Staff received a preliminary repair estimate in December 2019, just days before bids for the new contract were received. The quote placed the repairs at over \$500,000 with a 22-week completion time, exceeding the scope and term of the existing contract. Staff estimate that a new compressor package would cost well over \$2 million and require 1 to 2 years of lead-time to purchase and install.

Staff are still awaiting the final engineering report from the manufacturer to determine the full extent of this work. Because final negotiations on the extent and cost of the repair are still in progress, it will not be possible to complete the repair under the existing contract. Staff plan

to conduct this overhaul within this upcoming contract pending approval by the Board. Given that the actual repairs will occur early in the new contract term and funding for the repairs are not currently included, staff anticipate a future change order may be required to add funds in specific line items of the new contract to ensure coverage for the anticipated repairs during the new contract term. Three other air compressors were available to ensure sufficient capacity for oxygen production.

**Procurement Process**

Contract S587 was publicly advertised in the Boston Herald, Banner Publications, El Mundo, and the Central Register as a non-professional services contract. The bidding documents were made available for public downloading on MWRA’s e-procurement system (Event #4068). A pre-bid site visit and walkthrough was conducted, at which there were no attendees. Bids were opened on December 12, 2019. One bid was received as follows:

<b>CONTRACTOR</b>	<b>BID PRICE</b>
Solutionwerks, Inc.	\$2,220,450 <sup>1</sup>
<i>Engineer’s Estimate</i>	<i>\$2,224,950</i>

Prior to the bid release, staff notified several companies including the previous bidders (one of which was the incumbent). Following the bid opening, staff attempted to contact interested companies to determine why they did not bid on the project. Several companies indicated they were too busy at this time. Others indicated the work was outside their expertise.

The value of the previous contract, S562, is \$1,929,750. Staff increased the Engineer's Estimate for Contract S587 to \$2,224,950 to provide for higher parts and manufacturer’s representative allowances required to support the aging facility. Staff had planned to repair the main air compressor under the existing contract (S562), and so did not add funds expressly for that purpose to the new contract (S587). Solutionwerks' bid, at \$2,220,450, is just under the Engineer's Estimate. Staff reviewed Solutionwerks' bid and determined that it is reasonable, complete, and complies with all of the requirements of the bid specifications.

References were checked and found to be favorable. As discussed above, Solutionwerks has successfully performed this work for MWRA under prior contracts. Staff have been satisfied with the firm's past performance on the current and previous contracts. Staff are of the opinion that Solutionwerks possesses the skill, ability, and integrity necessary to perform the work under this contract and is qualified to do so. Therefore, staff recommend the award of this contract to Solutionwerks as the lowest responsive bidder.

---

<sup>1</sup> This bid amount has been adjusted to address an obvious bidder error. Procurement staff spoke with representatives from Solutionwerks Inc. and confirmed that they had mistakenly entered a unit price instead of a Lump Sum amount in Bid Item 1.

**BUDGET/FISCAL IMPACT:**

There are sufficient funds available for the first portion of this contract in Deer Island's FY20 Current Expense Budget. Appropriate funding will be included in subsequent CEB requests for the remaining term of the contract.

**MBE/WBE PARTICIPATION:**

There were no MBE/WBE participation requirements established for this contract due to the limited opportunities for subcontracting.

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** February 19, 2020  
**SUBJECT:** Siphon and Junction Structure Rehabilitation  
Design and Engineering Services During Construction  
Kleinfelder Northeast, Inc.  
Contract 6224



**COMMITTEE:** Wastewater Policy & Oversight

     INFORMATION

  X   VOTE

  
Michele S. Gillen

Director of Administration



David W. Coppes, P.E.

