



MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard
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Boston, MA 02129

Frederick A. Laskey
Executive Director

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ADMINISTRATION, FINANCE & AUDIT COMMITTEE MEETING

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

to be held on

Wednesday, September 20, 2017

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

Time: 10:00 a.m.

AGENDA

A. Information

1. Internal Audit Department Activities Report – FY2017
2. Delegated Authority Report – July and August 2017
3. FY2017 Fourth Quarter Orange Notebook
4. FY2016-FY2020 Strategic Business Plan Annual Update for FY2017
5. FY2017 Amendment and Change Order Report
6. FY2017 Year-end Capital Improvement Program Spending Report
7. FY2017 Year-end Financial Update and Summary

B. Approvals

1. Bond Defeasance of Future Debt Service

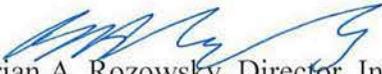
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Internal Audit Department Activities Report – FY2017



COMMITTEE: Administration, Finance & Audit

INFORMATION
 VOTE


Brian A. Rozowsky, Director, Internal Audit
Preparer/Title

RECOMMENDATION:

For information only. Internal Audit presents annually to the Board the results of completed assignments and the status of active and planned assignments. Every quarter, Internal Audit utilizes the Orange Notebook to briefly discuss recently issued reports and to report on the status of open audit recommendations and cost savings. This Staff Summary includes a discussion of activities since Internal Audit's last report to the Board in September 2016.

DISCUSSION:

In FY2017, a total dollar savings of \$3.5 million was recognized from 65 assignments, including internal audits, management advisory services, consultant incurred cost audits, consultant preliminary reviews, construction labor burden reviews, the true-up and review of HEEC billings and contract negotiation support.

Internal Audit's goal is to provide sufficient audit coverage to give reasonable assurance that internal management controls are functioning as intended and that only reasonable, allowable and allocable costs are paid to consultants, contractors and vendors. Audit coverage is provided through performance audits that analyze and evaluate MWRA programs and activities to determine if they are being carried out effectively and efficiently, compliance audits that focus on adherence to MWRA policies and procedures, contractual requirements, rules or regulations and management advisory services.

The development of the Annual Audit Plan is based on Internal Audit's risk assessment of program and management controls, as well as input from MWRA senior managers and the Advisory Board. The actual scheduling and completion of audit assignments depends on staff availability which can be impacted by control issues needing immediate attention or by unscheduled special requests for management advisory services.

Attachment 1 lists assignments completed since Internal Audit's last report to the Board, assignments currently in process and additional assignments planned to commence in FY2018.

INTERNAL AUDITS AND MANAGEMENT ADVISORY SERVICES

Vulnerability Assessment Review

Internal Audit reviewed four reports conducted by outside entities on vulnerability assessments of MWRA facilities to determine which recommendations have been completed, rejected or are in the process of being implemented.

Approximately 600 recommendations were made in the reports, of which 83% have been closed. Closed recommendations include implementation of findings, alternate controls in place to reduce the risk, recommendations that are no longer applicable and certain recommendations that have been rejected by MWRA due to disagreement, cost or impractical to implement.

The Security Task Force will review the open recommendations, many of which have been partially completed.

Fuel Card Usage

Internal Audit reviewed the internal controls over fuel purchases and invoice payments made in FY2016 for the Wright Express (WEX) fuel card purchases to determine the adequacy and compliance with policy and procedures.

There were 59 active WEX fuel cards that could be used at participating retail gas stations. Employees are encouraged to use the on-site fueling depots whenever possible, rather than using the fuel cards.

A number of recommendations were made including finalizing the policies and procedures, preparing receipt logs, reducing the number of authorized users, evidence of review and approval for invoice payment and reconciling the invoice with receipt logs. Of the 13 recommendations made, 7 have been implemented and closed.

Deer Island Purchase Card Usage

The purchase card program was established to provide an efficient and cost effective method of purchasing and paying for routine small dollar items. The objective of the audit was to determine compliance with current policies and procedures for the eight purchase cards used at Deer Island.

Internal Audit reviewed the purchase card activity for six months for all of the cards. In general, the program is functioning as intended, although recommendations were made to strengthen controls. These include updating the user manual and making it accessible on-line, ensuring timely submission of the transaction envelopes, segregating the approver and records manager functions, and notifying planners and schedulers when Maximo work order items are purchased.

Of the 15 recommendations made, 11 have been implemented and closed.

BWSC CSO Financial Assistance Agreement

The Boston Water and Sewer Commission (BWSC) entered into a Memorandum of Understanding (MOU) and Financial Assistance Agreement (FAA) with the MWRA to fund Combined Sewer Overflow (CSO) projects required by the Federal Court Order in the Boston Harbor Case. The MOU/FAA terminated on June 30, 2017.

Internal Audit conducts periodic reviews to validate that the payments to BWSC have been deposited into the account from which withdrawals may be made for eligible design and construction costs and staff time (force account charges).

In FY2017, a true-up of BWSC CY2016 payments was computed and, subsequent to the audit, BWSC withdrew the eligible CY2016 force account costs. Internal Audit completed a final review of the CY2017 force account costs in August 2017.

Internal Audit previously recommended closing out individual contracts, and all final eligibility reviews have now been completed. A total of approximately \$358,000 will be deposited into the account based on the eligible construction and consultant costs incurred.

Chelsea Lease Agreement

MWRA has a 30-year lease agreement for the facilities in Chelsea that expires on May 31, 2032. The payment amount is based on a predetermined rental plus actual real estate taxes and insurances.

Internal Audit reviewed the lease rental payments for FY2015 and FY2016 which were correctly paid. Amounts for real estate taxes and insurances are deposited into separate escrow accounts to pay the expenses as they come due. The audit finding revealed that the balances in the escrow accounts were considered excessive and \$155,000 was debited against future payments and a further reduction was made to the future monthly insurance deposit.

Charlestown Navy Yard Lease Agreement

MWRA has a 10-year lease agreement for the office space in the Navy Yard that expires on May 31, 2023. The payment is based on a predetermined rental plus the increase over the base for real estate taxes and operating expenses. In addition, MWRA has reimbursed the landlord for certain leasehold improvements.

Internal Audit reviewed the payments for CY2014 and CY2015 and real estate taxes for FY2015 and FY2016 to determine compliance with the terms of the agreement. Minor adjustments to the rent and operating expenses were made, as well as increasing the base operating expenses as a result of an under-accrual of expenses at the time the base was set.

Other Management Advisory Services

Annually Internal Audit provides management advisory services that include calculating MWRA's fringe and indirect cost rates, verifying unemployment benefit calculations, and providing support and review services to the Fore River Railroad Corporation (FRRC).

In FY2017, numerous other management advisory services were also performed by Internal Audit that included analyses of professional service contract labor rates, domicile vehicle policy, AACU data visualization, sole source awards, design contract estimates versus actual awards, thermal plant overtime analysis, age demographics of staff and Family Medical Leave Act (FMLA) time. Internal Audit also performed numerous vendor financial capability reviews and analyses in support of Procurement, and a review of MIS asset tracking and accountability. An analysis of the Viscom Systems contract for security equipment maintenance and repair services was conducted with recommendations made to improve controls over the management of the contract.

In FY2017, the annual savings resulting from internal audits and management advisory services totaled \$711,213.

CONTRACT AUDITS AND RELATED REVIEWS

In FY2017, savings of \$2,823,108 was recognized from the following contract audit and related assignments:

Consultant Incurred Cost Audits

An incurred cost audit determines that billed labor costs are supported by the consultant's time reports and project cost records, other direct costs are supported by valid payments, final indirect costs have been calculated in accordance with the contract, and that final indirect cost rates have been properly applied to labor billings. The extent of fieldwork required to complete an assignment is based on a risk assessment that starts with an invoice analysis and a review of a consultant's annual cost disclosure submittal. The fieldwork is usually conducted at the consultant's office, but may be reduced to a desk review to verify that costs billed were supported.

In FY2017, eight incurred cost audits were completed for total contract costs paid of \$13.3 million. These include Stantec, Arcadis, Green International Affiliates, Hatch Mott Macdonald and Fay, Spofford & Thorndike (purchased by Stantec in October 2015). A total of \$82,276 was recovered or avoided.

Consultant Preliminary Reviews

When a new contract is awarded, Internal Audit performs a consultant preliminary review to determine that proposed direct labor, indirect costs, and other direct costs are supported, and notifies Procurement and the project manager of any issues, including any unsupported proposed costs that might be available for re-allocation to another cost element. Internal Audit reviews and

accepts provisional indirect cost rates proposed by consultants for billing both new and active contracts. Approved provisional indirect cost rates are reported to project managers and Procurement as a reference source for reviewing invoices and pricing contracts and amendments.

In FY2017, eleven consultant preliminary reviews were completed with a total value of \$24.6 million. A total of \$190,155 in unsupported proposed costs was identified for potential reallocation.

Construction Labor Burden Rate Reviews

A construction labor burden review establishes provisional labor burden rates to be used in the pricing of future change orders. Typical adjustments to contractor proposed rates include the application of effective versus statutory Federal and State unemployment tax rates, applying appropriate experience modifications and other adjustments to workers compensation rates, and determination of the basis for general liability and umbrella insurances and bond premium.

In FY2017, seventeen labor burden rate reviews were completed with an estimated \$893,548 in cost savings.

Harbor Electric Energy Company (HEEC) 2016 True-Up and Billings

The purpose of this assignment was to verify the capacity charge calculation and operations and maintenance (O&M) charges billed under the HEEC agreement and the Department of Public Utility (DPU) tariff for CY2016. The capacity charge calculation uses a complex formula to determine the annual payment for the use of the cross-harbor cable. The DPU tariff is based on the same formula, but with a different component for deferred income taxes. The O&M charges include labor costs, materials needed to maintain the cable and insurances for the cable.

In FY2017, savings of \$449,837 were recognized from an initial billing adjustment, earlier negotiated changes to both the gross investment base and effective interest rate calculations used in the capacity charge calculation. A reimbursement was made to the MWRA for a true-up of CY2016 capacity charges and O&M costs.

In addition, Internal Audit provided financial analysis support to staff in the contract negotiations with HEEC for a new cross-harbor electrical cable.

Construction Claim and Change Orders

Internal Audit reviewed the labor burden on a proposed change order where the burden rate was reduced. Following an audit in FY2016 of costs claimed by a contractor and a subsequent settlement, many costs questioned in that audit were sustained.

Other Audits

Internal Audit reviewed the hours incurred by the contractor on the elevator maintenance contract at the Deer Island Treatment Plant to assist in the next contract procurement for these services.

A quality assurance/quality control review was performed on two consultants to determine compliance with their own submitted policies at the time of the contract award.

ATTACHMENT:

Status of Internal Audit Assignment FY2017 and FY2018

Status of Internal Audit Assignment FY 17 and FY 18

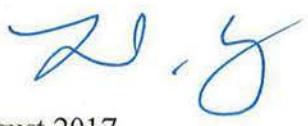
<u>COMPLETED</u>	<u>Date</u>	<u>IN PROCESS & PLANNED TO START IN FY18</u>
<u>Internal Audit/Management Advisory Services</u>		
Gas Card Usage for Domiciles	Nov-16	Cambridge FAA Force Account
Deer Island Purchase Card Usage	Mar-17	BWSC FAA 2017 (Final)
BWSC FAA 2016	Apr-17	Prevailing Wage
HEEC Contract Negotiations	May-17	Workers Compensation
Vulnerability Assessment	Jun-17	Uniform Debit Card Program
		Metering & Maintenance
		Vehicle Maintenance Work Flow
		Vendor Master File Review
		Warehouse Review
		Purchasing
<u>Reviews of Agreements and Contracts</u>		
Chelsea Lease	Aug-16	Chelsea Lease
CNY Lease	Sep-16	CNY Lease
Elevator Maintenance Contract	Nov-16	HEEC 2017 True-up
Viscom	Apr-17	NEFCo
HEEC 2016 True-up	May-17	Allied Universal Security
<u>Consultant Incurred Cost Audits</u>		
Regina Villa Associates	Aug-16	Keville
Brown & Caldwell	Nov-16	Bryant
Stantec	Nov-16	Dewberry
Lin Associates	Nov-16	CDM Smith
Green Int'l Affiliates	Dec-16	GZA GeoEnvironmental
Hatch Mott MacDonald	Dec-16	Hazen & Sawyer
Arcadis	Jan-17	AECOM
Fay Spofford & Thorndike	Jun-17	Kleinfelder
		Stantec
<u>Consultant Preliminary Reviews (Over \$1 mill)</u>		
DI As Needed (7501,7502,7503)	Sep-16	Peabody Pipeline (6895) CDM Smith
Prison Point Rehab (7359) Arcadis	Sep-16	Nut Island Odor & HVAC (7517) Hazen & Sawyer
Agency-Wide Technical Assistance	Sep-16	Wastewater Meter System (6739) \$5.1M
New Connecting Mains CP3 (6385) Green Int'l	Nov-16	Water S57, Sewer S 19,20,21 (7540) \$5.8M
Section 4,5,6,186 Study (7423) Hazen & Sawyer	Mar-17	Fuel Oil Tank Replacement (7553) \$1.5M
Comm Ave Pump Station (7523) Black & Veatch	Mar-17	DI Cathodic Protection (6880) \$1.4M
DITP Motor Control (7419) AECOM	Mar-17	Sect 89 & 29 Rehab (7116) \$3.2M
Shaft 12 Isolation Gate (7509) Arcadis	Apr-17	CSO Performance Assessment (7572) \$3M
Interceptor Renewal 3, Dorchester (7512) CDM	May-17	Nut Island Mech. & Elect. Upgrade (7365) \$1.6M
		Section 53 & 99 Connections (7485) \$5.2M
		Pump Stations & CSO Condition Assess (7162) \$3.3M
		Interceptor Renewal Milton (7515) \$2M
		South System VFD Replacement (7126) \$4.8M
		Steel Tanks Improvements (6832) \$3M
		Windsor Power Station (7460) \$4.4M
		DI HVAC (7094) \$2M
		Metro Tunnel Redundancy (7159) \$7.5M
		Section 56 Saugus (7454) \$2M
		Replacement S 25,75,59,60 (6955) \$3M
		Tops of Shafts (7560) \$1.6M

Status of Internal Audit Assignment FY 17 and FY 18

<u>COMPLETED</u>	<u>Date</u>	<u>IN PROCESS & PLANNED TO START IN FY18</u>
<u>Construction Labor Burden Rate Reviews (Over \$1 mill)</u>		
SEH Redundancy & Storage 1, (6454), Gioioso	Jul-16	Section 14 Malden (6957) Albanese
Beacon St Line Repair, (7458), Zoppo	Jul-16	Residuals Facilities Mechanical Upgrade (7152) \$2M
NIH Redundancy 1C (7478) Albanese D&S	Jan-17	NIH Phase 2 (7067) \$24.5M
Chelsea Creek Headworks (7161) BHD/BEC	Dec-16	SEH Redundancy & Storage 2 (7504) \$15.2M
CVA Screen Replacement (7488) Schultz	Mar-17	DI VFD Replacements (7131) \$5.3M
Fuel System Upgrade (7061A) Losordo	Aug-16	Residuals Facilities Electrical Upgrade (7152) \$2.2M
Section 80 Repair (7532) Caliacco	Mar-17	Clinton Roofing Rehab (7450) \$1.2M
Chelsea Creek Headworks (7161) Subs	Apr-17	DI Sodium Hypo & Bisulfate Tanks (7449) \$5M
Western Ops Maintenance (6650B) Colangeli	May-17	Delori Pump Station (7361) \$1.1M
Reading Extension Sewer (7164) Green Mountain	Jun-17	SEH Redundancy & Storage 3 (7505) \$10M
		DI Gas Protection Replacement (7167) \$2M
		Residuals Facilities Piping Relocation (7173) \$3M
		Clinton Screw Valves & Pump (7372) \$1.5M
		DI HVAC (7110) \$38.8M
		Maint Garage, Washbay, Storage Bld (7577) \$2.3M
		DI Expansion Joint Repair 3 (6705) \$2M
		DI Gravity Thickeners Rehab (7428) \$16.9M

STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Delegated Authority Report – July and August 2017



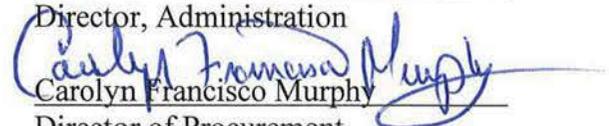
COMMITTEE: Administration, Finance & Audit

INFORMATION
 VOTE

Linda D'Addario, Admin. Systems Coordinator
Preparer/Title


Michele S. Gillen
Director, Administration

Barbara Aylward, Administrator A & F
Preparer/Title


Carolyn Francisco Murphy
Director of Procurement

RECOMMENDATION:

For information only. Attached is a listing of actions taken by the Executive Director under delegated authority for the period July 1 – August 31, 2017.

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 October 14, 2009, 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; or up to \$500,000 if the award is to other than 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; or up to \$500,000 if the award is to other than 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 JULY 1 - 31, 2017

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMEND/CO	COMPANY	FINANCIAL IMPACT
C-1.	07/10/17	OVERHEAD DOOR MAINTENANCE SERVICES, VARIOUS MWRA FACILITIES AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR SCHEDULED PREVENTIVE MAINTENANCE, NON-EMERGENCY AND EMERGENCY CORRECTIVE MAINTENANCE AND REPLACEMENT PARTS FOR 80 OVERHEAD DOORS AT VARIOUS MWRA FACILITIES FOR A TERM ON 730 CALENDAR DAYS.	OP-349	AWARD	SAFEWAY OVERHEAD CRANE SERVICE, INC.	\$86,978.00
C-2.	07/10/17	NORTHERN INTERMEDIATE HIGH SECTION 110 - READING AND WOBURN PERFORM SIDEWALK RESTORATION WORK ON OAK STREET IN READING.	7471	11	ALBANESE D & S, INC.	\$75,000.00
C-3.	07/14/17	WACHUSETT AQUEDUCT PUMPING STATION CONSTRUCTION ADD AN ALLOWANCE FOR MONTHLY ELECTRIC USAGE CHARGES FOR ELECTRICAL SERVICES.	7157	16	BHD/BEC, JOINT VENTURE 2015	\$200,000.00
C-4.	07/14/17	CHELSEA CREEK HEADWORKS UPGRADE DEMOLISH, TEMPORARILY AND/OR PERMANENTLY RELOCATE EXISTING ELECTRICAL FIRE ALARM, PAGE PARTY, SCADA AND SECURITY SYSTEMS; CUT, CAP AND DEMOLISH WATER LINES LOCATED IN THE SECOND FLOOR ELECTRICAL ROOMS; DEMOLISH ALL ELECTRICAL GEAR ASSOCIATED WITH THE AIR COMPRESSOR AND AIR DRYER	7161	2	BHD/BEC, JOINT VENTURE 2015	\$208,431.00
C-5.	07/27/17	CONSTRUCTION OF WATER MAINS - SECTIONS 36, W11C AND S9-A FINAL BALANCING CHANGE ORDER TO DECREASE THE FOLLOWING BID ITEMS TO REFLECT ACTUAL QUANTITIES USED: EXCAVATE AND DISPOSE OF GROUP IA, IB AND II SOILS; EXCAVATE ROCK AND BOULDER; TRAFFIC CONTROL; POLICE DETAIL; WORK BY UTILITIES; AND COMMODITIES PRICE ADJUSTMENTS.	7448	6	RJV CONSTRUCTION CORP.	(\$496,277.60)
C-6	07/27/17	OXYGEN GENERATION FACILITY SERVICES DEER ISLAND TREATMENT PLANT FINAL BALANCING CHANGE ORDER TO DECREASE THE FOLLOWING BID ITEMS TO REFLECT ACTUAL QUANTITIES USED: NON-EMERGENCY AND EMERGENCY ON-CALL SERVICES; REPLACEMENT PARTS; FACTORY AUTHORIZED SERVICE REPRESENTATIVE; AND FIRE DEPARTMENT SERVICES.	5529	3	SOLUTIONWERKS, INC.	(\$242,600.75)
C-7.	07/27/17	EXPEDITED MECHANICAL IMPROVEMENTS - CONVEYORS AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR THE EXPEDITED MECHANICAL IMPROVEMENTS - CONVEYOR AT THE MWRA'S BIOSOLIDS PROCESSING FACILITY FOR A TERM OF 240 CALENDAR DAYS.	7153A	AWARD	IPC LYDON, LLC	\$128,000.00
C-8.	07/27/17	PERSONNEL DOCK REHABILITATION DEER ISLAND TREATMENT PLANT REMOVE AND REPLACE 20 L-SHAPED SCANTLING ANGLES AND 4 UPPER FLANGE AND WEB SECTIONS ON CENTER WIDE FLANGE BEAMS ON DOCK NUMBERS 1 AND 2; PERFORM ADDITIONAL HULL PLATE REPLACEMENT WORK; PERFORM ADDITIONAL DECK EDGE STEEL REPLACEMENT WORK.	7168	1	COASTAL MARINE CONSTRUCTION, LLC	\$158,055.00
C-9.	07/27/17	CHICOPEE VALLEY AQUEDUCT INTAKE TRAVELING SCREEN REPLACEMENT ADD 2 DEEP WATER DIVES TO CLEAN DEBRIS; EXTEND CONTRACT TERM BY 32 CALENDAR DAYS FROM JULY 10, 2017 TO AUGUST 11, 2017.	7448	2	W.M. SCHULTZ CONSTRUCTION, INC.	\$180,000.00
C-10.	07/27/17	FIRE PROTECTION SPRINKLER SYSTEM SERVICE AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR FIRE PROTECTION SPRINKLER SYSTEM TESTING SERVICE, NON-EMERGENCY AND EMERGENCY REPAIR SERVICES FOR EQUIPMENT LOCATED AT MWRA FACILITIES FOR A TERM OF 730 CALENDAR DAYS.	OP-348	AWARD	COGSWELL SPRINKLER CO., INC.	\$180,700.00
C-11.	07/31/17	INSTRUMENTATION SYSTEMS SERVICES FINAL BALANCING CHANGE ORDER TO DECREASE THE FOLLOWING BID ITEMS TO REFLECT ACTUAL QUANTITIES USED: SCHEDULED PREVENTIVE MAINTENANCE; NON-EMERGENCY AND EMERGENCY CORRECTIVE MAINTENANCE; ON-CALL DIAGNOSTICS AND REMEDIATION SERVICES; AND REPLACEMENT PARTS.	OP-256	1	ZELLER CORP.	(\$142,079.12)
C-12.	07/31/17	FUEL STORAGE TANK MAINTENANCE SERVICE AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR SCHEDULED PREVENTIVE MAINTENANCE, TESTING AND CALIBRATION, MONTHLY VISUAL INSPECTIONS, NON-EMERGENCY AND EMERGENCY ON CALL SERVICE AND REPLACEMENT PARTS FOR 50 TANKS LOCATED AT VARIOUS MWRA FACILITIES FOR A TERM OF 1,095 CALENDAR DAYS.	OP-335	AWARD	COMMTANK, INC.	\$649,585.00

PURCHASING DELEGATED AUTHORITY ITEMS JULY 1 - 31, 2017

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMENDMENT	COMPANY	FINANCIAL IMPACT
P-1.	07/06/17	MAINTENANCE AND SUPPORT FOR MICROSOFT SQL SERVER ENTERPRISE CORE LICENSES AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR MAINTENANCE AND SUPPORT FOR MICROSOFT SQL SERVER ENTERPRISE CORE LICENSES FOR THE TIME PERIOD JULY 21, 2017 THROUGH JUNE 20, 2020.	WRA-4403Q		CDW-G LLC	\$39,868.08
P-2.	07/06/17	PURCHASE OF HEWLETT PACKARD PACKWIDE MULTIFUNCTION PLOTTER AWARD OF PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR HEWLETT PACKARD PACKWIDE MULTIFUNCTION PLOTTER FOR ENGINEERING, CONSTRUCTION AND FIELD OPERATIONS STAFF.	WRA-4376Q		B.L. MAKEPEACE, INC.	\$40,194.00
P-3.	07/06/17	PURCHASE OF MICROSOFT PREMIER SERVICES AWARD OF A SOLE SOURCE PURCHASE ORDER FOR MICROSOFT PREMIER SERVICES WEB ACCESS AND TECHNICAL SUPPORT.			MICROSOFT CORPORATION	\$66,080.00
P-4.	07/06/17	PURCHASE OF TWO YEAR CONTRACT FOR TRASH REMOVAL SERVICES AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDERS FOR TRASH REMOVAL SERVICES AT VARIOUS FIELD OPERATIONS FACILITIES (DBI) AND CLINTON WASTEWATER TREATMENT PLANT (ALLIED).	WRA-4386		DBI WASTE SYSTEM, INC. ALLIED WASTE SERVICES	\$103,471.00 \$30,280.00
P-5.	07/06/17	MAINTENANCE AND SUPPORT FOR HEWLETT PACKARD EQUIPEMENT AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR HEWLETT PACKARD EQUIPEMENT MAINTENANCE AND SUPPORT FOR THE TIME PERIOD JULY 1, 2017 THROUGH JUNE 30, 2018.	WRA-4398Q		HEWLETT PACKARD ENTERPRISE COMPANY	\$178,105.66
P-6.	07/18/17	PURCHASE OF ONE 45 TON AIR COOLED CHILLER AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR ONE 45 TON AIR COOLED CHILLER FOR DEER ISLAND TREATMENT PLANT.	WRA-4397Q		HTS ENGINEERING	\$33,230.00
P-7.	07/18/17	PURCHASE OF THREE HEWLETT PACKARD SERVERS AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR HEWLETT PACKARD ENTERPISE SERVERS AND SUPPORT.	WRA-4400Q		HUB TECHNICAL SERVICES, LLC	\$50,919.35
P-8.	07/18/17	PURCHASE OF ONE FIRE PUMP CONTROLLER AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR THE PURCHASE AND INSTALLATION OF ONE FIRE PUMP CONTROLLER AT NUT ISLAND HEADWORKS.	WRA-4359		BUSSCO, INC.	\$52,987.00
P-9.	07/25/17	REBUILD ONE MUFFIN MONSTER GRINDER AWARD OF A SOLE SOURCE PURCHASE ORDER TO REBUILD ONE MUFFIN MONSTER GRINDER FOR HINGHAM PUMP STATION.			JWC ENVIRONMENTAL	\$26,475.00
P-10.	07/25/17	MAINTENANCE AND SUPPORT FOR CISCO SMARTNET SWITCHES AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR MAINTENANCE AND SUPPORT FOR 100 CISCO SMARTNET SWITCHES FOR THE TIME PERIOD AUGUST 1, 2017 THROUGH JULY 31, 2018.	WRA-4407Q		PRESIDIO NETWORKED SOLUTIONS, INC.	\$39,388.77
P-11.	07/27/17	SUPPLY AND DELIVERY OF HYDROGEN SULFIDE CONTROL CHEMICALS EXERCISE ONE YEAR RENEWAL OPTION FOR THE SUPPLY AND DELIVERY OF HYDROGEN SULFIDE CONTROL CHEMICALS TO THE FRAMINGHAM EXTENSION SEWER AND FRAMINGHAM EXTENSION RELIEF SEWER.	WRA-4260	1	EVOQUA WATER TECHNOLOGIES, LLC	\$135,551.06
P-12.	07/28/17	SUPPLY AND DELIVERY OF LIQUID OXYGEN AWARD OF A TWO YEAR PURCHASE ORDER TO THE LOWEST RESONSIVE BIDDER FOR THE SUPPLY AND DELIVERY OF LIQUID OXYGEN TO THE JOHN J. CARROLL WATER TREATMENT PLANT.	WRA-4383		LINDE, LLC	\$798,346.70
P-13.	07/31/17	PURCHASE OF ONE MOBILE WATER DISPENSING UNIT AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR THE PURCHASE OF ONE MOBILE WATER DISPENSING UNIT.	WRA-4405		OUT OF THE BLUE HYDRATION, INC.	\$53,350.00
P-14.	07/31/17	PURCHASE OF HEWLETT PACKARD ENTERPRISE SERVERS AND STORAGE RECISSION OF AWARD OF A PREVIOUSLY APPROVED PURCHASE ORDER FOR THE PURCHASE OF HEWLETT PACKARD ENTERPRISE (HPE) SERVICES AND STORAGE FOR THE COMMVault PROJECT; AND AWARD OF A NEW PURCHASE ORDER FOR SUCH HPE SEVICES AND STORAGE TO THE	WRA-4344Q		HUB TECHNICAL SERVICES LLC	\$103,650.08

CONSTRUCTION/PROFESSIONAL SERVICES DELEGATED AUTHORITY ITEMS AUGUST 1 - 31, 2017

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMEND/CO	COMPANY	FINANCIAL IMPACT
C-1.	08/04/17	MICROBIAL SOURCE TRACKING STUDY OF BACTERIA IN MWRA RECEIVING WATERS AWARD OF A SOLE SOURCE CONTRACT TO CONDUCT A MICROBIAL SOURCE TRACKING STUDY OF BACTERIA IN MWRA RECEIVING WATERS FOR A TERM OF 364 CALENDAR DAYS.	S570	AWARD	UNIVERSITY OF MASS/BOSTON	\$26,213.00
C-2	08/14/17	INSTALLATION OF ENERGY EFFICIENT EXPLOSION PROOF LED INTERIOR LIGHTING AT THE NUT ISLAND HEADWORKS AWARD OF AN ENERGY EFFICIENT CONTRACT TO A NGRID PREQUALIFIED VENDOR FOR THE INSTALLATION OF ENERGY-EFFICIENT EXPLOSION PROOF LED INTERIOR LIGHTING AT THE NUT ISLAND HEADWORKS FOR A TERM OF 150 CALENDAR DAYS. A REBATE TOTALING \$31,549 WILL BE RECEIVED FROM NGRID UPON PROJECT COMPLETION, RESULTING IN A PAYBACK PERIOD OF 5 YEARS.	OP-359	AWARD	HORIZON SOLUTIONS, LLC	\$96,048.00
C-3.	08/14/17	PAINTING AND COATING - BIOSOLIDS PROCESSING FACILITY AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR SLUDGE TANK AND SILO COATING AT THE MWRA'S BIOSOLIDS PROCESSING FACILITY FOR A TERM OF 365 CALENDAR DAYS.	7151	AWARD	SOEP PAINTING CORP.	\$648,000.00
C-4.	08/21/17	FIRE ALARM SYSTEM SERVICES CENTRAL AND WESTERN MASSACHUSETTS AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR FIRE ALARM SYSTEM SERVICES FOR CENTRAL AND WESTERN MASSACHUSETTS LOCATIONS FOR A TERM OF 730 CALENDAR DAYS.	OP-357	AWARD	ENCORE HOLDINGS, LLC d/b/a ENCORE FIRE PROTECTION	\$187,248.00
C-5.	08/21/17	PHASE 8 SEWER MANHOLE REHABILITATION AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR PHASE 8 SEWER MANHOLE REHABILITATION FOR A TERM OF 300 CALENDAR DAYS.	OP-358	AWARD	GREEN MOUNTAIN PIPELINE SERVICES, INC.	\$328,585.00
C-6.	08/28/17	CONTINUOUS EMISSIONS MONITORING SYSTEM SERVICES AWARD OF A CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR INSPECTION, TESTING, CLEANING AND CALIBRATION OF CONTINUOUS EMISSIONS MONITORING EQUIPMENT AT THE DEER ISLAND TREATMENT PLANT FOR A TERM OF 730 CALENDAR DAYS.	S567	AWARD	CK ENVIRONMENTAL, INC.	\$98,660.00

PURCHASING DELEGATED AUTHORITY ITEMS AUGUST 1 - 31, 2017

NO.	DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMENDMENT	COMPANY	FINANCIAL IMPACT
P-1.	08/14/17	PURCHASE APPLICATION DEVELOPMENT TECHNICAL CONSULTANT AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR CONSULTING SERVICES FOR APPLICATION DEVELOPMENT TECHNICAL CONSULTANT FOR THE TIME PERIOD OF 825 BILLABLE HOURS.	WRA-4395Q		MOTION RECRUITMENT PARTNERS, LLC PARTNERS, LLC	\$70,125.00
P-2.	08/16/17	PURCHASE OF IMPLEMENTATION SERVICES AWARD OF PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR IMPLEMENTATION SERVICES TO UPGRADE ORACLE DISCOVERER 10G FOR ENQUAL WASTEWATER AND WATER.	WRA-4399Q		SHI INTERNATIONAL, CORPORATION	\$26,340.00
P-3.	08/18/17	PURCHASE OF ONE ACCUSONIC FLOW METER AWARD OF A SOLE SOURCE PURCHASE ORDER FOR ONE ACCUSONIC FLOW METER FOR THE SOMERVILLE MARGINAL COMBINED SEWER OVERFLOW.			ADS, LLC	\$41,900.00
P-4.	08/18/17	PURCHASE OF MAXIMO SUPPORT CONSULTANT AWARD OF A PURCHASE ORDER UNDER STATE BLANKET CONTRACT TO THE LOWEST RESPONSIVE BIDDER FOR MAXIMO SUPPORT CONSULTANT SERVICES FOR THE TIME PERIOD OF 780 BILLABLE HOURS.	WRA-4404Q		COMPUTER & ENGINEERING SERVICES, INC.	\$93,412.80
P-5.	08/18/17	SUPPLY AND DELIVERY OF GRAVEL BORROW AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR SUPPLY AND DELIVERY OF GRAVEL BORROW FOR CLINTON WASTEWATER TREATMENT PLANT'S LANDFILL.	WRA-4406		PLANET EARTH MATERIALS	\$164,340.00
P-6.	08/23/17	PURCHASE OF 15 FOOT CLASS BACKHOE/LOADER AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR ONE NEW 15-FOOT CLASS BACKHOE/LOADER W/ EXTENDABLE DIPPER STICK AND SNOW PLOW, AUGER AND COMPACTOR ATTACHMENT.	WRA-4370		NORTHLAND INDUSTRIAL TRUCK COMPANY	\$145,600.00
P-7.	08/23/17	SUPPLY AND DELIVERY OF AQUA AMMONIA AWARD OF A PURCHASE ORDER TO THE LOWEST RESPONSIVE BIDDER FOR SUPPLY AND DELIVERY OF AQUA AMMONIA FOR JOHN J. CARROLL WATER TREATMENT PLANT FOR A TERM OF ONE YEAR.	WRA-4410		BORDEN & REMINGTON CORPORATION	\$193,830.00
P-8.	08/23/17	DIVER ASSISTED SUCTION HARVESTING APPROVAL OF AMENDMENT #1 FOR DIVER ASSISTED SUCTION HARVESTING OF INVASIVE PLANTS AT STILLWATER BASIN, WACHUSETT RESERVOIR DUE TO DISCOVERY OF SEVERAL ADDITIONAL "HOTSPOTS" OF INVASIVE GROWTH.	WRA-4317	1	AE COMMERCIAL DIVING SERVICES	\$229,596.00
P-9.	08/28/17	PURCHASE OF SPLIT MECHANICAL SEAL KITS AWARD OF SOLE SOURCE PURCHASE ORDER FOR THREE SPLIT MECHANICAL SEAL KITS FOR THE PRISON POINT COMBINED SEWER OVERFLOW.			A.W. CHESTERTON COMPANY	\$30,800.00
P-10.	08/28/17	MAINTENANCE AND SUPPORT OF ANNUAL LABORATORY INFORMATION MANAGEMENT SYSTEM AWARD OF SOLE SOURCE PURCHASE ORDER FOR MAINTENANCE AND SUPPORT OF MWRA'S LABORATORY INFORMATION MANAGEMENT SYSTEM FOR THE TIME PERIOD NOVEMBER 1, 2017 THROUGH OCTOBER 31, 2018.			LABWARE, INC.	\$64,830.50

POSITION CONTROL REGISTER (PCR) LOCATION CHANGES JULY 2017

<u>DATE OF CHANGE</u>	<u>POSITION TITLE</u>	<u>CURRENT PCR#</u>	<u>CURRENT COST CENTER</u>	<u>NEW PCR #</u>	<u>NEW COST CENTER</u>	<u>REASON FOR CHANGE</u>
7/11/2017	Sr. Instrument Technician	5480023	Meter Maint - WW	29880177	Trade Labor Maintenance	Union Settlement
7/24/2017	Program Manager, Energy Management	2915015	DI Senior Management	5210095	Operations Management	To centralize energy management

STAFF SUMMARY

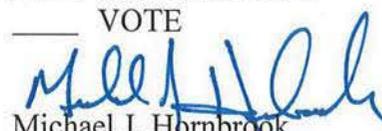
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: FY17 Fourth Quarter Orange Notebook



COMMITTEE: Administration, Finance & Audit

INFORMATION
 VOTE

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



Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

For information only. The Board of Directors 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. Significant outcomes for the fourth quarter are highlighted below.

Workforce Management

Staff turnover continues to be higher than it has been in recent years. In Fiscal Year 2017, there have been a total of 222 promotions, transfers, or external hires, of which 32 percent were external hires (72), and 68 percent were internal promotions or transfers (150). (Page 43)

Despite the turnover, MWRA was able to fill vacancies quickly, and as a result, staffing levels ended the Fiscal Year on target. As of the end of June 2017, MWRA had 1150.1 Full Time Equivalent (FTEs), compared with the budgeted target of 1150 FTEs. (Page 43) Management closely reviews each vacancy to determine if a backfill is necessary or if the vacant position should be used to satisfy a more critical need as it occurs.

Water Use

Water use by communities decreased over the last two quarters, with the end of the drought, less use by partial communities and no emergency use. System-wide consumption for calendar year 2017 is lower than 2016 and 2015. Consumption by all water users for the first six months of the calendar year was 173.3 million gallons per day (mgd), 13.7 mgd and 7.3 percent less than the same period in 2016. (Page 31)

Water Supply and Source Water Management

Over the fourth quarter and into the first quarter of this fiscal year, Quabbin Reservoir has begun recovering from the severe drought of 2015 and 2016. From the beginning of April until the end of June, Quabbin rose 3.6 feet, gaining 29.4 billion of gallons of water in storage, and going from 82.1 to 89.3 percent full. On June 12th, the system returned to Normal operating level, and by July 17th was above the elevation on the same date last year. (Page 28) Quabbin continues to track fuller than last year as it continues its normal summer into fall descent, and on September 11th had 6.4 billion gallons more water in storage than on the same date last year. Watershed yields (the net amount of water entering the reservoirs) were above the long term averages for April, May and June.

Water Distribution System Valves

With increased management attention over the past several fiscal years, as discussed in previous Orange Notebook summaries, main line and blow-off valve exercising and replacement programs either met or came significantly closer to targets during this fiscal year. Valve Operability status continues to be excellent, with mainline, blow-off and control valves all exceeding their operability targets, and air release valves being just below the target. (Page 9)

Community Support Programs

MWRA has a number of programs which provide financial or technical assistance to communities to manage or improve their local water and wastewater systems. During FY17, the Inflow/Infiltration Program provided \$22.2 million dollars in grants and loans, somewhat lower than the projected target of \$28.2 million. The Local Water System Assistance Program provided \$22.7 million in zero-interest loans, slightly over its target of \$20.1 million. Three zero-interest loans were made to communities for lead service line replacement with a total of \$6 million, against a projected target of \$5 million. (Pages 33-35)

MASSACHUSETTS WATER RESOURCES AUTHORITY

Board of Directors Report

on

Key Indicators of MWRA Performance

for

Fourth Quarter FY2017

Q1	Q2	Q3	Q4



Frederick A. Laskey, Executive Director
Michael J. Hornbrook, Chief Operating Officer
September 20, 2017

Board of Directors Report on Key Indicators of MWRA Performance

Fourth Quarter FY2017

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

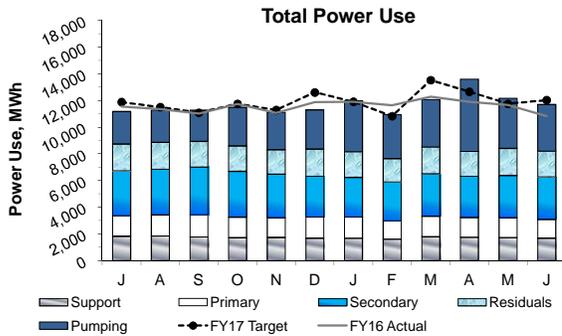
Frederick A. Laskey, Executive Director
Michael J. Hornbrook, Chief Operating Officer
September 20, 2017

OPERATIONS AND MAINTENANCE

Deer Island Operations

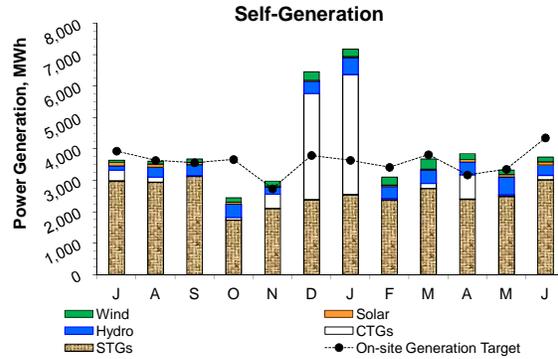
4th Quarter - FY17

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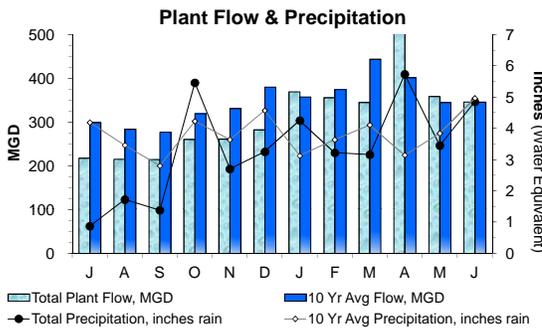


Total power usage in the 4th Quarter was 2.9% above target as Total Plant Flow was 15.8% above target with the 3 year average plant flow. Power used in all plant processes were at or below their individual targets for the quarter. Power used in wastewater pumping operations was 13.3% above target. **Overall, total power usage in FY17 was 1.8% below target as the 3 year total plant flow average was 2.0% below target.**

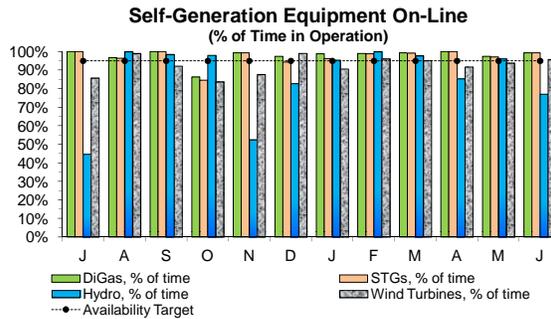
Note: Power usage projections are based on 3 year averages.