Chief Operating Officer

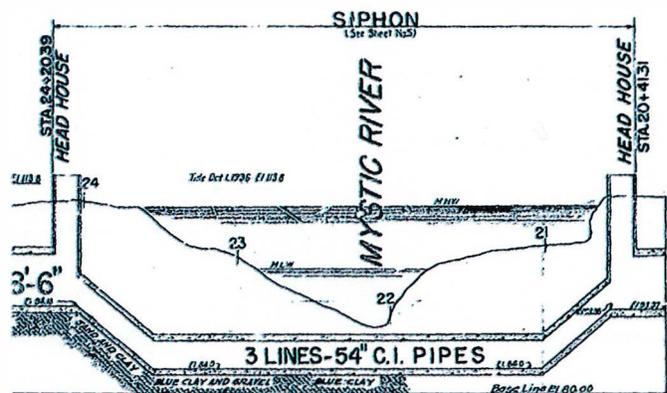
John P. Colbert, P.E., Chief Engineer  
David Parker, Project Manager  
Preparer/Title

### RECOMMENDATION:

To approve the recommendation of the Consultant Selection Committee to award Contract 6224, Siphon and Junction Structure Rehabilitation, Design and Engineering Services During Construction, to Kleinfelder Northeast, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in an amount Not to Exceed \$2,854,552.34, for a contract term of 54 months from the Notice to Proceed.

### DISCUSSION:

Siphon chambers are located at the upstream and downstream ends of depressed sewers that are constructed to avoid obstructions in sewer alignments such as rivers and subsurface utilities. Upstream siphon chambers ensure proper wastewater elevation so that the depressed sewer flows under pressure. Downstream chambers provide transitions between depressed sewers and downstream gravity sewers. Junction structures are facilities at which flows from sewers are redirected to converge with or receive flows from other sewers. Within the MWRA system, there are 171 siphon and junction structures. Most of these structures are located in or adjacent to wetland areas that present constraints on design, permitting and construction to mitigate environmental impacts.



Typical siphon profile

In 2019, staff investigated siphon chamber and junction structure sites located throughout MWRA's collection system. Staff used updated inspection information as well as prior consultant reports to develop a priority list of siphon chamber and junction structure improvements. In addition to structural rehabilitation and/or access improvements, priority was also given to siphon chambers and junction structures requiring flood protection (100 year storm + 2.5 feet). MWRA has prioritized the first 41 siphon chambers and junction structures for inclusion in this contract based on the structures risk of flooding, structural condition, and need for improved access. These modifications will limit the inflow into the MWRA system during flood conditions. Additional siphon structures are being upgraded by in-house staff, and a Phase 2 design for 40 additional structures is planned for the future.



Current means of access



Flooded siphon chamber

### **This Contract:**

Contract 6224 includes design and engineering services during construction for Siphon and Junction Structure Rehabilitation. Preliminary design activities include wetland flagging, survey and mapping at each structure site and along easements, internal and external inspection of each structure and evaluations to address structural condition, flood protection, odor, safety issues, and preparation of recommendations. The contract includes inspection of each siphon structure site to assess if there is adequate access for both construction and maintenance, and preparation of easement plans for both construction and permanent use. Permit requirements will be identified and coordinated with the 17 communities where the structures are located, as well as state agencies and property owners.

Final design will include preparation of construction contract plans, specifications, cost estimates and bidding assistance as well as preparation of draft and final permit applications, and additional information as required by the permitting agencies. Potential permits and approvals include: Massachusetts DEP NOIs issued and administered by the local Conservation Commissions; MEPA ENF; Chapter 91 License; Army Corps of Engineers' Section 404 General Permit; Massachusetts DEP Section 401 Water Quality Certification; Massachusetts CZM Federal Consistency Review; DCR Access; and MASSDOT Access.

Engineering Services During Construction (ESDC) includes administration, review of contractor submittals and requests for information, assistance with change orders, and preparation of record drawings. ESDC services will be provided during construction of the project through completion, final acceptance, and the one-year warranty period. Resident Engineering/Inspection services are not included in this contract, but will be procured separately at a later date.

The project schedule includes a 24-month design and permitting phase and an 18-month construction phase. The consultant contract duration will be 54 months, including the one-year warranty period. The number of distinct structure locations throughout a large geographic area, multiple communities, and time to obtain the required permits and construction easements results in a longer design phase than construction phase.

The anticipated construction work includes improved access to sites (modify and/or repair existing surface easement conditions or acquire new surface easements), improved ingress to the structures (hatches, manholes, safety), protection from the 100 year storm +2.5 feet flood, structural repairs to the interior and exterior of structures, and in some locations odor control additions to the structure. Repair needs vary considerably among the 41 structures.