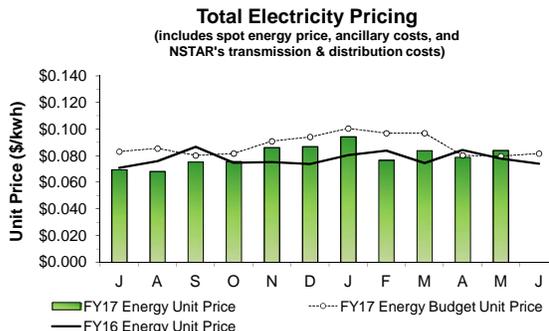
Power generated on-site during the 4th Quarter was on target (+0.4%). While generation by the STGs and CTGs met or exceeded their targets, generation by the Hydro Turbines was 22% below target as a result of mechanical and control issues. Wind Turbine generation was 10.0% below target as a result of turbulence caused by wind blowing through the digesters tripping the turbines offline occurring at a greater frequency than in past years. Solar Panel generation was 9.0% below target as the amount of radiant sunshine was approximately 11% lower than in previous years. Overall, power generation was 10.8% above target for FY17.



Total Plant Flow for the 4th Quarter was 11.3% above target with the 10 year average plant flow (405.2 MGD actual vs. 364.2 MGD expected) as precipitation for the quarter was 17.0% higher than target (14.03 inches actual vs. 11.96 inches expected). **Total Plant Flow in FY17 was 10.1% below target as precipitation was 12.4% below target.**



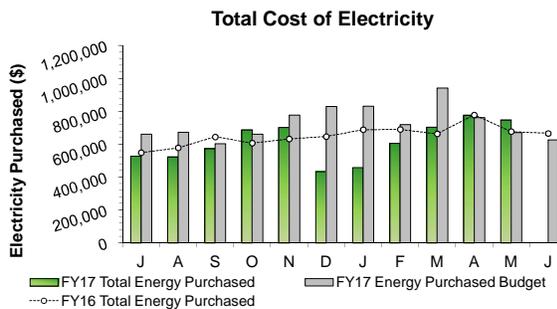
The DiGas system and STGs exceeded the 95% availability target for the 4th Quarter. Wind Turbine availability fell below target by 1.3% due to turbulence caused by wind blowing through the digesters and tripping the turbines offline. The Hydro Turbines fell 8.8% below target due to mechanical and control issues in the 4th Quarter. **Overall in FY17, the DiGas and STGs exceeded the 95% availability target, while Hydro Turbine availability was 9.3% below target and the Wind Turbines were 2.5% below target.**



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. An invoice for the June electricity usage has not been received yet. The actual Total Energy Unit Price in the 4th Quarter (April and May data only) was 1.8% higher than the FY17 budget estimate for the same period. The Total Energy Unit Price includes a fixed block price, spot energy price, transmission & distribution charges, and ancillary charges.

Total Energy Unit Price in FY17 through May is 9.3% lower than budget.

Note: Only the actual energy prices are reported. Therefore, the dataset lags by one (1) month due to the timing of invoice receipt.



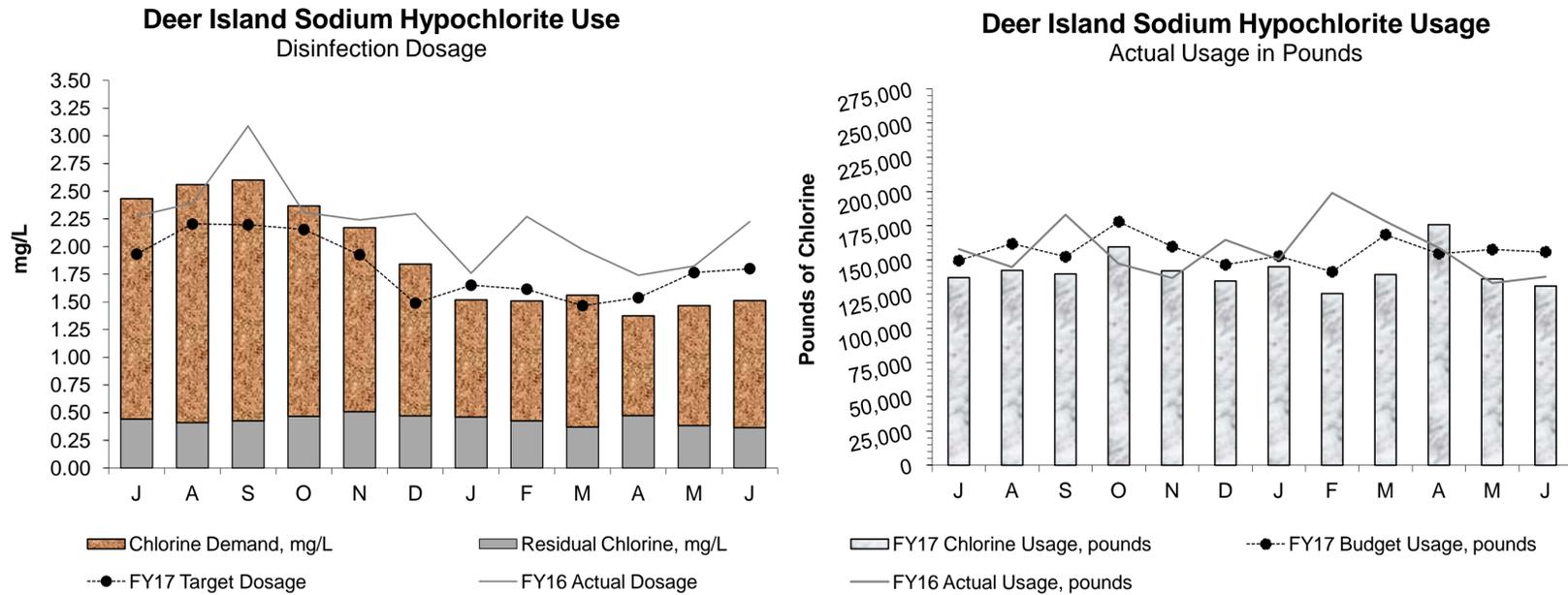
The invoices for the total cost of Electricity Purchased for June have not been received as of reporting time. The total cost of Electricity Purchased during the 4th Quarter (April and May data only) was 8.6% higher than budget. **FY17 costs through May are \$1,385,518 (17.1% lower than budgeted as the Total Energy Unit Price is 9.3% lower than budget and the Total Electricity Purchased is 7.7% lower than budget.** Total Electricity Purchased in December and January were more than 46% lower than budgeted as the cross harbor electrical cable, that supplies the primary source of power to Deer Island, was de-energized for significant portions of this period to allow Eversource to safely perform cable location and dredging work (Phase 1A and 1B of Eversource/HEEC cable location and protection project). Therefore, CTG operation, and not Electricity Purchased, was used to meet the electrical needs of the treatment plant.

Note: Only months with complete Electricity Purchased data are reported. Therefore, the dataset lags by one (1) month due to the timing of invoice receipt.

Deer Island Operations

4th Quarter - FY17

Page 2 of 4



The disinfection dosing rate in the 4th Quarter was 15.0% below the target. DITP maintained an average disinfection chlorine residual of 0.41 mg/L this quarter with an average dosing rate of 1.45 mg/L (as chlorine demand was 1.04 mg/L). Actual sodium hypochlorite usage in pounds of chlorine was 5.4% below target this quarter due to lower chlorine demand. **Overall in FY17, disinfection dosing was 5% above target while sodium hypochlorite usage in pounds of chlorine was 9.1% below target.**

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

Secondary Blending Events

Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	0	0	0	100.0%	0.00
A	0	0	0	100.0%	0.00
S	0	0	0	100.0%	0.00
O	2	2	0	99.7%	3.94
N	2	2	0	99.7%	4.50
D	1	1	0	99.9%	2.30
J	2	2	0	99.7%	8.62
F	0	0	0	100.0%	0.00
M	2	2	0	99.4%	8.54
A	3	3	0	95.2%	104.64
M	2	2	0	99.9%	5.21
J	1	1	0	99.3%	6.81
Total	15	15	0	99.1%	144.57

97.7% of all flows were treated at full secondary during the 4th Quarter. There were a total of six (6) separate secondary blending events; all due to high plant flow resulting from heavy rain. The six (6) combined blending events resulted in a total of 116.66 hours of blending and 829.59 Mgal of flow blended with secondary effluent. The Maximum Secondary Capacity for the entire quarter was 700 MGD.

Overall in FY17, 99.1% of all flows were treated at full secondary. There were a total of 15 separate secondary blending events in FY17, all due to high plant flows resulting from heavy rain. The 15 secondary blending events combined produced a total of 144.57 hours of blending and 978.43 Mgal of flow blended with secondary effluent.

Secondary permit limits were met at all times during the 4th Quarter, as well as during all of FY17.

Deer Island Operations & Maintenance Report

Environmental/Pumping:

The plant achieved an instantaneous peak flow rate of 1,238.2 MGD just after noon on April 1. This peak flow occurred during a two (2) day rain event that produced 2.43 inches of precipitation. Overall, Total Plant Flow in the 4th Quarter was 11.3% above the 10 year average plant flow target for the quarter, but 10.1% below target for FY17.

Essential maintenance and rehabilitation activities involving the replacement of butterfly flow control valves, discharge isolation valves, flow meters, and associated piping for each of the 10 wastewater pumps in the North Main Pump Station (NMPS) continued in Quarter 3. All equipment is original and dates back to the facility upgrades in 1995. Over time, the valves in these facilities have sustained damage from age and wear and must be replaced to allow proper isolation of pumps and equipment for maintenance. There were a total of seven (7) force main isolation events during the fourth quarter of FY17, to install the new equipment for Pump #2, to remove and install the new equipment for Pump #9, to remove, redesign, and then install Pump #7, and to remove the old equipment for Pump #10. NMPS, Winthrop Terminal Headworks Facility, and South System Pump Station continued to operate during these events. No interruptions or restrictions in flow occurred during this work as all north system flow was handled through the other force main in the facility. Flow through the isolated force main in NMPS was suspended at approximately 3:30 a.m. and was restored before 3:00 p.m. once the scheduled tasks for the day were completed.

Deer Island Operations

4th Quarter - FY17

Page 3 of 4

Deer Island Operations & Maintenance Report (continued)

Environmental/Pumping (continued):

Cleaning of the North Main Pump Station riser shafts occurred at the end of April. The ten-foot diameter North Metropolitan Relief Tunnel riser shaft yielded approximately two (2) cubic yards of material and the eleven-foot diameter Boston Main Drainage Tunnel riser shaft yielded nearly 15 cubic yards of material. Material was disposed utilizing a line item in the grit and screenings hauling and disposal contract. The removal of this floating material reduces the risk of pumping system malfunctions during low flow and pump-down events at the North Main Pump Station. Scheduling of this cleaning operation twice yearly in the spring and fall appears to be very successful and manageable.

On June 1 and June 29, all south system flows were diverted to South System Pump Station (SSPS) pumps 5 to 8 (wet well 2) for approximately 12 hours in order to isolate pumps 1 to 4, and complete repairs on the check valve dashpot on SSPS pump #1. Once the work was completed at the end of the day, pumps 1 to 4 were returned to operational status. A similar repair was started on SSPS pump #3 on July 19. No interruptions in flow occurred during this work.

Secondary Treatment:

Annual turnaround maintenance was performed on Train #2 at the Cryogenic Oxygen Facility in April. This turnaround maintenance is performed on roughly half of the components and systems in the Cryo Facility and allows the remaining half of the facility to continue to operate and produce oxygen uninterrupted. The same turnaround maintenance will be performed on Train #1 in the fall.

Odor Control:

Activated carbon in carbon adsorber (CAD) units #1 and #3 in the Residuals Odor Control (ROC) Facility was changed out in May as part of routine practice to replace spent carbon.

Energy and Thermal Power Plant:

Overall, total power generated on-site accounted for 29.1% of Deer Island's total power use for the month. Renewable power generated on-site (by Solar, Wind, STGs, and Hydro Turbines) accounted for 26.5% of Deer Island's total electrical power use for the month. **Overall in FY17, total power generated on-site accounted for 34.0% of Deer Island's total power use, and renewable power generated on-site accounted for 27.3% of total power use.**

The scheduled annual overhaul maintenance of CTG-1A and 2B began on May 8 along with an audit inspection of each unit. These two (2) tasks were completed simultaneously on each CTG to lessen the down time of each unit and only one (1) CTG was taken out of service at a time. This work required the engine of each CTG to be separated from the generator in order to complete the maintenance and inspection and was performed over the course of several days. Thermal Power Plant staff successfully tested each CTG following the completion of work on each unit.

On May 31, the boilers in the Thermal Power Plant were taken offline to allow DITP Maintenance staff to complete the annual dump condenser cleaning prior to placing the steam system in summer operating mode. Boiler 201 was returned to operation later that evening, following the dump condenser work, to restore steam production and steam turbine power generation.

DITP took delivery of 468,000 gallons of #2 fuel oil without incident from May 30 through June 8. 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-1A was operated from approximately 9:39 A.M. to 11:17 A.M. on June 13 for an ISO-NE declared Demand Response audit event.

Regulatory:

Emissions compliance testing on the Residuals Odor Control (ROC) treatment system on DITP was conducted by consultants from June 26 to June 27. The ROC treatment system treats combined process air from the gravity thickeners and the centrifuge facility. The DITP Air Quality Operating Permit issued by the MA DEP requires that DITP conduct emissions compliance testing for the various emission units once every five (5) years to demonstrate compliance with applicable total reduced sulfur (TRS) and non-methane hydrocarbon (NMHC) emission limits. This testing requires the continuous emissions monitoring of the inlet and outlet of the odor control system over a 24-hour period for TRS at the outlet (stack) of the odor control system and for NMHC at the inlet. NMHC were also tested at the stack and the inlet was sampled for target Volatile Organic Compounds (VOCs). All the preliminary test results show that DITP was in compliance. The draft report summarizing the test results is currently being prepared by the consultants.

A MA DEP staff person was on site at the DITP on June 22 and 27 for an announced site visit to review and inspect the plant's equipment in reference to DITP's air operating permit. He was given a comprehensive tour of the Thermal Power Plant, Residuals Odor Control (ROC) Facility, as well as other areas, and was provided raw data used for generating emissions compliance reports as requested. Initial communications indicate the inspection had gone well and no issues were raised by the DEP.

On June 25, the MWRA received official notification confirming DITP's achievement for earning NACWA's (National Association of Clean Water Agencies) Platinum Award for Peak Performance which recognizes member agency facilities for outstanding compliance of their National Pollutant Discharge Elimination System (NPDES) permit limits. The Platinum award is given to agencies in recognition of 100% compliance with NPDES permits over a consecutive five year period. Deer Island earned the Platinum Award¹⁰ for having operated with no permit violations from 2007 through 2016.

Clinton AWWTP:

Phosphorus Reduction Facility:

Work completed or in progress during the fourth quarter: Plumbing contractor completed installation of natural gas lines to each building. This will replace the fuel oil for building heat and backup heat source for digesters. Installed new natural gas burners in the Administration and Dewatering buildings. Installed new polymer feed systems. Installed rapid mix, flocculation and coagulation mixers. Installed disk filter control panels.

Digester Building:

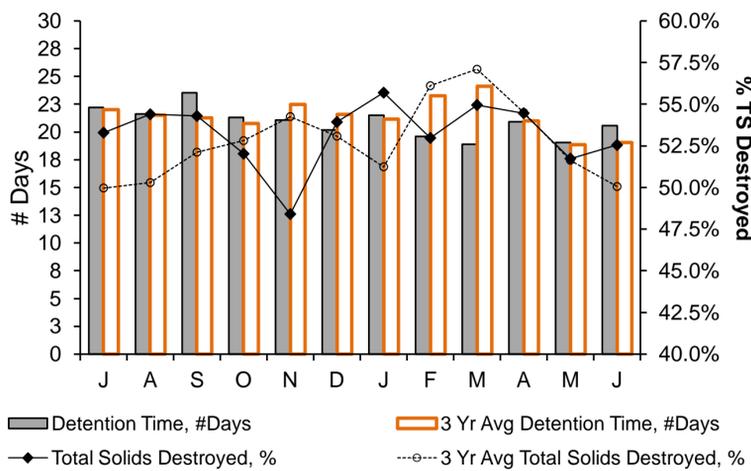
Installed new gas regulator valves on digester sludge heaters. Replaced both methane gas flares for the digesters.