**Procurement Process**

On October 29, 2019, MWRA issued a one-step Request for Qualifications Statements/Proposals (RFQ/P) that was publicly advertised in the Central Register, Boston Herald, Banner Publication and El Mundo; and directly solicited firms by email. Twenty-one firms received copies of the RFQ/P. The RFQ/P included the following evaluation criteria and points: Cost (25 points); Qualifications and Key Personnel (25 points); Technical Approach, Capacity/Organization and Management Approach (23 points); Experience/Past Performance on Similar Non-Authority Projects and Past Performance on Authority Projects (22 points); MBE and WBE Participation (5 points).

On December 16, 2019, MWRA received one proposal, from Kleinfelder Northeast, Inc. Staff surveyed those firms that took out the RFQ/P but did not submit a proposal. The firms reported a variety of factors, including: lack of qualified staff available to perform the scope; proposing on other current, competing RFQ/Ps; and an inability to find a complementary “teaming” arrangement. As a result, Procurement determined the competition was adequate, and the selection committee proceeded to evaluate the sole proposal received. The following table represents the cost and level of effort proposed:

Proposer	Proposed Cost	Proposed Hours
<i>Engineer’s Estimate</i>	<i>\$2,124,850.00</i>	<i>13,669</i>
Kleinfelder	\$2,854,552.34	20,651

The Selection Committee met on January 14, 2020 to evaluate and rank the proposal. The results are presented below.

Proposer	Total Final Score	Order of Preference* Points	Ranking
Kleinfelder	323	4	1

\*Order of Preference represents the sum of individual Selection Committee members' rankings where the firm receiving the highest number of points is assigned a "1"; the firm receiving the next highest number of points is assigned a "2," and so on.

Kleinfelder's proposal included highly qualified personnel who have extensive and relevant experience in the required fields of structural inspection, structural engineering and permitting. Kleinfelder presented a multi-disciplinary team, including subconsultants with whom the firm has successfully worked in the past. In addition to positive references for performance on past Authority projects and external structural rehabilitation projects, all references indicated they would rehire the firm. Kleinfelder also demonstrated a full understanding of the project requirements as evidenced by the many site-specific challenges presented in its Technical Approach and the manner in which it will achieve the project goals. The proposal was clearly presented, and the team has the capacity, organization and management approach necessary to successfully complete the project.

Kleinfelder's cost was approximately \$729,702.34 more than the Engineer's Estimate, or 34% higher; but for this price the firm included 20,651 hours – or 51% more hours than the 13,669 hours in the Engineer's Estimate. Kleinfelder's proposal was excellent and reflected the firm's experience with complex rehabilitation projects on varied sites and demonstrated its thorough understanding of the scope of work for this project.

The Kleinfelder proposal cost is higher than the Engineer's Estimate due to the firm's assessment of the large number of sites (41 structures), locations (31 in 17 communities), and varying site conditions. In addition the use of subconsultants for survey, easement, wetland assessment, permitting, hazardous soil assessment, siphon chamber condition assessment and corrosion protection, and estimating account for 40% of level of effort for the proposal.

Specifically, Kleinfelder's proposal includes a greater level of effort for field investigation/structure inspection, permits/environmental assessment, survey/mapping and preliminary design work than the Engineer's Estimate. Considerations by Kleinfelder in estimating its proposed level of effort included difficult access to the structures/sites; extensive easement survey with numerous recordings at the registry of deeds; and more extensive cleaning of structures before they can be inspected and tested.

The Kleinfelder proposal also indicates greater level of effort for wetlands delineation and field assessments are needed, as well as additional evaluations of resource areas for local wetlands permitting. There will also be additional effort required to support potential analyses, evaluations and proposed mitigation associated with local permits for construction as well as post-construction permit closeout work required in local wetlands permitting.

Based on the unanimous vote of the Selection Committee, staff recommend the award of Contract 6224 to Kleinfelder in the amount not to exceed \$2,854,552.34.

**BUDGET/FISCAL IMPACT:**

The FY20 Capital Improvement Program includes a budget of \$1,584,200 for Contract 6224; the recommended contract amount is \$2,854,552.34 or \$1,270,352.34 over budget. This amount will be covered within the five-year CIP spending cap. The Proposed FY21 CIP includes \$2,041,450 for Contract 6224.

**MBE/WBE PARTICIPATION:**

The minimum MBE and WBE participation requirements for this project were established at 7.18% and 5.77% respectively. Kleinfelder has committed to 16.63% MBE and 11.99% WBE participation.

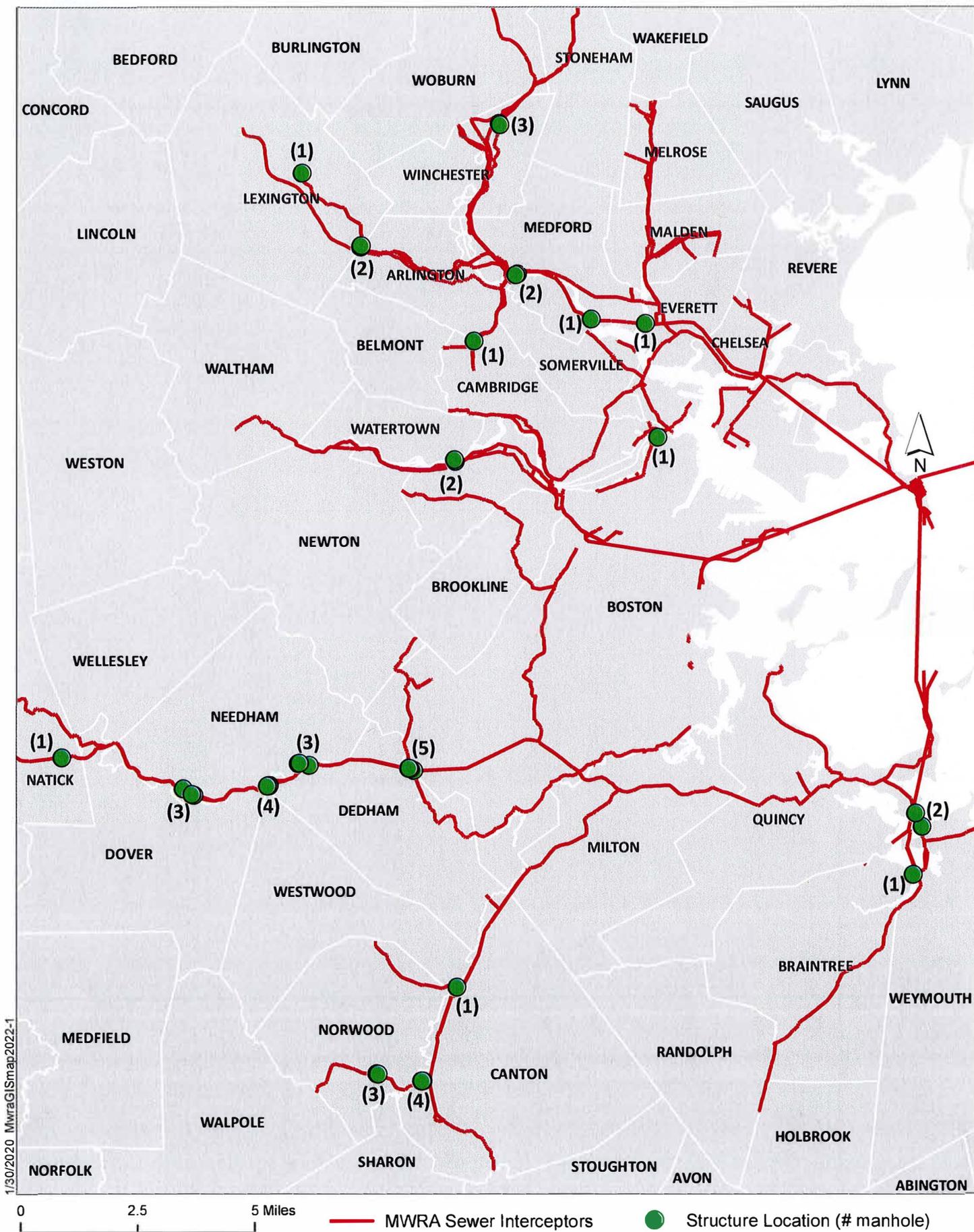
**ATTACHMENT:**

Figure 1 – Siphon/Junction Structure Locations.