Deer Island Operations and Residuals

4th Quarter - FY17

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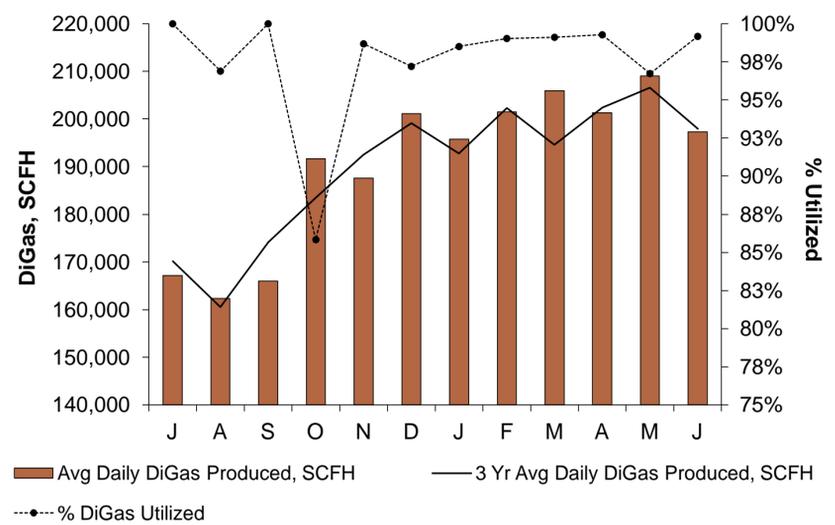
Sludge Detention Time in Digesters and Total Solids Destruction



Total solids (TS) destruction following anaerobic sludge digestion averaged 52.9% during the 4th Quarter, on target with the 3 year average of 52.1% for the same period, as the sludge detention time in the digesters was 20.2 days. DI operated with an average of 8.0 digesters during the 4th Quarter, on target with the 3 year average. **Overall in FY17, TS destruction averaged 53.2%, higher than the 3 year average of 52.8%, even though sludge detention time was 20.9 days, lower than the 3 year average of 21.4 days.**

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

Digester Gas Production and % Utilized

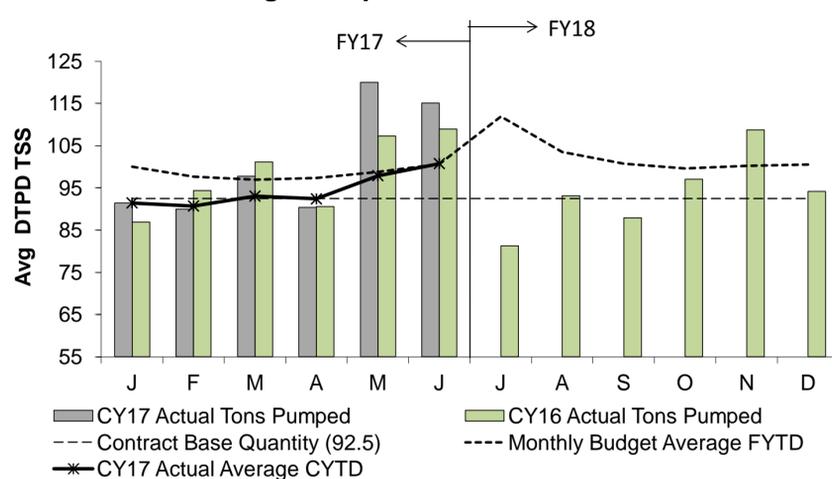


The Avg Daily DiGas Production in the 4th Quarter was on target with the 3 Year Avg Daily DiGas Production. On average, 98.4% of all the DiGas produced in the quarter was utilized at the Thermal Power Plant. DiGas utilization was slightly lower in May due to scheduled maintenance requiring both boilers to be taken off line for approximately 17 hours. **Overall in FY17, the Avg Daily DiGas Production was also on target (+0.5%), with 97.5% of all the DiGas produced utilized at the Thermal Power Plant.**

Residuals Pellet Plant

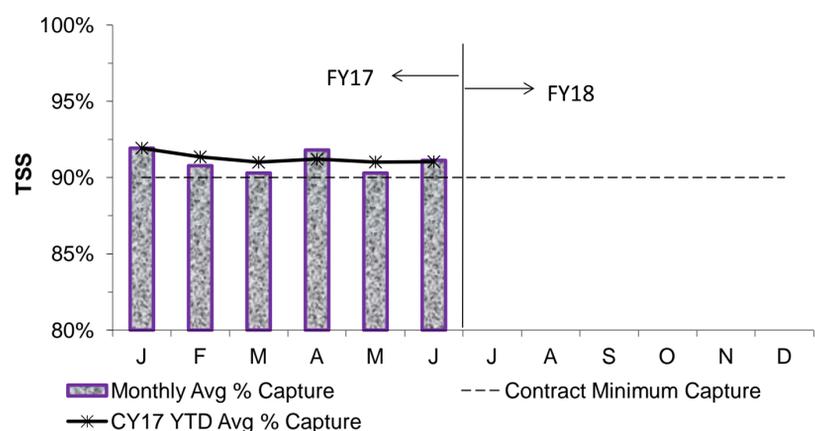
MWRA pays a fixed monthly amount for the calendar year to process up to 92.5 DTPD/TSS as an annual average. The monthly invoice is based on 92.5 DTPD/TSS (Dry Tons Per Day/Total Suspended Solids) times 365 days divided by 12 months. At the end of the year, the actual totals are calculated and additional payments are made on any quantity above the base amount. The base quantity of 90.0 DTPD/TSS was changed to 92.5 DTPD/TSS starting on January 1, 2016 with the terms of the new contract. On average, MWRA processes more than 92.5 DTPD/TSS each year (FY17's budget is 100.6 DTPD/TSS and FY18's budget is 99.5 DTPD/TSS).

Sludge Pumped From Deer Island



The average total quantity of sludge pumped to the Pellet Plant in the 4th Quarter of FY17 was 108.5 DTPD - above target with FY17's average budget of 100.6 DTPD. **Overall in FY17, the average total amount of sludge pumped from Deer Island was 97.2 DTPD, 3.4% lower than the target of 100.6 DTPD**

Monthly Average % Capture of Processed Sludge

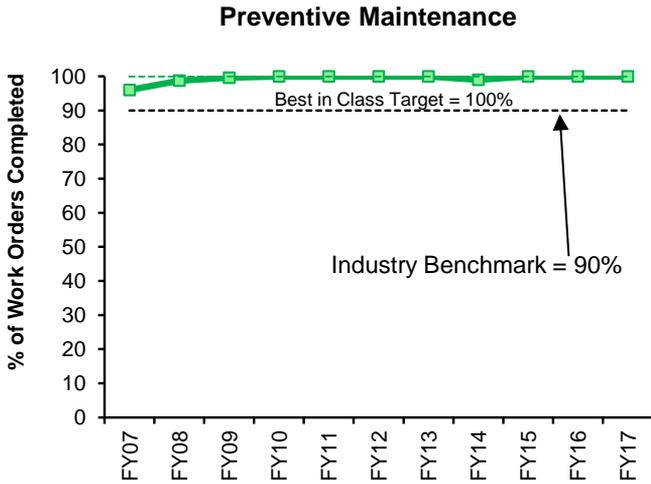


The contract requires NEFCo to capture at least 90.0% of the solids delivered to the Biosolids Processing Facility in Quincy. The CY17 to date average capture is 91.0%.

Deer Island Yearly Maintenance Metrics

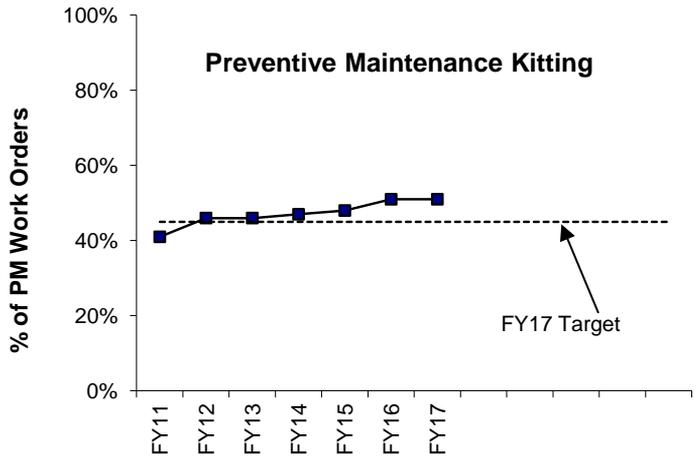
4th Quarter - FY17

Proactive and Productivity Measures

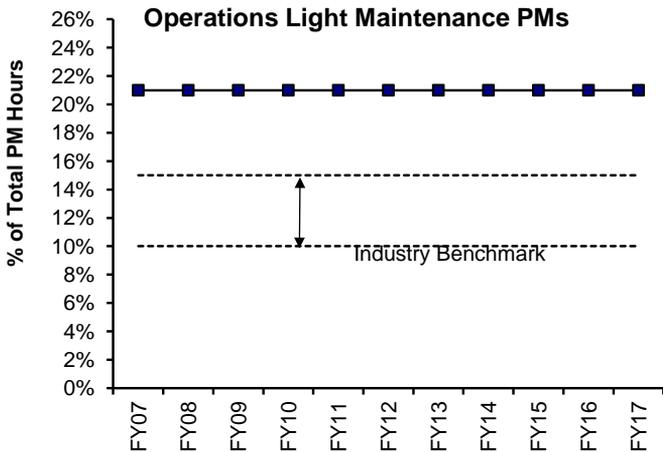


The industry benchmark is 90% for Preventive Maintenance (PM) completion. Upon reaching the 90% goal in FY05, the target goal was increased to the "Best in Class" Target of 100% PM completion. Since then, the percentage of PM work order completion has been at 99% or higher.

Reliability-Centered Maintenance (RCM) and PM optimization efforts have continued since FY01. PM

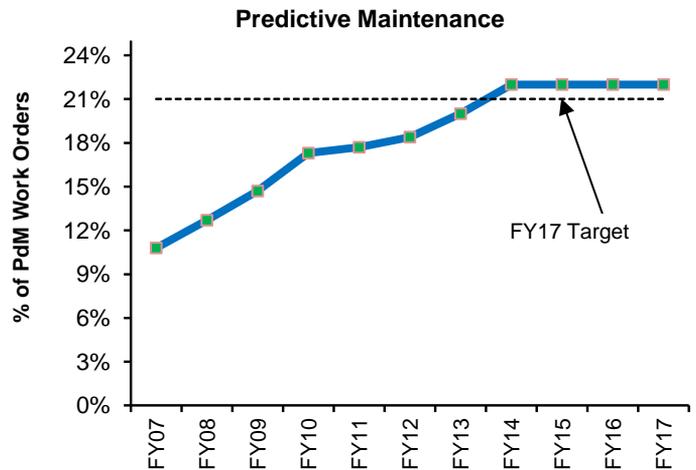


Preventive Maintenance (PM) inventory items were loaded into Maximo to assign spare parts for equipment to PM work orders. DITP reached the PM kitting goal of 100% in FY10. In FY11 a new graph (above) was developed to track kitting of all maintenance work orders in an effort to increase wrench time. Staff continues to fine-tune the process to "kit" all maintenance work orders. Kitting is considered a best practice by maintenance and reliability professionals. It entails staging parts necessary to complete maintenance work. Kitting allows maintenance staff to spend more time "turning the wrench" and less time waiting for parts at the stockroom window. Kitting for FY17 was 51%, surpassing DITP's goal of 48%.



The percentage of preventive maintenance work order hours completed by Operations staff (not maintenance staff) increased from less than 1% in January 2002 to the current level of 21% in FY17.

DITP reached the industry benchmark range of 10-15% in April 2003 and has exceeded the goal through FY17. Operations completes approximately 600 PM work orders per month.



Predictive maintenance has steadily increased from 2% in FY03 to 22% in FY17, surpassing DITP's FY17 goal of 21%.

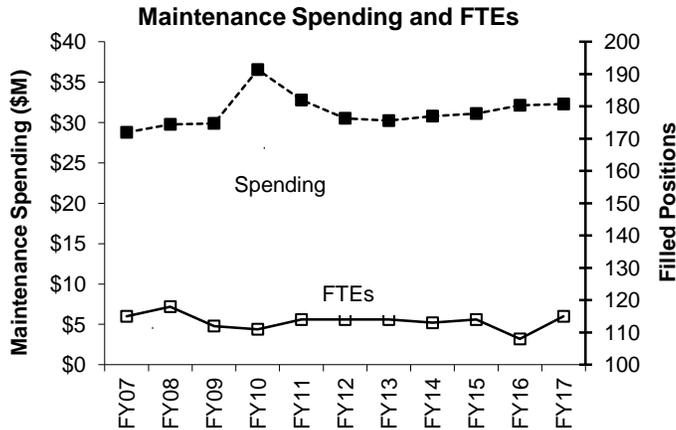
The increase in predictive maintenance was achieved through the expanded use of lubrication, vibration, thermography, and acoustic ultrasonic testing techniques.

The Condition Monitoring Group continually reviews and investigates new opportunities and initiatives to expand condition monitoring testing and analysis.

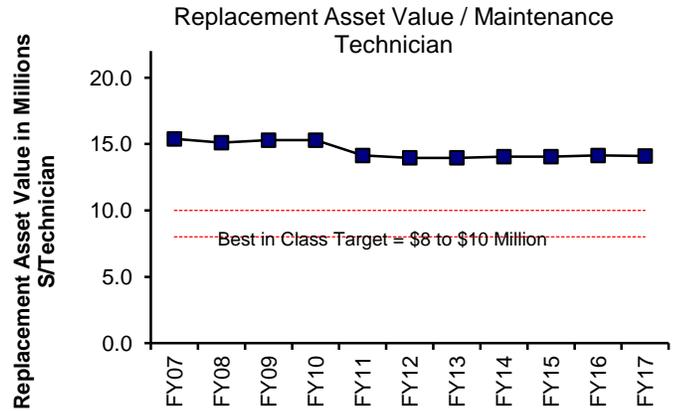
Deer Island Yearly Maintenance Metrics

4th Quarter - FY17

Overall Maintenance Program Measures

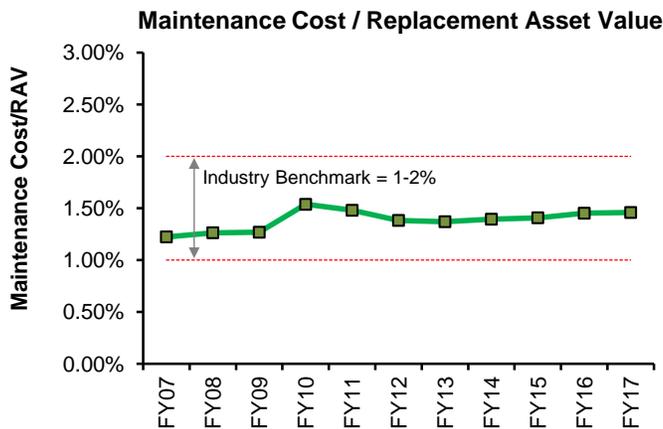


DITP's Maintenance staff is currently at 115 FTE's. Maintenance has been successful in meeting its goals through implementation of numerous maintenance efficiencies including: Operations staff performing light maintenance, cross-functional training and flexibility, and Reliability-Centered Maintenance.

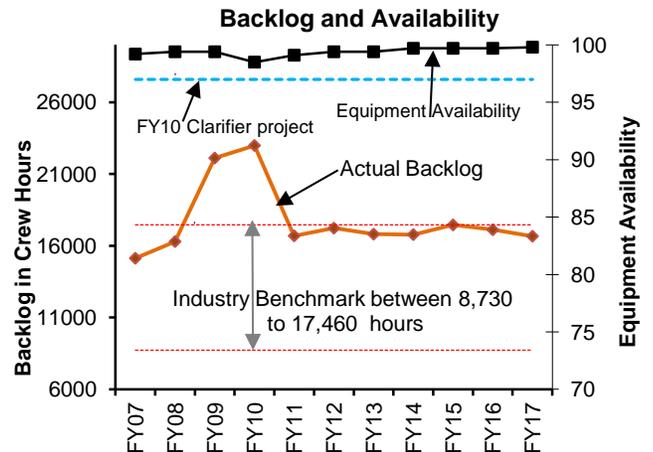


DITP adopted a "best in class" target of \$8-\$10 Million/Technician for maintenance staffing. Even after a period of downward trending, DITP remains above this Best in Class target range. However, as the plant ages and additional equipment replacements are expected, DITP management will reassess staffing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

The Maintenance Spending graph shows actual annual maintenance spending and large CIP asset replacements (equipment costs only). Maintenance budgeting continues to evaluate plant assets and requirements for replacement of obsolete equipment to ensure the plant operates at maximum efficiency. In FY17, overall spending slightly increased from FY16 due to an increase in Maintenance Projects. Scheduled projects during FY17 included: Grit Classifier Cover Rehabilitation Project, East and West Odor Control Acid Wash Piping Prefabrication/Installation, Waste Gas Burners Gas Valve Replacement and the Scum Wet Wells Chopper Pump Replacements.



The industry benchmark for annual maintenance spending is between 1% to 2% of replacement asset value, currently DITP is at 1.46%. The plant's replacement asset value is calculated at approximately \$2.4 billion dollars. DITP's current maintenance spending is within the industry benchmark. As the plant ages and equipment replacement is required, spending is expected to increase. DITP Maintenance CEB spending is \$12.5 million coupled with CIP spending which funded Grit Classifier Cover Rehabilitation Project, East and West Odor Control Acid Wash Piping Prefabrication/Installation, Waste Gas Burners Gas Valve Replacement, Pump Stations Valve Replacement Project, and Digester Sludge Pump Replacements.



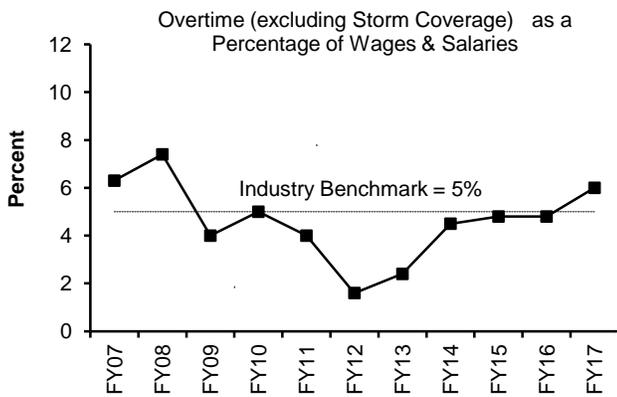
Industry benchmark for Equipment Availability are 97% and over the last ten years, equipment availability has consistently exceeded the benchmark. In FY17 the availability was 99.8%, the highest availability to date.

Industry Benchmark for Backlog is between 8,730 to 17,460 hours for maintenance based on current staffing, the total average backlog for FY17 was 16,666 hours, which is slightly below the industry benchmark. The slight decrease in backlog is from utilizing staff during Eversource Cable Outage to perform light maintenance tasks.

Deer Island Yearly Maintenance Metrics

4th Quarter - FY17

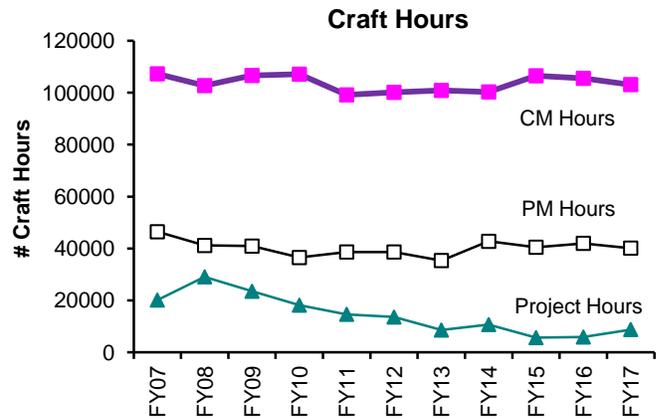
Overall Maintenance Program Measures (cont.)



Management continues its effort to keep overtime below the industry benchmark. DITP maintenance overtime was 6% for FY17. Management has taken steps to reduce overtime spending by limiting overtime to repair critical equipment and systems only.

DITP has been on or under Industry Benchmark from FY09 through FY16.

The increase in overtime in FY17 was due to the Eversource Cable Outage Project.



Continued optimization of the Preventive Maintenance (PM) program through the transfer of some light maintenance tasks from Maintenance to Operations staff (21% of PM hours at the end of FY17), elimination of duplicate work orders, increasing PM frequency due to equipment history and performance. Reliability-Centered Maintenance (RCM) recommendations resulted in a significant decrease of 6,303 hours in maintenance staff PM hours from FY07 to FY17.

Corrective Maintenance (CM) hours decreased from last year due to additional maintenance projects. Project Maintenance hours increased due to large HVAC Equipment Replacement, Grit Classifier Cover Rehabilitation, Upgraded Acid Washing Piping System, New Gas Valves for Gas Burners and Centrifugal Chopper Pump Replacement Projects.



■ Predictive Maintenance
 ■ Emergency Maintenance
 ■ Project
 ■ Corrective Maintenance
 ■ Preventive Maintenance

During FY17, the number of work orders increased by 3,391 from the previous year primarily due to the increase in Predictive Maintenance work orders (CBM) associated with the Condition Monitoring Program. The number of Corrective Maintenance (CM) work orders decreased slightly in FY17. Project (PROJ) work orders increased for FY17 due to additional maintenance projects scheduled.

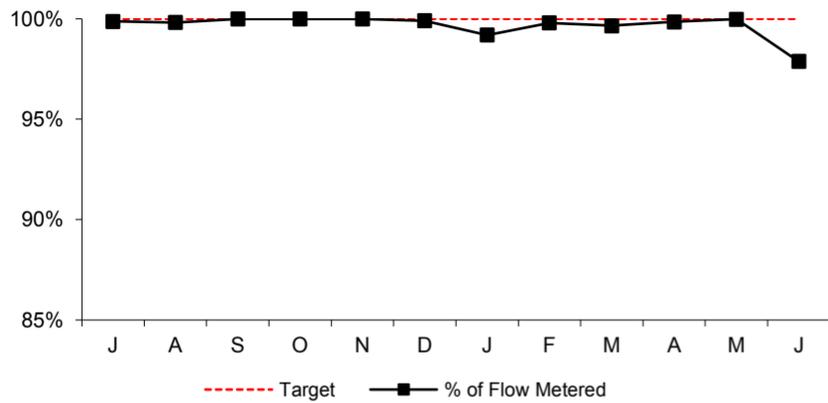
The DI Planning Unit, is continuously modifying PM, PdM, CM and CBM Job Plans to ensure maintenance is being performed efficiently and effectively, while ensuring reliability and availability of DITP's Assets.