# FIGURE 1

## SIPHON / JUNCTION STRUCTURE REHABILITATION - PHASE I



1/30/2020 MvraGISmap2022-1

0 2.5 5 Miles

— MWRA Sewer Interceptors ● Structure Location (# manhole)



# MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard  
100 First Avenue, Building 39  
Boston, MA 02129

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
Fax: (617) 788-4899  
TTY: (617) 788-4971

## BOARD OF DIRECTORS' MEETING

*Chair:* K. Theoharides  
*Vice-Chair:* J. Carroll  
*Secretary:* A. Pappastergion  
*Board Members:*  
C. Cook  
K. Cotter  
P. Flanagan  
J. Foti  
B. Peña  
H. Vitale  
J. Walsh  
J. Wolowicz

to be held on

Wednesday, February 19, 2020

Location: 100 First Avenue, 2nd Floor  
Charlestown Navy Yard  
Boston, MA 02129

Time: 1:00 p.m.

## AGENDA

### I. APPROVAL OF MINUTES

### II. REPORT OF THE CHAIR

- A. Annual Meeting: Election and Appointment of MWRA Officers and Committee Assignments

### III. REPORT OF THE EXECUTIVE DIRECTOR

- A. MWRA Extraordinary Service Awards

### IV. BOARD ACTIONS

#### A. Approvals

1. Approval of the 2020 Affirmative Action Plan (ref. P&C A.1)
2. PCR Amendments – February 2020 (ref. P&C A.2)
3. Appointment of Work Coordination Center Manager, Operations (ref. P&C A.3)
4. Transmittal of the FY2021 Proposed Current Expense Budget to the MWRA Advisory Board (ref. AF&A B.1)
5. Appointment of Proxy for Fore River Railroad Corporation (ref. AF&A B.2)

#### B. Contract Awards

1. Actuarial Services Related to Compliance with GASB No. 74 and 75: The Segal Company, Inc., Contract F254 (ref. AF&A C.1)

**B. Contract Awards (continued)**

2. Fuel Storage and Day Tank Systems Replacement at the Gillis and Lexington Street Pumping Stations and Hayes Pump Station: NRC East Environmental Services, Inc., Contract 7554 (ref. AF&A C.2)
3. Security Equipment Maintenance and Repair Services: Viscom Systems, Inc., Contract EXE-043 (ref. AF&A C.3)
4. Oxygen Generation Facility Services, Deer Island Treatment Plant: Solutionwerks, Inc., Contract S587 (ref. WW B.1)
5. Siphon and Junction Structure Rehabilitation, Design and Engineering Services During Construction: Kleinfelder Northeast, Inc., Contract 6224 (ref. WW B.2)

**V. OTHER BUSINESS**

**VI. CORRESPONDENCE TO THE BOARD**

**VIII. ADJOURNMENT**

## **MASSACHUSETTS WATER RESOURCES AUTHORITY**

### Meeting of the Board of Directors

January 15, 2020

A meeting of the Board of Directors of the Massachusetts Water Resources Authority was held on January 15, 2020 at the Authority headquarters in Charlestown. Vice Chair Carroll presided. Present from the Board were Ms. Wolowicz and Messrs. Cook, Cotter, Foti, Pappastergion, Peña, Vitale and Walsh. Chair Theoharides and Mr. Flanagan were absent. Among those present from the Authority staff were Frederick Laskey, Executive Director, Carolyn Francisco Murphy, General Counsel, David Coppes, Chief Operating Officer, Carolyn Fiore, Deputy Chief Operating Officer, Thomas Durkin, Director of Finance, Michele Gillen, Director of Administration, Kathleen Murtagh, Director of Tunnel Redundancy and Assistant Secretaries Ria Convery and Kristin MacDougall. Vandana Rao, EEA, was also in attendance. The meeting was called to order at 1:08 p.m.

### APPROVAL OF NOVEMBER 20, 2019 MINUTES

Upon a motion duly made and seconded, it was

Voted: to approve the minutes of the Board of Directors' meeting of November 20, 2019 as presented and filed with the records of the meeting.

### REPORT OF THE EXECUTIVE DIRECTOR

Mr. Laskey noted that MWRA will participate in the Massachusetts Municipal Association trade show on January 24 and 25, 2020. He reported that MWRA reached a new record single day low for water usage on December 25, 2019. He also updated the Board on the HEEC Cable Project, PFAS monitoring and CSO Control court reporting. He also announced that MWRA's Hatchery Pipeline and Hydro project received a Silver Award from the American Council of Engineering Companies. Finally, he reminded Board members that the Annual Meeting of the Board will be held at the February 19, 2020 Board of Directors meeting.

APPROVALS

PCR Amendments – January 2020

Upon a motion duly made and seconded, it was

Voted: to approve amendments to the Position Control Register (PCR) as presented, effective on a date determined by the Executive Director. (ref. P&C A.1)

Appointment of Business Systems Analyst III, MIS Department

Upon a motion duly made and seconded, it was

Voted: to approve the appointment of Mr. John Rothermel to the position of Business Systems Analyst III (Unit 6, Grade 12), in the MIS Department, at an annual salary of \$117,748.43, commencing on a date to be determined by the Executive Director. (ref. P&C A.2)

Appointment of Manager of Metering and Monitoring, Operations

Upon a motion duly made and seconded, it was

Voted: to approve the appointment of Mr. Michael Greeley to the position of Manager of Metering and Monitoring (Non-Union, Grade 14), in the SCADA, Metering and Monitoring Department, at an annual salary of \$133,000, commencing on a date to be determined by the Executive Director. (ref. P&C A.3)

Appointment of Associate General Counsel

Upon a motion duly made and seconded, it was

Voted: to approve the appointment of Angela D. Atchue to the position of Associate General Counsel, Law Division (Non-Union, Grade 15) at an annual salary of \$139,900, commencing on a date to be determined by the Executive Director. (ref. P&C A.4)

Transmittal of the FY21 Proposed Capital Improvement Program to the MWRA Advisory Board

Upon a motion duly made and seconded, it was

Voted: to approve the transmittal of the FY21 Proposed Capital Improvement Program to the Advisory Board for its 60-day review and comment period. (ref. AF&A B.1)

### CONTRACT AWARDS

#### Janitorial Services at the Deer Island Treatment Plant: Star Building Services, Inc. Bid WRA-4775

Upon a motion duly made and seconded, it was

Voted: to approve the award of Contract WRA-4775, Janitorial Services at the Deer Island Treatment Plant to Star Building Services, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in an amount not to exceed \$1,589,300, for a contract term of three years. (ref. WW A.1)

#### Supply and Delivery of Hydrogen Peroxide to the Deer Island Treatment Plant, Brenntag Northeast, LLC, Bid WRA-4784

Upon a motion duly made and seconded, it was

Voted: to approve the award of Purchase Order Contract WRA-4784, for the supply and delivery of hydrogen peroxide to the Deer Island Treatment Plant to the lowest responsive bidder, Brenntag Northeast, LLC, and to authorize the Executive Director, on behalf of the Authority, to execute said purchase order contract in an amount not to exceed \$1,734,300 for a period of two years, from April 1, 2020 through March 31, 2022. (ref. WW A.2)

#### Nut Island Headworks Odor Control and HVAC Improvements, Walsh Construction Company II, LLC, Contract 7548

Upon a motion duly made and seconded, it was

Voted: to approve the award of Contract 7548, Nut Island Headworks Odor Control and HVAC Improvements, to the lowest responsible and eligible bidder, Walsh Construction Company II, LLC, and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the bid amount of \$57,565,399, for a contract term of 1,034 calendar days from the Notice to Proceed. (ref. WW A.3)

Wachusett Dam Bastion Improvements, Design and Engineering Services During Construction, Kleinfelder Northeast, Inc, Contract 7333

Upon a motion duly made and seconded, it was

Voted: to approve the recommendation of the Consultant Selection Committee to award Contract 7333, Wachusett Dam Bastion Improvements, Design and Engineering Services During Construction, to Kleinfelder Northeast, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the amount of \$768,274.74 for a contract term of 45 months from the Notice to Proceed. (ref. W B.1)