Operations Division Metering & Reliability

4th Quarter - FY17

WATER METERS

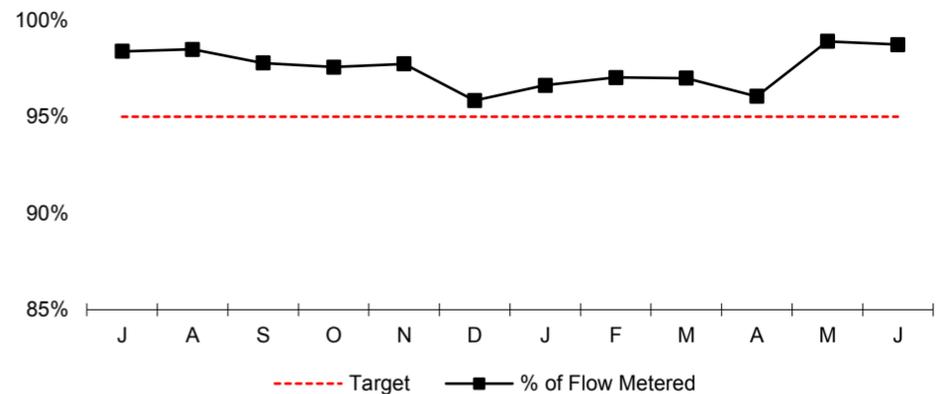
Percent of Total Revenue Water Deliveries Calculated Using Meters



The target for revenue water deliveries calculated using meters is 100%. Estimates are generated for meters that are out of service due to instrumentation problems or in-house and capital construction projects. During the 4th Quarter FY17, meter actuals accounted for 99.23% of flow; only 0.77% of total revenue water deliveries were estimated. Estimation in June due primarily to a Norwood construction project. The following is the breakdown of reasons for estimations: In-house and Capital Construction Projects - 1.08% Instrumentation Failure - .08%

WASTEWATER METERS

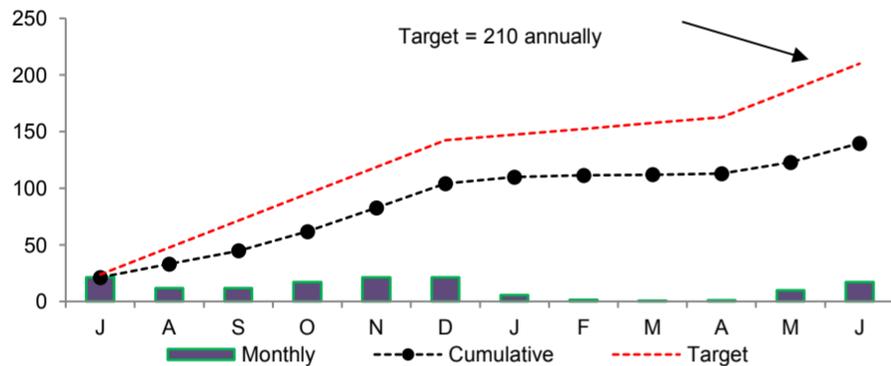
Percent of Total Wastewater Transport Calculated Using Meters



The target for revenue wastewater transport calculated using meters is 95%. Estimates are generated for meters missing data due to instrument failure and/or erratic meter behavior. Estimates are produced using data from previous time periods under similar flow conditions. During the 4th Quarter of FY17, meter actuals accounted for 97.90% of flow; only 2.10% of wastewater transport was estimated.

WATER DISTRIBUTION SYSTEM PIPELINES

Miles Surveyed for Leaks



During the 4th Quarter of FY17 27.8 miles of water mains were inspected. The total inspected for the fiscal year to date is 139.76 miles. Surveyed below target due to extensive community leak detection support.

Leak Backlog Summary

Month	J	A	S	O	N	D	J	F	M	A	M	J
Leaks Detected	3	2	2	3	3	3	0	0	3	2	1	0
Leaks Repaired	1	1	1	4	2	2	2	1	1	4	1	1
Backlog	7	8	9	8	9	10	8	7	9	7	7	6
Avg. Lag Time	24.9	42.3	36.7	41.3	45.2	51.9	62.3	70.6	67.4	69.2	72.6	78.3

During the 4th Quarter of FY17, three leaks were detected and six repaired. Six leaks remain unrepaired, of which, two are carried over from FY15. Refer to Leak Report below. Additionally during Q4 community assistance, (i.e. individual leak location work to hydrant surveys) was provided to the following communities:
 April: Arlington, Canton, Malden, Medford, Newton and Revere.
 May: Brookline, Canton, Medford, Revere and Somerville.
 June: Boston, DCR-Clinton, Lynn and Newton.

FY17 Leak Report

Date Detected	Location of Leaks	Repaired	Date Detected	Location of Leaks/Unrepaired
07/22/16	69 Riverside Avenue, Medford	07/29/16	6/8/2015	Allandale Rd. @ Grove St., Brookline, Sect 78, located acoustically, not surfacing
01/11/15	Arborway @ St. Joseph St., West Roxbury	08/15/16	6/17/2015	Washington St at East St, Dedham; Sect 77, located acoustically, not surfacing, need redundant SEH pipeline to enable isolation
09/15/17	West Squantum @ Amsterdam Ave., Quincy	09/20/16	7/01/2016	Forest St, Winchester, Sect 89, leaking blow off valve, not surfacing need redundant NIH pipeline to enable isolation
10/12/16	Prospect St at Sun St, Waltham	10/13/16	7/26/2016	Res. Playground, Cleveland Circle, in softball outfield, Fisher Hill main leaking into drain, not surfacing, need to repair in winter
10/13/16	1025 West Roxbury Parkway, Brookline	10/17/16	12/04/2016	1025 W Rxbry Pkwy, Brookline, Sect 95, located coustically, not surfacing, leaking blow off valve
08/11/16	Lee St at Boylston St, (Rte 9), Brookline	10/20/16	12/04/2016	710 Ashland St/Summer St, Lynn, Sect 91, not surfacing, leaking emergency connection valve between MWRA and LWSC systems LWSC has difficulty isolating 16" main.
10/18/16	West St at Lagrange St, West Roxbury	10/26/16		
11/02/16	Morton St at Blue Hill Ave, Dorchester	11/07/16		
06/01/16	Commonwealth Ave at Oakland Ave, Newton	11/30/16		
11/06/16	2 Lynn Fells Parkway, Near W. Wyoming, Stoneham	12/22/16		
11/06/16	122 Lynn Fells Parkway at Youle St, Melrose	12/30/16		
09/28/16	Quinobequin Rd at Rte 128, Newton	01/04/17		
12/20/16	Main St at Madison, Malden	01/09/17		
08/30/16	Morton St at American Legion Hwy, W. Roxbury	02/22/17		
07/16/15	Capt Robt Cook Drive, Needham, Sect 80	03/15/17		
03/22/17	Route 128 NB Newton, Sect 80	04/03/17		
03/27/17	Recreation Rd, Weston, Sect 80	04/07/17		
04/22/17	Section 80, Grove St, Newton	04/22/17		
03/20/17	Section 39, 335 Hyde Park Ave	04/24/17		
04/09/17	Morton St., Dorchester, Section 58, line isolated	05/04/17		
05/15/17	Beach Street, @ Eaton Street, Revere	06/07/17		

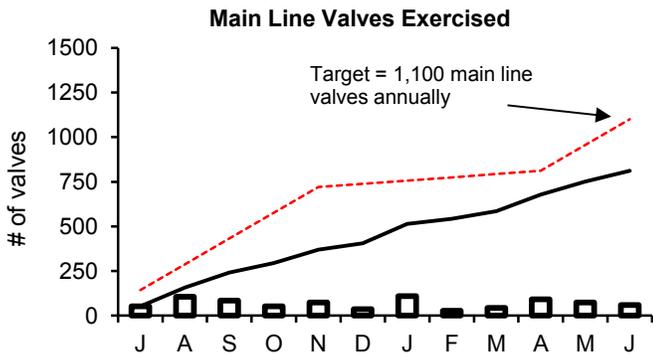
Water Distribution System Valves

4th Quarter - FY17

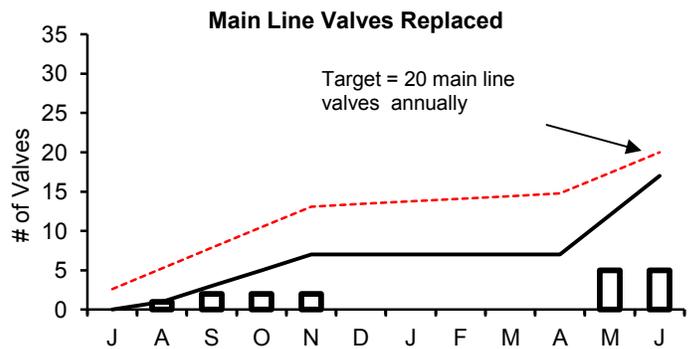
Background

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.

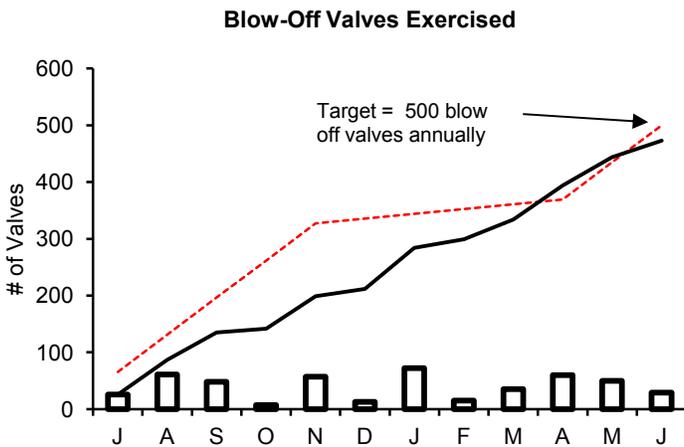
Type of Valve	Inventory #	Operable Percentage	
		FY17 to Date	FY17 Targets
Main Line Valves	2,159	95.7%	95%
Blow-Off Valves	1,317	97.4%	95%
Air Release Valves	1,380	94.6%	95%
Control Valves	49	100.0%	95%



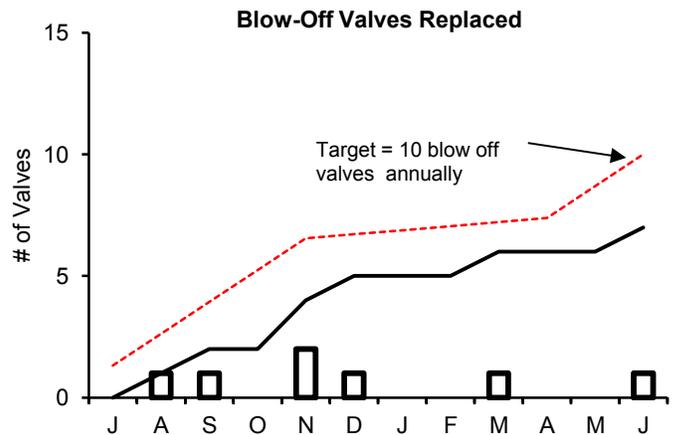
During the 4th Quarter of FY17, staff exercised 225 main line valves. The total exercised for the fiscal year is 811. Below target due to high priority CIP projects.



During the 4th Quarter of FY17, staff replaced ten main line valves. The total replaced for the fiscal year is 17. Below target due to non-valve replacement project, e.g. Deer Island rip rap work.



During the 4th Quarter of FY17, staff exercised 139 blow off valves. The total exercised for the fiscal year is 473.



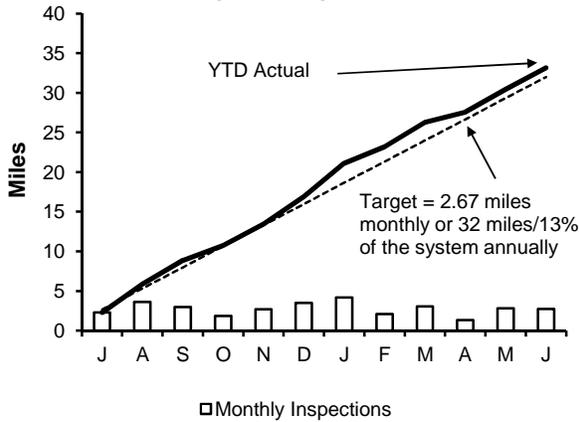
During the 4th Quarter of FY17, staff replaced one blow off valve. The total replaced for the fiscal year is seven. Below target due to non-valve replacement project, e.g. DITP rip rap work.

Wastewater Pipeline and Structure Inspections and Maintenance

4th Quarter - FY17

Inspections

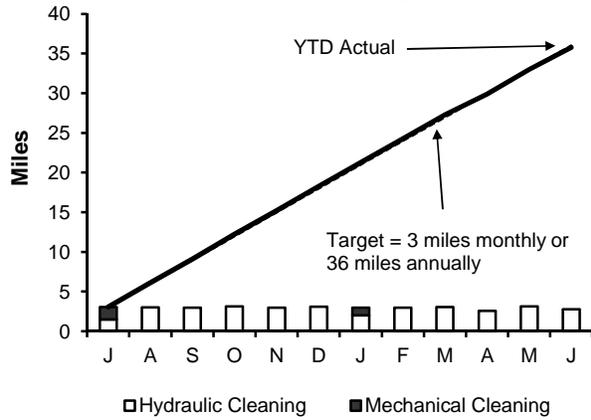
Pipeline Inspections



Staff internally inspected 6.89 miles of MWRA sewer pipeline during this quarter. The year to date total is 33.17 miles. Community Assistance was provided to the city of Somerville(287' of 12" sewer) and Cambridge(100' of 12" sewer) this quarter.

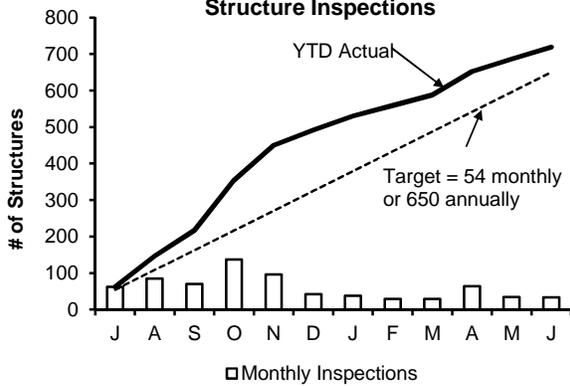
Maintenance

Pipeline Cleaning



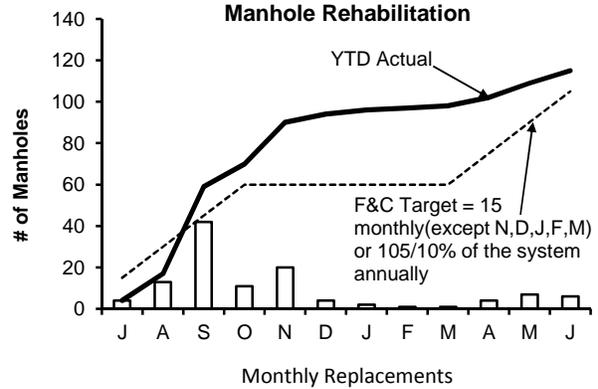
Staff cleaned 8.47 miles of MWRA's sewer system and removed 40 yards of grit and debris during this quarter. The year to date total is 35.78 miles. No Community Assistance was provided this quarter.

Structure Inspections



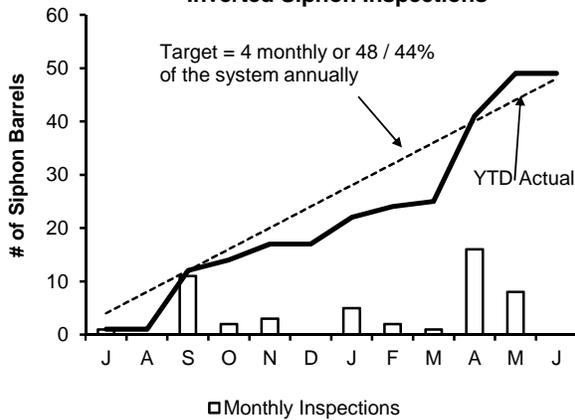
Staff inspected the 36 CSO structures and performed 131 additional manhole/structure inspections during this quarter. The year to date total is 719 inspections.

Manhole Rehabilitation



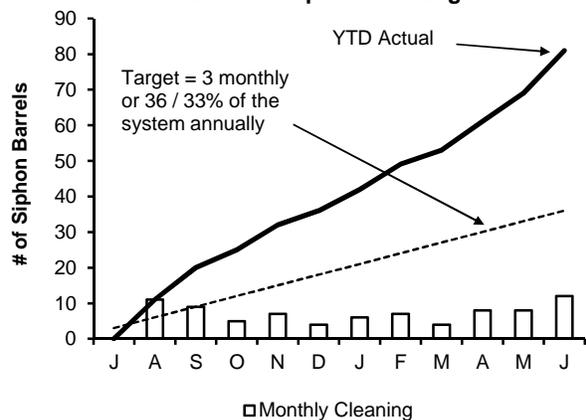
Staff replaced 17 frames & cover during this quarter. The year to date total is 115.

Inverted Siphon Inspections



Staff inspected 24 siphon barrels this quarter. Year to date total is 49 inspections.

Inverted Siphon Cleaning

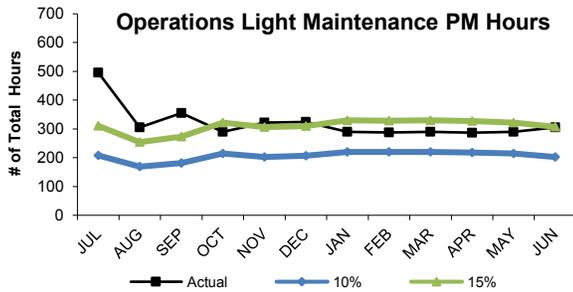


Staff cleaned 28 siphon barrels during this quarter. Year to date total is 81.

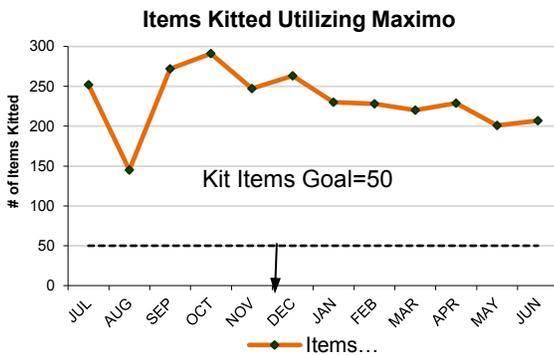
Field Operations' Metropolitan Equipment & Facility Maintenance

4th Quarter - FY17

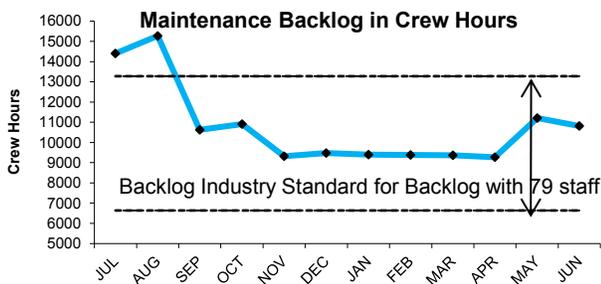
Several maintenance and productivity initiatives are in progress. The goal for the Overall PM completion and the Operator PM completion was raised to 100% for Fiscal Year 2010. The Operator PM and kitting initiatives frees up maintenance staff to perform corrective maintenance and project work, thus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



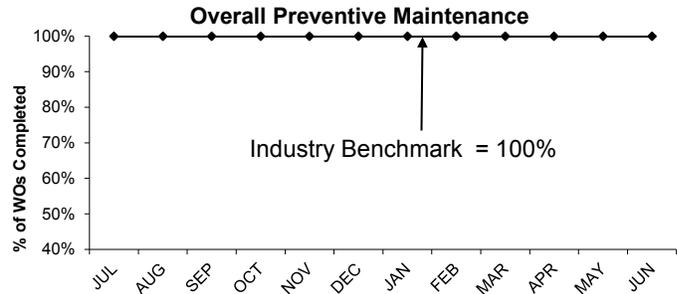
Operations staff averaged 294 hours of preventive maintenance during the 4th Quarter, an average of 14% of the total PM hours for the 4th Quarter, which is within the industry benchmark of 10% to 15%.