Bond Counsel Services: Greenberg Traurig, LLP, Contract F253

Upon a motion duly made and seconded, it was

Voted: to approve the recommendation of the Consultant Selection Committee to award Contract F253 to Greenberg Traurig LLP for Bond Counsel Services and to authorize the Executive Director, on behalf of the Authority, to execute contract F253 in an amount not to exceed \$1,558,800 and for a term of four years from the Notice to Proceed. (ref. AF&A C.1)

Deer Island Demand Response Services: Direct Energy Business Marketing, LLC, Contract S590

Upon a motion duly made and seconded, it was

Voted: to approve the award of Contract S590, Deer Island Demand Response Services, to Direct Energy Business Marketing, LLC, and to authorize the Executive Director, on behalf of the Authority, to execute said contract in the bid amount of five percent of the revenue received from ISO New England for a four-year term from June 1, 2020 through May 31, 2024. (ref. AF&A C.2)

Janitorial Services at the Chelsea Facility: Star Building Services, Inc., Bid WRA- 4776

Upon a motion duly made and seconded, it was

Voted: to approve the award of Contract WRA-4776, Janitorial Services at the Chelsea Facility, to Star Building Services, Inc., and to authorize the Executive Director,

on behalf of the Authority, to execute said contract in an amount not to exceed \$583,884, for a contract term of three years. (ref. AF&A C.3)

CONTRACT AMENDMENTS/CHANGE ORDERS

Nut Island Headworks Odor Control and HVAC Improvements: Inspections, Evaluations, Design, Construction Administration Engineering Services, Hazen and Sawyer, P.C. Contract 7517, Amendment 1

Upon a motion duly made and seconded, it was

Voted: (with Mr. Foti opposed): to authorize the Executive Director, on behalf of the Authority, to approve Amendment 1 to Contract 7517, Nut Island Headworks Odor Control and HVAC Improvements Inspections, Evaluations, Design, Construction Administration and Resident Engineering Services, with Hazen and Sawyer, P.C., to increase the contract amount by \$1,542,925.00 from \$5,736,900.77 to \$7,279,825.77 and increase the contract term by 700 days from December 28, 2021 to November 28, 2023. Mr. Foti noted that his opposition to the amendment was not a reflection on the consultant. (ref. WW B.1)

Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations: Woodard & Curran, Inc., Contract S559, Amendment 2

Upon a motion duly made and seconded, it was

Voted: to authorize the Executive Director, on behalf of the Authority, to approve Amendment 2 to Contract S559, Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations, with Woodard & Curran, Inc., and to execute said Amendment jointly with Boston Water and Sewer Commission in the amount of \$3,385,389.03, of which MWRA shall be responsible for \$895,854.94 and Boston Water and Sewer Commission shall be responsible for \$2,489,534.09, for a total not to exceed amount of \$4,801,706.00 to \$8,187,095.04, and to increase the contract term by 730 calendar days, from March 2, 2020 to March 2, 2022. (ref. WW B.2)

Remote Headworks and Deer Island Shafts Study, Mott MacDonald, LLC, Contract 7237, Amendment 2

Upon a motion duly made and seconded, it was

Voted: to authorize the Executive Director, on behalf of the Authority, to approve Amendment 2 to Contract 7237, Remote Head Works and Deer Island Shafts Study, with Mott MacDonald, LLC, to modify the scope of work in the existing contract and extend the contract term by 5 months, from January 24, 2020 to June 24, 2020, with no increase in the contract amount. (ref. WW B.3)

EXECUTIVE SESSION

Vice Chair Carroll announced that the Board would enter Executive Session to discuss real estate, collective bargaining (all units), litigation and security, since discussion in open session may have a detrimental effect upon the bargaining and litigating position of the Authority. It was moved to enter Executive Session to discuss real estate, collective bargaining, litigation and security and thereafter to return to open session solely for the purpose of adjournment.

Upon a motion duly made and seconded, a roll call vote was taken in which the members were recorded as follows:

<u>Yes</u>	<u>No</u>	<u>Abstain</u>
Carroll		
		Cook
Cotter		
Foti		
Pappastergion		
Peña		
Vitale		
Walsh		
Wolowicz		

Voted: to enter Executive Session for the purpose of discussing real estate, collective bargaining (all units), litigation and security and thereafter to return to open session solely for the purpose of adjournment. (Mr. Cook left the meeting.)