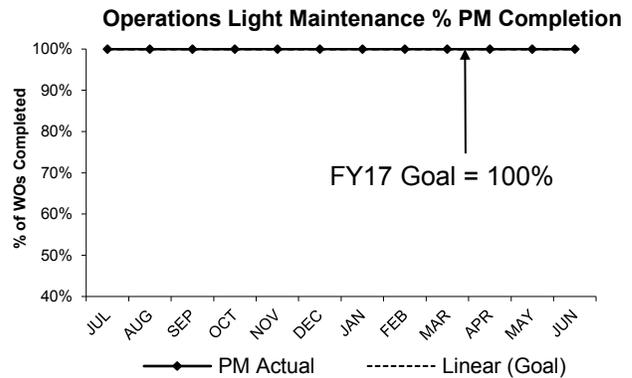
In an effort to more efficiently complete work, maintenance staff and work coordination staff have utilized the Lawson/Maximo interface to better kit stock and non stock material. The goal for FY17 is to "kit" 50 stock and non stock items total per month. An average of 212 items were kitted during the 4th Quarter



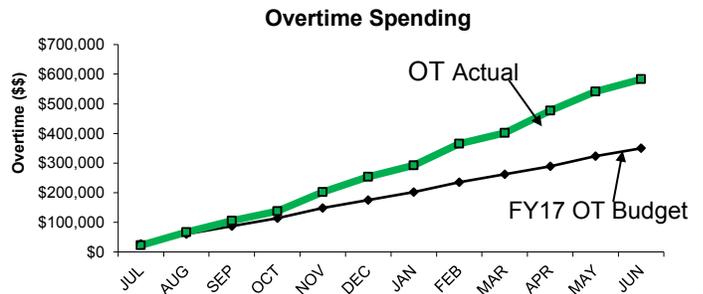
The 4th Quarter backlog average is 10431 hours. Management's goal is to continue to control overtime and still stay within the industry benchmark of 6450 to 12,940 hours.



The Field Operations Department (FOD) preventive maintenance goal for FY17 is 100% of all PM work orders. Staff completed an average of 100% of all PM work orders in the 4th Quarter.



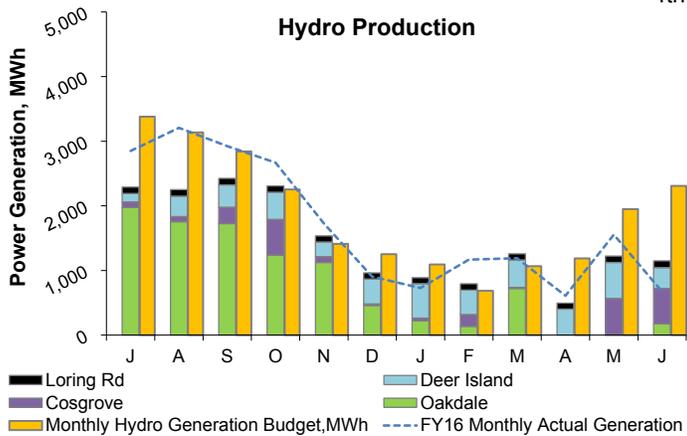
Wastewater Operators complete light maintenance PM's which frees up maintenance staff to perform corrective maintenance. Operations' FY17 PM goal is completion of 100% of all PM work orders assigned. Operations completed an average of 100% of PM work orders in the 4th Quarter.



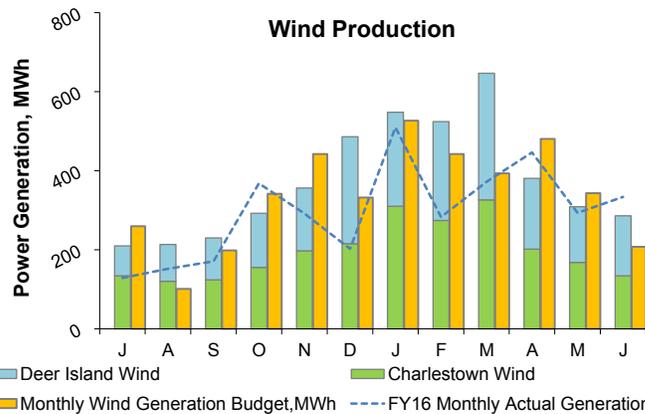
Maintenance overtime was \$94k over budget for the 4th Quarter and \$233k over budget for FY17. Overtime was used for staging wet weather events and performing critical maintenance repairs. The year end total of overtime spending was \$583k for FY17.

Renewable Electricity Generation: Savings and Revenue

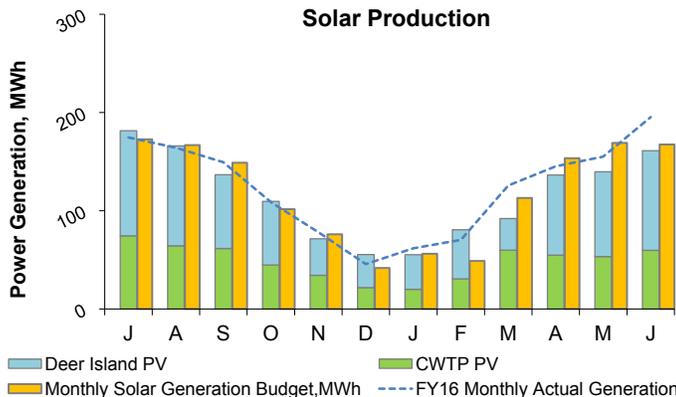
4th Quarter - FY17



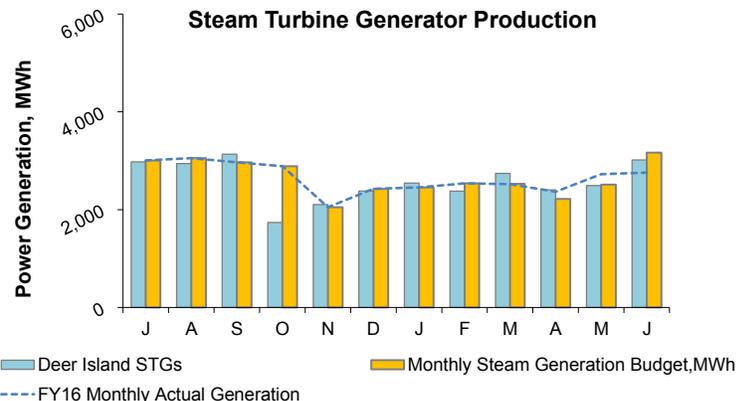
In the 4th quarter, the renewable energy produced from all hydroelectric facilities totaled 2,867 MWh; 47% below budget³. The total energy produced in FY17 is 17,578 MWh; 22% below budget³, partly due to Cosgrove operating at a lower rate for scheduled testing, and both Deer Island hydro turbines being temporarily off-line due to mechanical issues (during the first quarter). Oakdale was also offline for most of the 4th Quarter due to transformer replacement and turbine maintenance. The total savings and revenue² to date in FY17 (actuals through May¹) is \$653,472; 43% below budget³, partly due to the fact that the actual electricity unit price for Deer Island has been 9% below the budgeted³ estimate for the same period and due to the reasons stated above. The savings and revenue value does not include RPS REC revenue (see next page).



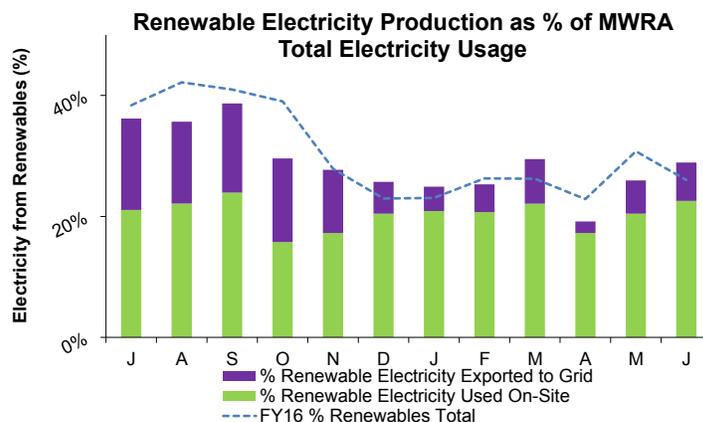
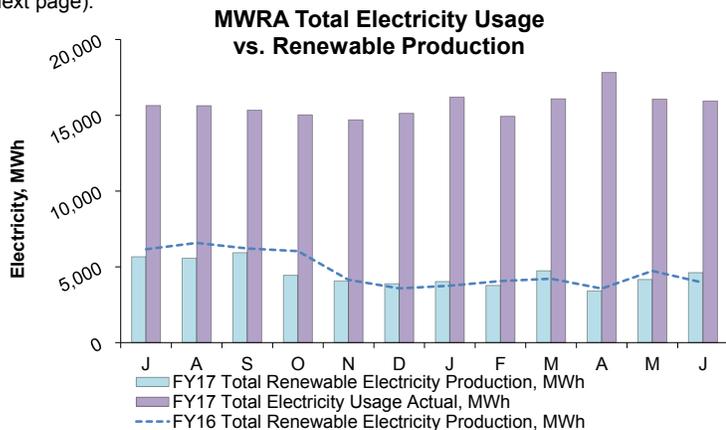
In the 4th quarter, the renewable energy produced from all wind turbine generators totaled 976 MWh; 5% below budget³. The total energy produced in FY17 is 4,483 MWh; 10% above budget³. The total savings and revenue² to date in FY17 (actuals through May¹) is \$577,823; 6% above budget³. The savings and revenue value does not include RPS REC revenue (see next page).



In the 4th quarter, the renewable energy produced from all solar PV systems totaled 437 MWh, 11% below budget³. The total energy produced in FY17 is 1,386 MWh; 2% below budget³. The total savings and revenue² to date in FY17 (actuals through May¹) is \$139,642; 2% below budget³. The savings and revenue value does not include RPS REC revenue (see next page).



In the 4th quarter, the renewable energy produced from all steam turbine generators totaled 7,914 MWh, equal to budget³. The total energy produced in FY17 is 30,862 MWh; 3% below budget³. The total savings and revenue² to date in FY17 (actuals through May¹) is \$2,214,925; 12% below budget³, partly due to the fact that the actual electricity unit price for Deer Island has been 9% below the budgeted³ estimate for the same period. The savings and revenue value does not include RPS REC revenue (see next page).

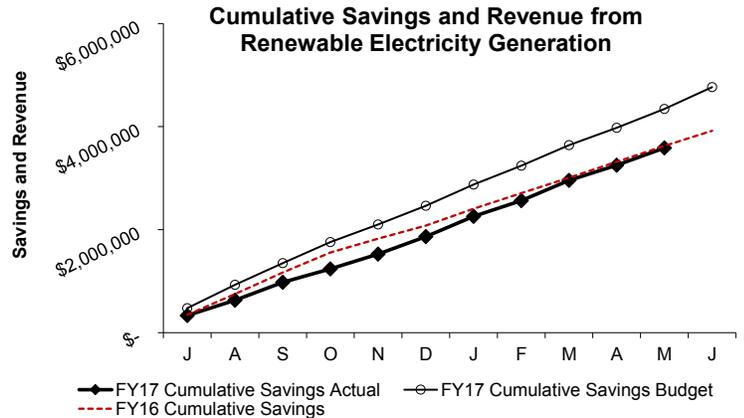
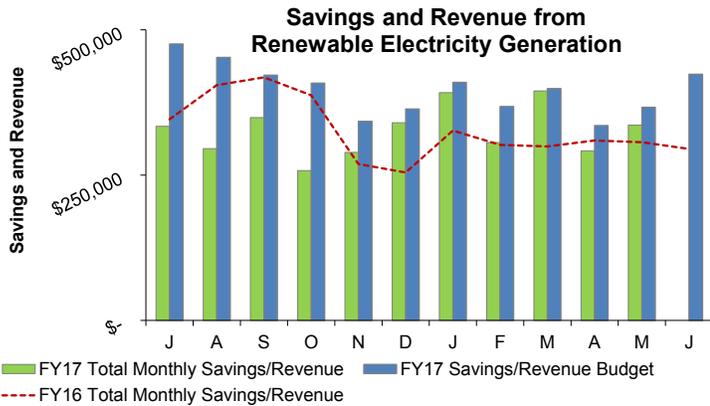


In FY17, MWRA's electricity generation by renewable resources totaled 54,309 MWh. MWRA's total electricity usage was approximately 188,501 MWh. The MWRA total electricity usage is the sum of all electricity purchased for Deer Island and FOD plus electricity produced and used on-site at these facilities. 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 FY17, 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.

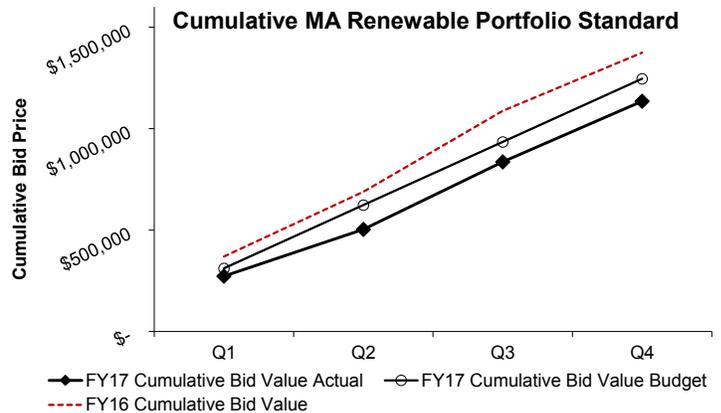
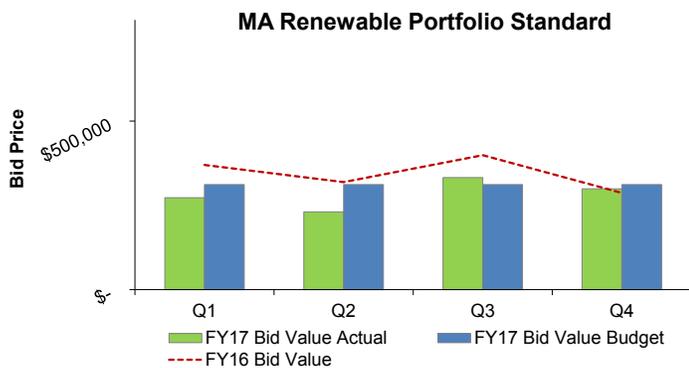
- Notes:
1. Only the actual energy prices are being reported. Therefore, some of the data lags up to 3 months due to timing of invoice receipt.
 2. Savings and Revenue: Savings refers to any/all renewable energy produced that is used on-site therefore saving the cost of purchasing that electricity, and 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

4th Quarter - FY17

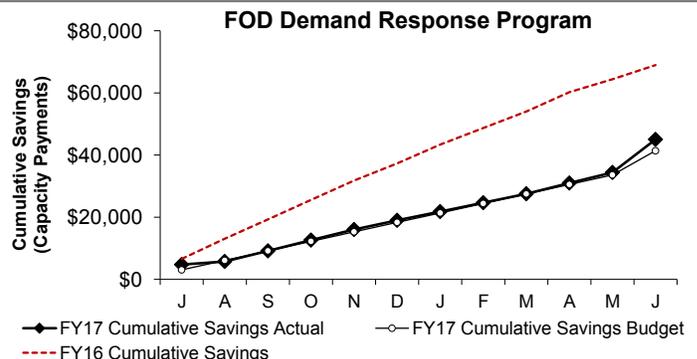
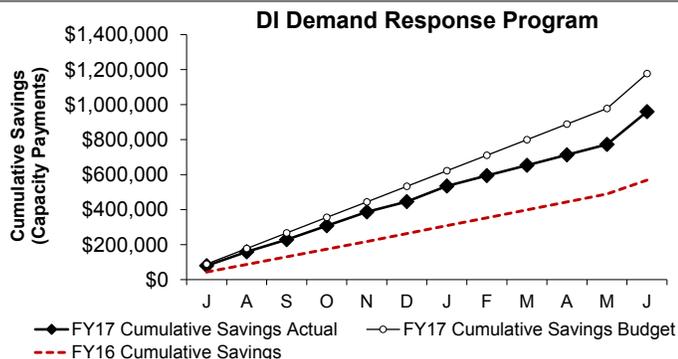


Savings and revenue from MWRA renewable electricity generation in the first 11 months of FY17 (actuals through May¹) is \$3,585,862; which is 17% below the budget³, partly due to the fact that the actual electricity unit price for Deer Island has been 9% below the budgeted² estimate for the same period. Also due to DI STGs performing 40% below budget in October due to annual maintenance work on both STGs and the entire Thermal Power Plant. Savings and revenue² from all renewable energy sources include wind turbines, hydroelectric generators, solar panels, and steam turbines (DI). This includes savings and revenue due to electricity generation (does not include avoided fuel costs and RPS RECs). The use of DITP digester gas as a fuel source provides the benefit of both electricity generation from the steam turbine generators, and provides thermal value 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 4th Quarter¹ from MWRA's renewable energy assets; 5,809 Q4 CY2016 Class I Renewable Energy Certificates (RECs), 4,411 Q4 CY2016 Class II RECs, and 43 Q4 CY2016 Solar RECs were sold for a total value of \$299,100 RPS revenue; which is 4% below budget³ for the Quarter. REC values reflect the bid value on the date that bids are accepted, even though the RECs were produced during Q4 of CY2016. Cumulative bid values reflects the total value of bids received to date.

Note: Only Class I and Solar RECs were sold for Q1 CY2016 sales. All of the available Q1 CY2016 Class II RECS were transferred to the electricity supplier (Direct Energy) to meet MWRA's obligation to them.



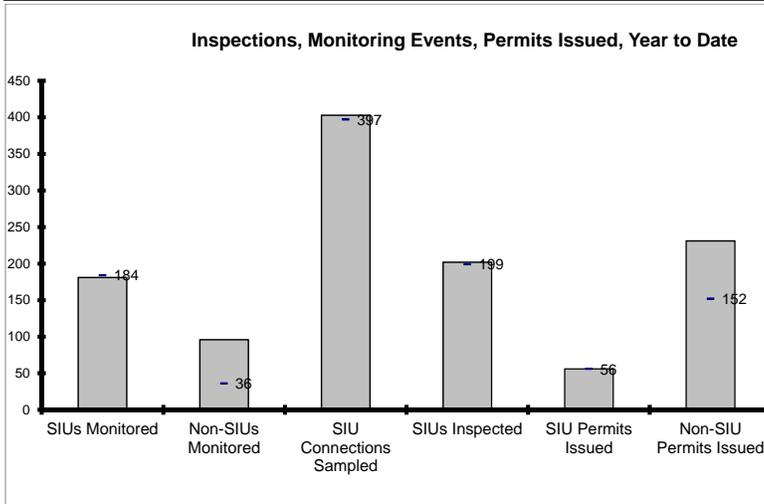
Currently Deer Island, JCWTP, and Loring Rd participate in the ISO-New England Demand Response Programs⁴. By agreeing to reduce demand and operate the facility generators to help reduce the ISO New England grid demand during periods of high energy demand, MWRA receives monthly Capacity Payments from ISO-NE. When MWRA operates the generators during an ISO-NE called event, MWRA also receives energy payments from ISO-NE. FY17 Cumulative savings (Capacity Payments only) through June¹ total \$959,726 for Deer Island and \$45,020 for FOD. Demand response payments are based on avoided electricity demand as measured during two audits per year. Higher electrical demand on the day of the audit will result in higher demand response payments. In FY17 the audits measured less electrical demand than anticipated in the budget, so payments were less than anticipated.

Notes:

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

Toxic Reduction and Control

4th Quarter - FY17



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 in the month. However, many of these industries have more than one sampling point and the "SIU Connections Sampled" data reflect samples taken from multiple sampling locations at these industries.

EPA requires MWRA to issue or renew 90% 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. For this fiscal year.

	Number of Days to Issue a Permit						Total Permits Issued	
	0 to 120		121 to 180		181 or more		SIU	Non-SIU
	SIU	Non-SIU	SIU	Non-SIU	SIU	Non-SIU		
Jul	0	23	0	0	0	0	0	23
Aug	4	14	0	1	0	0	4	15
Sep	2	15	0	1	1	1	3	17
Oct	0	9	0	1	0	0	0	10
Nov	2	9	0	2	0	1	2	12
Dec	6	17	0	1	0	1	6	19
Jan	3	17	0	4	0	0	3	21
Feb	6	16	0	2	1	1	7	19
Mar	11	18	0	2	0	0	11	20
Apr	8	26	0	3	0	3	8	32
May	6	15	0	4	0	1	6	20
Jun	6	21	0	1	0	1	6	23

% YTD	96%	87%	0%	10%	4%	4%	56	231
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In the 4th Quarter of FY17, ninety-five permits were issued, twenty of which were SIUs. The SIU permits were all issued within 120 days. There were thirteen non-SIU permits issued beyond the 120-day timeframe with five of them beyond the 180-day timeframe.