\* \* \* \*

EXECUTIVE SESSION

\* \* \* \*

The meeting adjourned at 2:09 p.m.

Approved: February 19, 2020

Attest:

\_\_\_\_\_  
Andrew M. Pappastergion, Secretary

\_\_\_\_\_  
Documents used for this meeting, referenced above, can be found here:  
<http://www.mwra.com/monthly/bod/boardmaterials/2020/o-2020-01-15.pdf>

**STAFF SUMMARY**

**TO:** Board of Directors

**FROM:** Kathleen A. Theoharides, Chairperson *K. Theoharides*

**DATE:** February 19, 2020

**SUBJECT:** Annual Meeting: Election and Appointment of MWRA Officers, Retirement Board Member and Committee Assignments

**RECOMMENDATION:**

That the Board of Directors (1) designate this February 19, 2020 meeting as the Annual Meeting which, as provided in the Authority’s by-laws, will be deemed a special meeting of the Board for the purpose of election of officers; (2) elect a Vice-Chairman of the Board; and (3) appoint a Secretary of the Board, an MWRA Treasurer, and such Assistant Secretaries and Assistant Treasurers of the Board as the Board deems appropriate. New Committee Chairs will be appointed approximately every two years.

To ratify the following appointments of Board members to standing Committees:

Administration, Finance and Audit	Wastewater Policy and Oversight	Water Policy and Oversight	Personnel and Compensation
Chair: H. Vitale Vice Chair: J. Foti	Chair: P. Flanagan Vice Chair: J. Walsh	Chair: B. Pena Vice Chair: C. Cook	Chair: J. Wolowicz Vice Chair: K. Cotter
C. Cook J. Carroll K. Cotter A. Pappastergion B. Pena J. Walsh	C. Cook J. Carroll J. Foti A. Pappastergion B. Pena H. Vitale	J. Carroll J. Foti A. Pappastergion H. Vitale J. Walsh J. Wolowicz	J. Carroll P. Flanagan J. Foti A. Pappastergion H. Vitale J. Walsh

**DISCUSSION:**

Article IV, Section 1, of the by-laws, which specifies the officers to be elected, provides that:

“The Board of Directors shall annually elect one of its members as Vice-Chairman and shall annually appoint a Secretary and a Treasurer, who need not be members of the Board of Directors.”

The by-laws also provide that:

“Upon the recommendation of the Executive Director, the Board of Directors may also elect one or more Assistant Secretaries and Assistant Treasurers.”

## Retirement Board Appointments

The provisions of G.L. c. 32 § 20 (4 7/8 D) regarding the MWRA Retirement Board, provide that:

“ . . . the secretary of the Authority shall be a member *ex officio*. . . .”

That same section of that statute further provides that a second member of the Retirement Board “ . . . shall be appointed by the board of directors of the authority for a term of 3 years . . .” Thomas J. Durkin was appointed as a member of the Retirement Board for a three-year term beginning on July 1, 2018.

## Nomination of Officers

Currently, the following individuals serve as the MWRA’s officers:

Vice-Chairman:	John J. Carroll
Secretary:	Andrew M. Pappastergion
Treasurer:	Matthew Horan
Retirement Board Member:	Thomas J. Durkin
Assistant Secretaries:	Kristin MacDougall Rose Marie Convery
Assistant Treasurer:	Robert Belkin

The Chairman wishes to request that a motion be made to nominate the following as officers, inclusive of appointments of certain MWRA staff as Treasurer, Retirement Board Member, Assistant Secretaries and Assistant Treasurers, as follows:

Vice-Chairman:	John J. Carroll
Secretary:	Andrew M. Pappastergion
Treasurer:	Matthew Horan
Retirement Board Member:	Thomas J. Durkin
Assistant Secretaries:	Kristin MacDougall Rose Marie Convery
Assistant Treasurers:	Robert Belkin Michael Cole

There are no special procedures for election of officers, except as governed by Robert’s Rules of Order. Thus, any Board member may make a nomination to elect an officer, and the nomination will carry upon a majority vote of the quorum.