Overall for FY17, 96% of all SIU permits issued, (54 of 56), met the 120-day requirement. However the two remaining SIU permits were issued beyond the 180-day timeframe - one had late-payment of fees problems and the other was delayed during the permit category determination phase.

The new Clinton NPDES permit effective March 1, 2017, requires TRAC to issue/renew all industrial user control mechanisms within 90 days of their expiration date or within 180 days after the industry has been determined to be an SIU. While three Clinton SIU permits were issued in this fiscal year, two of them were issued since March 1, and both complied with the 90-day timeframe.

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. With the September 2016 change in the Mass DEP regulations, increasing the molybdenum limits to 40 mg/kg for land use application, the MWRA may more often be able to sell its pellets in-state 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.

In the last three months, the level of molybdenum has been hovering around the 2016 average for the April to June months. MWRA has met the DEP's requirement for the 4th quarter. MWRA exceeded the DEP's requirement for July, August, September and October of FY17. MWRA and its contractor, NEFCO, do not distribute product that does not meet the suitability standards.

EPA Required SIU Monitoring Events
for FY17: 184
YTD : **181**

Required Non-SIU Monitoring Events
for FY17: 36
YTD : **96**

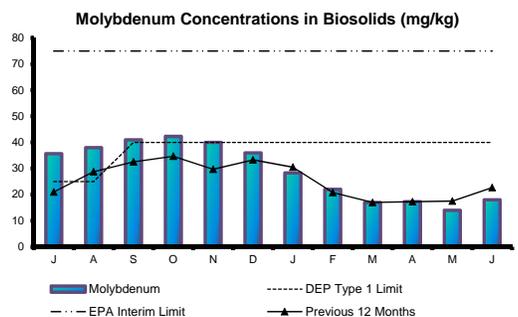
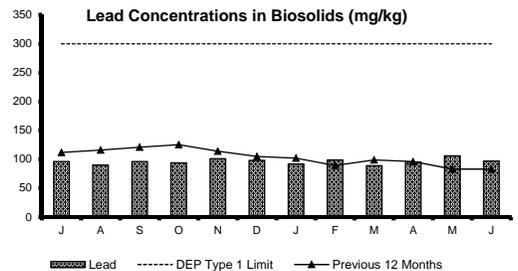
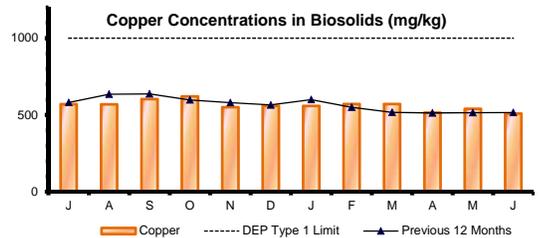
SIU Connections to be Sampled
For FY17: 397
YTD: **403**

EPA Required SIU Inspections
for FY17: 199
YTD: **202**

SIU Permits due to Expire
In FY17: 56
YTD: **56**

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, partial sample event is counted as an event although not enough sample was taken due to discharge rate, increased inspections has led to permit category changes requiring additional monitoring events. This accounts for the difference in the goal set for FY17 and the actual number of events monitored.

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. Permit issuance can be delayed for several reasons including; non-payment of fees, MWRA awaiting the company's submittal of sample results for final determination of SIU category, or MWRA enforcement action.



Field Operations Highlights

4th Quarter – FY17

Western Water Operations and Maintenance

- Carroll Water Treatment: Staff replaced the plug valve that connects the storage tank drain (mud) valve system to the dewatering chamber. Valve Maintenance and Machine Shop Staff made modifications to the spool piece to accommodate the new valve and leak tested the system after the work was completed. Treatment plant returned to full plant operation after completing the annual half plant shutdown and necessary work to accommodate the Wachusett Aqueduct Pump Station Project. Aqua Aerobic Systems (which acquired the original supplier of the Ozone Generators. Fuji Electric) was hired to service the four Ozone Generator Power Supply Units and did an external inspection of the Ozone Generators.
- Diving Operations: Staff supported underwater diving operations at multiple locations. Norumbega Covered Storage Tank was undergoing an internal inspection for material buildup as well as structural condition. Winsor Power Station Intake had divers replacing the traveling screens as well as cleaning the intake channel. Quabbin Shaft 12 had divers doing an internal inspection to support the design project to install a shutdown mechanism. All required support for Lock Out/Tag Out (LOTO), Valve Operations as well as coordination to mitigate impacts to the operating system.
- Oakdale Power Station: Staff utilized the shutdown in April when no water was being transferred from the Quabbin Reservoir to perform electrical and mechanical projects. The main power generation transformer was replaced, the old transformer removed from the site, and the transformer pad modified. Mechanical repairs were also made to the lower guide bearing for the turbine. This bearing is monitored by a Vibration Based Predictive Maintenance Program, which indicated a slightly elevated vibration. During the shutdown, the guide bearing was removed and inspected, the Babbitt and Housing repaired and the turbine was placed into service in June to meet demand and establish the interflow conditions in the Wachusett Reservoir.

Metro Water Operations and Maintenance

- Water Pipeline Program: Work on the Deer Island Rip Rap Project that began in the 3rd Quarter was completed, prior to Sail Boston on June 17th. A project to increase flow capacity at Meter 130 supplying Winchester was completed, including installation of 12" piping, valves, and a larger insert Venturi Tube to improve pressure. The emergency connections that had been opened were closed, and the Winchester system was returned to its normal configuration. On May 18, Washington, D.C. experienced a break in an 1860's cast iron water main, and were in need of repair parts. Paul Burrige, Senior Program Manager drove four 30" repair couplings to Washington that day, arriving before 9pm. DC Water was able to make the repair due to MWRA's delivery of the repair couplings. A Leak Detection Survey was performed on 27.8 miles of MWRA water main, and community assistance was provided to Arlington, Boston, Brookline, Canton, DCR-Clinton, Lynn, Malden, Medford, Newton, Revere, Somerville and Wakefield. Community assistance was provided to Medford, Swampscott and Winthrop with community-owned Pressure Reducing Valves (PRVs). Winthrop had experienced a water main break due to its PRV malfunctioning, and Swampscott's tank was approaching its overflow level due to its malfunctioning PRV. Assistance was provided to Malden to rebuild their Meter 204 PRV and to Swampscott to adjust the operating range of their Meter 115 PRV. Assistance was provided to Winthrop late in June as the town dealt with another water main break. A 6" pump was deployed to assist with trench dewatering. The normally closed PRV on Section 108 in Norwood was flushed and placed into service to allow the Town of Norwood to perform valve and piping work in their distribution system. The work being done by Norwood requires that Meter 163 to the town be isolated and out of service for the duration of the project.
- Commonwealth Avenue Pump Station SCADA Upgrade: The control system in the Comm Ave Pump Station dates back to the construction of the west building in 2000, and is outdated. In early April, the Programmable Logic Controller (PLC) in the west building was replaced, with the east building remained in operation. The PLC and control system were successfully replaced, and an updated SCADA screen created for operation and control of the pump station from the Operations Control Center (OCC) in Chelsea.

Operations Engineering

Norumbega Tank Inspection: The tank inspection began on April 24th. A crack showing signs of infiltration in the roof of Cell 2 was discovered and thus needed to be repaired immediately. The inspection was suspended and a waterproofing contractor was hired to repair the roof from above. Cracking was also discovered along the walls and ceiling of the effluent channel, but no signs of infiltration. This will be evaluated when the full report is received and reviewed. The inspection was completed and the tank was placed in normal operation June 9th. While the covers over the hatches were removed for the inspection, the hatch alarms were updated.

Commercial Point CSO Chemical Building Demolition: Staff are obtaining the necessary permits required to demolish this building.

EAP for City, City Extension and the Dorchester Tunnels: Operations Engineering and Planning are currently, developing operation plans for the reconfiguration of the system during a tunnel isolation. A training course for MWRA Personnel is also being developed, with training to begin in late September or early October. The SOPs for the isolation for the tunnel system are also being finalized.

Wastewater Operations & Maintenance -- Wastewater Operations

- Alewife Brook Pump Station Rehabilitation-Contract #6797: Operations Staff is working with Construction Staff and the Contractor for this project. The contractor continued testing the bypass pumping system in April. Operations Staff attended the monthly Project Coordination Meeting onsite at the facility and several Bypass Pumping Meetings, and several internal coordination meetings in May. Bypass pumping documentation for this project was reviewed in June. Operations Staff also attended Mission Control (Bypass Pumping SCADA/Remote Monitoring System) Training.
- Back-Up Pump Control: Operations Staff attended meetings with Process Control and SCADA Staff to review and revise back-up pump control test procedures. The new procedures will be utilized to test back-up pump controls and ensure proper operation.

Metro Equipment and Facility Maintenance -- Equipment Maintenance Program

- Nut Island Load Bank: The Nut Island Emergency Generator load bank was becoming unreliable due to age and environment. A new load bank was purchased and installed by MWRA Electricians.

Field Operations Highlights

4th Quarter – FY17

- Chelsea Headworks: MWRA Plumbers conducted Grit Pipe Thickness Testing using non-invasive ultrasonic testing. Exhaust Fan Motor #1 experienced a bearing failure, and was replaced with a motor in stock. The failed motor will be rebuilt as a spare.
- Prison Point Dryweather Pump #1: The check valve failed, and a new valve was purchased and installed by MWRA Plumbers.

Metering

- Meter Systems: Staff continues to work with MIS to update the Telog Virtual Network and putting all the wireless meters on a private network. Staff prepared and presented the Staff Summary for the Wastewater Replacement Contract to the Board of Directors. Assisted Canton, Chelsea and Quincy on water loss issues. Worked with DCR on dam monitoring at Reservoir 2 in Framingham.

TRAC

- The New Clinton NPDES Permit became effective March 1, 2017. It requires MWRA to issue or renew all necessary Industrial User control mechanisms within 90 days of expiration or within 180 days after the industry has been determined to be a Significant Industrial User (SIU). During the 4th Quarter, TRAC issued two SIU Permits in Clinton, both within 90 days of receipt of the application.
- TRAC Staff conducted 171 Annual SIU Inspections, 1,255 other inspections and 178 Industrial Surveys. All the required Annual SIU Inspections for FY17 were complete by May 31, 2017. During the month of June, TRAC Staff conducted 52 spot inspections, 16 Industrial Surveys, and 29 other inspections.
- TRAC Staff monitored the septage receiving sites a total of 132 times. Staff conducted 6 septage hauler inspections necessary to renew and update a Septage Hauler Permit. Staff conducted 725 inspections of existing gasoline/oil separators, inspected 126 new construction gasoline/oil separators, and 8 MWRA Facility gasoline/oil separators.

Environmental Quality-Water

Algae

- From June 26th-30th, Staff provided on-site sampling and sonde profiling support at the Chestnut Hill Standby Reservoir in response to a Cyanobacteria Bloom.
- Staff continued with monitoring activity for nuisance taste and odor algae throughout June. Algae sampling increased as a result of elevated *Anabaena* Levels within Wachusett Reservoir. *Anabaena* Levels subsided and did not result in the need for an algaecide treatment.

Community Support

In coordination with MWRA Department of Laboratory Services (DLS) and the Massachusetts Department of Environmental Protection (DEP), Staff coordinated and facilitated six sessions of MWRA's biennial Drinking Water Sampler Program.

- On May 3rd, Staff provided equipment and training to DCR Staff involving sensor module replacement on several probes installed on the two EXO2 Monitoring Sondes belonging to DCR. Staff provided training on June 16th to seven DCR Staff on the calibration and deployment of Turner Sondes. Training included a review of Standard Operating Procedures (SOPs) for sonde calibration and field sampling and hands-on field sampling exercise at the Sudbury Reservoir using a Turner Sonde.

In-House Support

- Staff provided sampling support for the Norumbega Covered Storage Tank Inspection Project throughout May and June. During the offline tank cell period, sediment and water samples were collected and transferred for testing. Results showed that the water was suitable for cell reactivation. Additionally, Staff monitored chlorine residuals throughout the duration of the project using the Contaminant Monitoring System (CMS) and weekly grabs' sample checks.
- In June, Staff began quarterly monitoring at Sudbury Standby Reservoir. Samples were collected for various water quality parameters including: UV254, dissolved oxygen, specific conductance, pH, nutrients, nitrate, total organic carbon and algal toxins. Staff performed a full-depth sonde profile and collected samples from epilimnion through hypolimnion.

Buoy

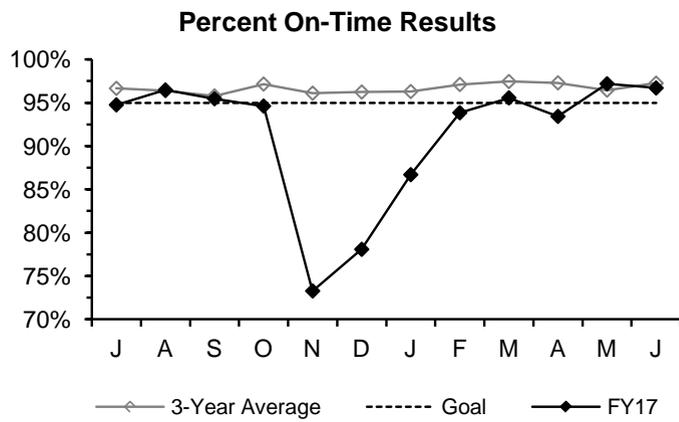
- On May 12th, Staff completed deployment of Buoys 2, 3 and 4. All three buoys have EXO2 and Turner Sonde Equipment currently collecting data from the Wachusett Reservoir. A new Gull/Cormorant Deterrent Device was installed on Buoy 4 to prevent gulls and cormorants from dropping fecal matter on buoy equipment, and being evaluated for its effectiveness at deterring the birds.
- Contaminant Monitoring System: Staff responded to two CMS alarm incidents in April, four in May and seven in June. Normal response protocols were followed in each incident.

Environmental Quality—Wastewater

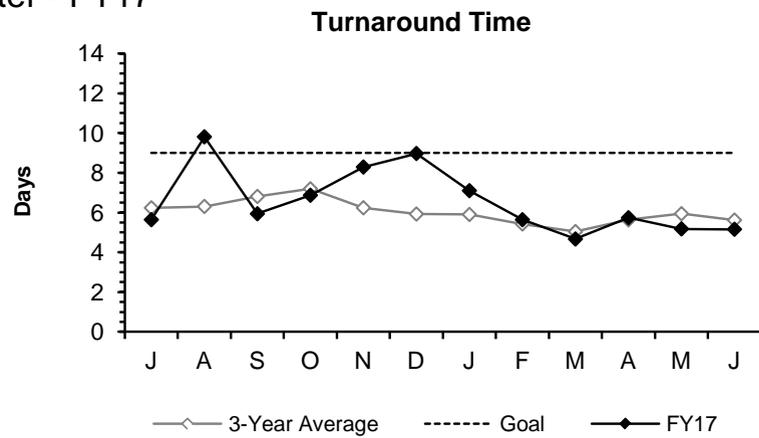
- Ambient Monitoring: Analysis and interpretation of results from 2016 monitoring occurred this quarter, as did numerous field surveys.
- Harbor/Beach/CSO Monitoring: Harborwide monitoring continues. CSO receiving water monitoring also continues with daily sampling rotating between subareas in support of the water quality standards variance. In 2017, limited weekend sampling after rainstorms has been added to the program to fully characterize return to baseline, and DLS staff were able to sample an extended period after a few storms including early April and over Memorial Day weekend. DCR beach sampling began on a weekly basis on May 25, daily after June 19; results are being posted to MWRA.com as they are received.
- Cooperation with Other agencies: ENQUAL Staff attended a Metropolitan Beaches Commission Meeting in Lynn on Kings Beach' issues on May 30th. Several ENQUAL Staff attended the Boston Harbor & Islands Symposium sponsored by the National Park Service and Massachusetts Bays Program in April and MWRA Staff gave three oral presentations and prepared three posters.

Laboratory Services

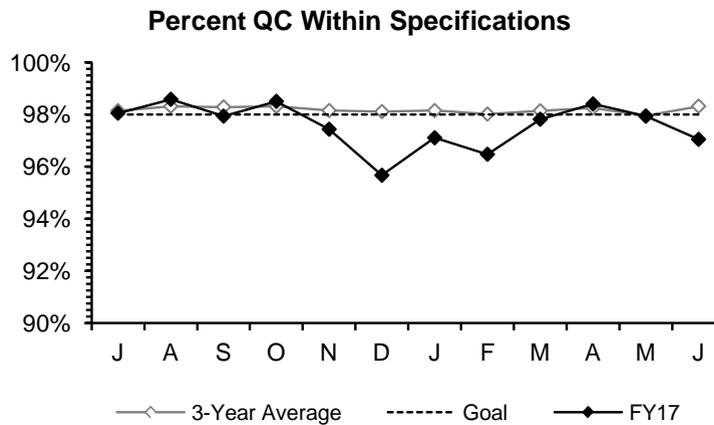
4th Quarter - FY17



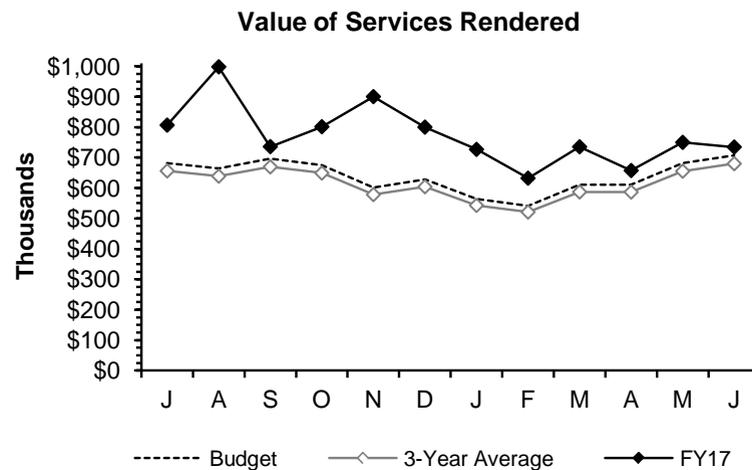
The Percent On-Time measurement was above the 95% goal 2 out of 3 months for the quarter. All regulatory reporting deadlines were met.



Turnaround Time was faster than the 9-day goal for the 3 months of the quarter.



Percent of QC tests meeting specifications was slightly below the 98% in-house goal for 2 months of the quarter. While this didn't affect regulatory reporting, it did require some re-work to obtain acceptable QC.



Value of Services Rendered was above the seasonally adjusted budget projection for three months of the quarter.

Highlights:

S. Rhode was re-appointed to a second three-year term on the Association of Public Health Laboratories' Environmental Lab Sciences Committee.

Harmful Algal Blooms:

S. Rhode was one of five contributors to a new APHL publication, "A Freshwater Algal Toxin Guidance Document for Public Health Laboratories". Harmful algal blooms can be a problem in every region of the country.

Cyanide:

A peer-reviewed paper, "Free Cyanide Forms During Drinking Water Free Cyanide Determination" by M. Delaney and C. Blodgett has been accepted for publication in the Journal of the American Water Works Association.

Quality Assurance:

The Southboro Lab successfully participated in a DEP certification audit, with perfect results. We passed all 29 annual drinking water microbiology Proficiency Test samples on the first try. These are required to maintain DEP certification.

DITP:

We successfully participated in an audit by DEP on DITP's air permit. We are unaware of any adverse findings.

Clinton:

DEP conducted an on-site audit for chemistry certification at the Clinton Laboratory. We are working on addressing the small number of minor findings. The microbiology DEP audit will be in August.

Drinking Water:

MWRA's participation on EPA's Environmental Laboratory Advisory Board has resulted in a letter to EPA advising them of several ways to improve drinking water testing for cyanide to avoid getting false positive results.

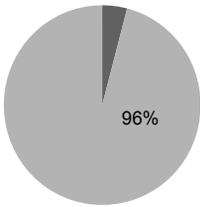
CSO Assessment:

We continued to perform weekend CSO receiving water sampling in the Charles and Mystic Rivers during/after significant wet weather events. This is intended to give additional data for the CSO Assessment to document the recovery of the rivers after it

CONSTRUCTION PROGRAMS

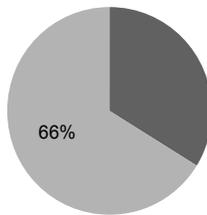
Projects In Construction 4th Quarter - FY17

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

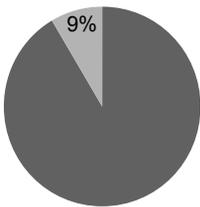
NIH Section 110 Reading & Woburn

Project Summary: This project involves the construction of 8,800 linear feet of 36-inch water transmission main in the City of Woburn and the Town of Reading.

Notice to Proceed: 12-Jan-2016 Contract Completion: 30-Mar-2018

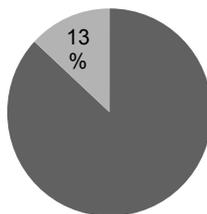
Status and Issues: As of June, the Contractor began final paving preparation and associated work such as resetting granite curbing, sidewalk construction, driveway apron construction, ramp construction and removal of structure castings.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

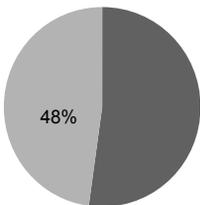
Chelsea Creek Headworks Upgrade

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

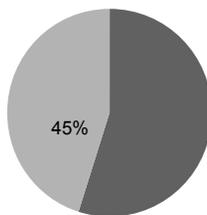
Status and Issues: As of June, Channel 1 abatement was completed and the channel was returned to service, after which the abatement of Channel 2 began. The HVAC contractor continued with the removal of ductwork on the operating levels prior to abatement activities.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

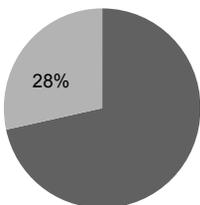
Wachusett Aqueduct Pumping Station

Project Summary: This project involves the construction of a 240 MGD pump station to supply water from the Wachusett Aqueduct to the Carroll Water Treatment Plant.

Notice to Proceed: 1-Mar-2016 Contract Completion: 14-Feb-2019

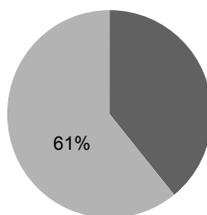
Status and Issues: As of June, the Contractor worked on the following: began plumbing installation, installed bridge crane, installed structural steel and continued work on the south wall of the Pipe Gallery. They also, continued with the slide/weir gates, installed wet well access hatches and 36" pumps #1 through #6.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

Alewife Brook Pump Station Improvements

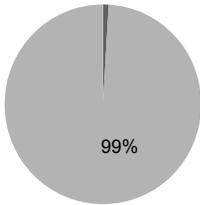
Project Summary: This project involves the replacement of wet-weather pumps, motors, gear drives, VFD's, MCC, screens, sluice gates, standby generator, roof, PLC's and HVAC. Also, the remediation of PCB's and asbestos and the installation of a flow meter on the 66-inch downstream Alewife Brook Conduit.

Notice to Proceed: 29-Jan-2016 Contract Completion: 31-May-2018

Status and Issues: As of June, the Contractor set up and performed air monitoring for PCB Abatement in the pump room and performed PCB abatement verification sampling. In addition, they completed forming boiler concrete pad and installed reinforcing.

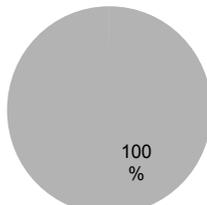
Projects In Construction 4th Quarter - FY17

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

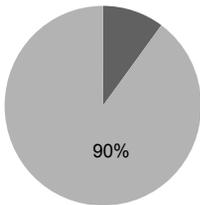
Caruso Pump Station Improvements

Project Summary: This project involves the replacement of the stand-by emergency generator and improvements to the HVAC, fire suppression and security systems at the Caruso Pump Station.

Notice to Proceed: 24-Mar-2016 **Contract Completion:** 3-May-2017

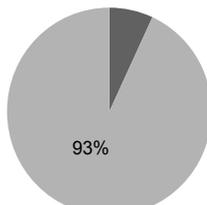
Status and Issues: Substantial completion was established on June 9th and a monetized punch list has been submitted to the Contractor.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

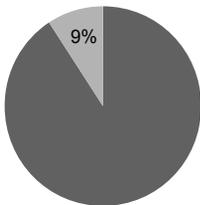
DITP Valves and Piping Replacements

Project Summary: This project involves the replacement of the twenty 60" butterfly valves and ten 60" flow meters in the NMPS; three 48", twelve 36" plug/check valves, six 30" flow meters and six 30-36" gate valves in the WTF.

Notice to Proceed: 23-Jun-2014 **Contract Completion:** 22-Jun-2017

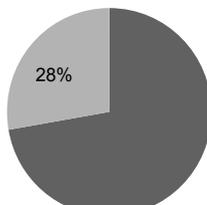
Status and Issues: As of June, Contractor completed the replacement of two Butterfly Valves and one flow meter on Train #7 and commenced the replacement of the valves on Train #10 and installed new linkage pins and the dashpot for the check valve on Train #1.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

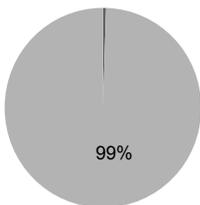
Winthrop Terminal VFD and Motor

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

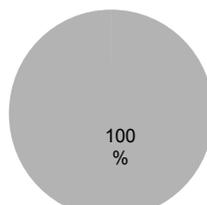
Status and Issues: The Contractor, JFW submitted major equipment submittals. The first transformer to be testing during September and the first VFD/Motor shop test will be in November.

Money



■ Amount Remaining
■ Billed to Date

Time



■ Days Remaining
■ Days Expended

DITP Replacement of Scum Skimmers

Project Summary: This project involves the replacement of the existing carbon steel tip tubes with 316 stainless steel in 48 primary and 54 secondary clarifiers to improve reliability and increase longevity.

Notice to Proceed: 9-Oct-2013 **Contract Completion:** 10-Oct-2016

Status and Issues: The punchlist work is on-going. The Contractor has submitted the necessary documentation required for a Partial Release of Retainage.

CSO CONTROL PROGRAM

4th Quarter – FY17

All 35 projects in the Long-Term CSO Control Plan are complete, in compliance with Schedule Seven. The FY18 CIP includes approximately \$8.4 million in remaining CSO related capital spending through 2021. Remaining work includes Cambridge’s completion of surface restoration associated with the Alewife/CAM004 sewer separation contracts (\$1.3 million), BWSC’s removal of additional inflow from its Dorchester Interceptor system in the South Dorchester Bay sewer separation areas (\$3.8 million), the federal court mandated three-year CSO post-construction monitoring and performance assessment, 2018-2020 (\$3.0 million) and as-needed technical or regulatory support (\$0.3 million).

Project/Item	Status as of June 30, 2017
BWSC Memorandum of Understanding and Financial Assistance Agreement (MOU/FAA)	MWRA staff have completed final eligibility reviews – and MWRA and BWSC have executed final eligibility certifications – for the BWSC construction and ESDC contracts funded through the MOU/FAA since inception in 1996. The MOU/FAA ended on June 30, 2017. Remaining BWSC CSO related work eligible for MWRA funding is limited to the removal of additional stormwater inflow from the BWSC Dorchester Interceptor system. This work has been removed from the MOU/FAA and instead will be funded under a new, separate agreement (see related item, below).
Dorchester Interceptor Inflow Removal	MWRA’s CIP and the MOU/FAA with BWSC has for many years included \$5.4 million for additional inflow removal from the BWSC Dorchester Interceptor system in the South Dorchester Bay Sewer Separation area, of which \$1.7 million was transferred to the BWSC MOU/FAA CSO account and \$1.6 million of that was withdrawn by BWSC to fund related design and construction work. On May 17, 2017, the MWRA Board of Directors authorized removing the remaining \$3.8 million from the BWSC MOU/FAA and instead including this funding amount in a separate, 4-year financial assistance agreement with BWSC effective July 1, 2017.
City of Cambridge Memorandum of Understanding and Financial Assistance Agreement	The City of Cambridge attained substantial completion of its last project, CAM004 Sewer Separation, in December 2015 in compliance with Schedule Seven. Extensive surface restoration work eligible for MWRA funding at a remaining award amount of \$1.3 million is scheduled to continue through December 2017, followed by six months of final eligibility review and close-out of the Cambridge construction contracts and close-out of the MOU/FAA in June 2018.
MWRA CSO Performance Assessment	The federal court schedule requires MWRA to commence a 3-year assessment of CSO performance by January 2018. MWRA submitted the Scope of Work for the CSO Post-Construction Monitoring Program and Performance Assessment to DEP on May 1, 2017, in compliance with a condition in the Charles River and Alewife Brook/Upper Mystic River CSO variances. DEP noticed the Scope of Work in the Massachusetts Environmental Monitor for a 30-day public comment period that closed on June 22. On July 1, MWRA advertised the RFQ/P for a professional services contract that will provide flow metering, hydraulic modeling, water quality evaluations and system performance assessments.

CIP Expenditures 4th Quarter FY17

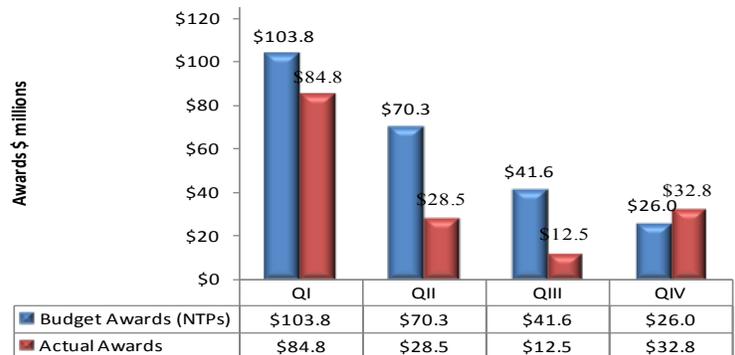
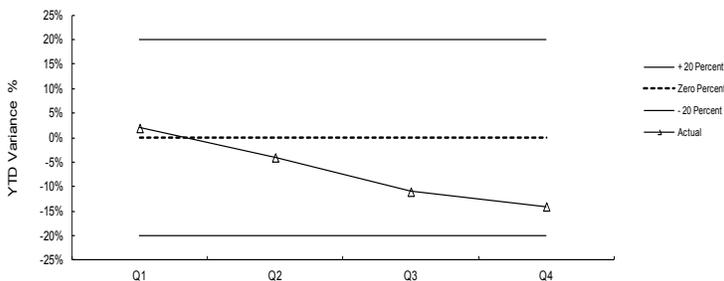
FY17 Capital Improvement Program Expenditure Variances through June by Program - (\$ in thousands)				
Program	FY17 Budget Through June	FY17 Actual Through June	Variance Amount	Variance Percent
Wastewater	70,374	64,803	(5,571)	-8%
Waterworks	73,009	63,311	(9,698)	-13%
Business and Operations Support	11,943	5,075	(6,868)	-58%
Total	\$155,326	\$133,189	(\$22,137)	-14%

Project underspending within Wastewater was due to fewer than anticipated community requests for loans and grants, delay in the award of the Chelsea Headworks Upgrade Construction, schedule changes for the Clinton Roof Rehabilitation and Deer Island Gravity Thickener contracts, partially offset by payment of a legal settlement for Primary/Secondary Clarifier Rehabilitation at Deer Island, construction progress on the North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacements, Deer Island Power System Improvements, Clinton Phosphorus Reduction, Digester Sludge Pump Replacement Phase 2, timing of payment for final work on the Chelsea Screenhouse and Deer Island Electrical Upgrades contracts, and updated final cost estimates for the Cambridge Sewer Separation contracts. Project underspending in Waterworks was due to schedule changes for NIH Section 89/29 Redundancy Phase 1C and Phase 2 Construction, SEH Section 111 Construction contracts, Marlborough Maintenance Facility, and Chestnut Hill Gatehouse No. 1 Repairs, reduced scope for Sudbury Aqueduct MEPA Review, timing of Watershed Land purchases, less than anticipated progress for Rosemary Brook Siphon Building Repairs, partially offset by greater than anticipated community requests for loans, contractor progress on NIH Section 89/29 Redundancy Phase 1B, Wachusett Pump Station, Fish Hatchery Pipeline, and additional work for the Webster Avenue Bridge Pipe Replacement Construction.

Budget vs. Actual CIP Expenditures

(\$ in thousands)

Total FY17 CIP Budget of \$155,326,778



Construction Fund Management

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

Cash Balance as of 6/30/2017	\$117.2 million
Unused capacity under the debt cap:	\$1.236 billion
Estimated date for exhausting construction fund without new borrowing:	MAY-18
Estimated date for debt cap increase to support new borrowing:	Not anticipated at this time
Commercial paper/Revolving loan outstanding:	\$178 million
Commercial paper capacity:	\$ 350 million
Budgeted FY17 capital spending*:	\$136 million

* Cash based spending is discounted for construction retainage.

DRINKING WATER QUALITY AND SUPPLY

Source Water – Microbial Results and UV Absorbance

4th Quarter – FY17

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 (formerly Ware Disinfection Facility) raw water tap before being treated and entering the CVA system.

All samples collected during the 4th 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, compared to the allowable 10%.**

Sample Site: Wachusett Reservoir

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

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

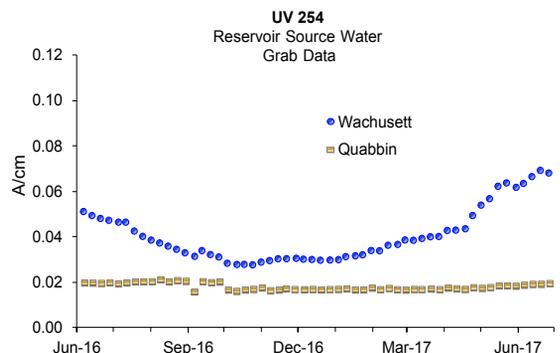
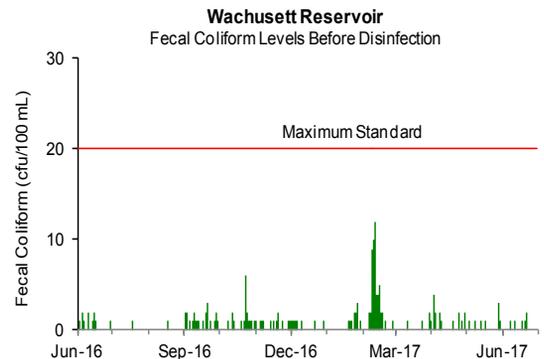
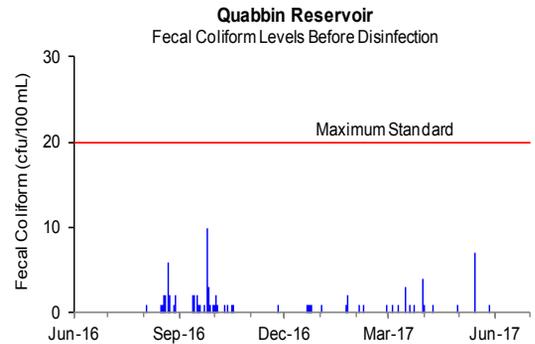
All samples collected during the 4th Quarter were below 20 cfu/100ml. **For the current six-month period, 0.0% of the samples exceeded a count of 20 cfu/100mL.**

Source Water – UV Absorbance

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

Quabbin Reservoir UV-254 levels are currently around 0.019 A/cm.

Wachusett Reservoir UV-254 levels are currently around 0.068 A/cm.



Source Water – Turbidity

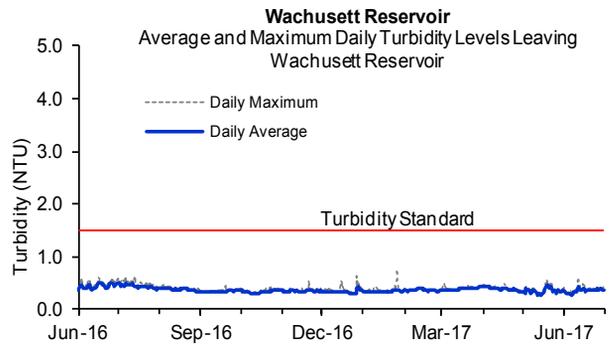
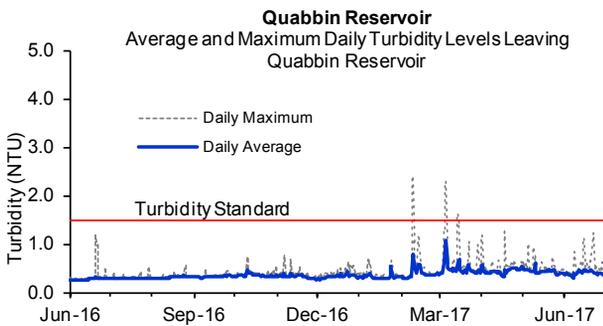
4th Quarter – FY17

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 5 NTU (Nephelometric Turbidity Units), and water only can be above 1 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 Wachusett were within DEP standards for the quarter. Maximum turbidity results at Quabbin were within DEP standards for January. High winds on February 9 and February 13 caused the turbidity at the BWTF intake to exceed 1 NTU on these days. High north winds on March 4 to 5 and March 14 to 15 caused the turbidity at the BWTF intake to exceed 1 NTU on these days. During these events disinfection effectiveness was not affected; CT was maintained at all times, downstream disinfectant residuals were maintained, and no coliform were detected in downstream samples.

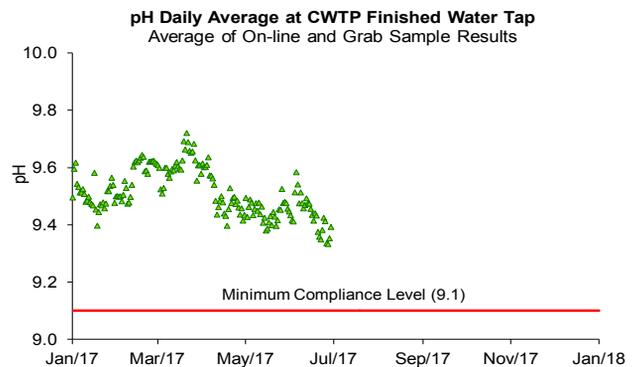
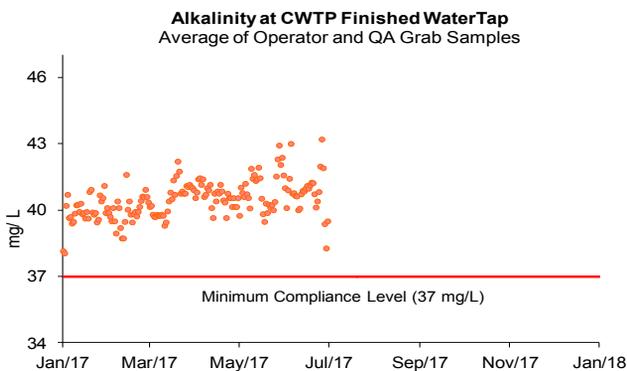


Treated Water – pH and Alkalinity Compliance

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

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

Distribution system samples were collected on June 7 and 8, 2017. Distribution system sample pH ranged from 9.5 to 9.6 and alkalinity ranged from 40 to 42 mg/L. No sample results were below DEP limits for this quarter.



Treated Water – Disinfection Effectiveness

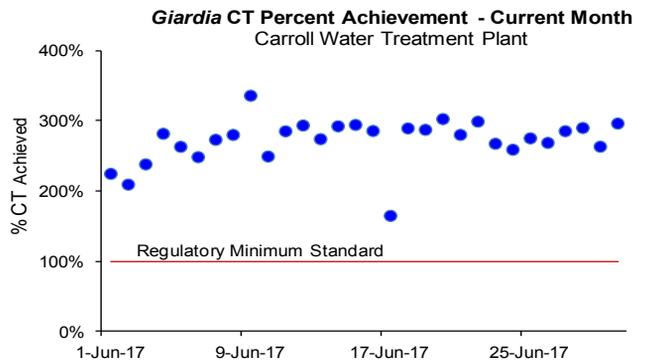
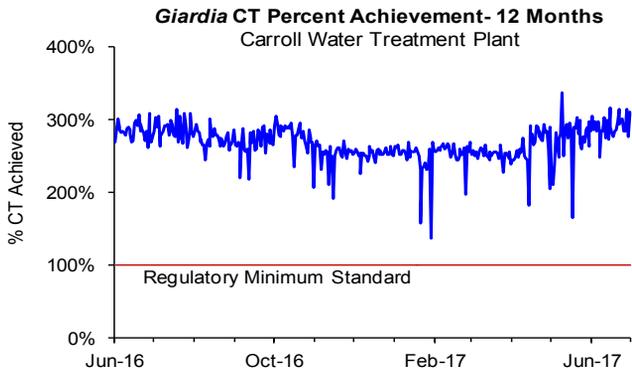
4th Quarter – FY17

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.

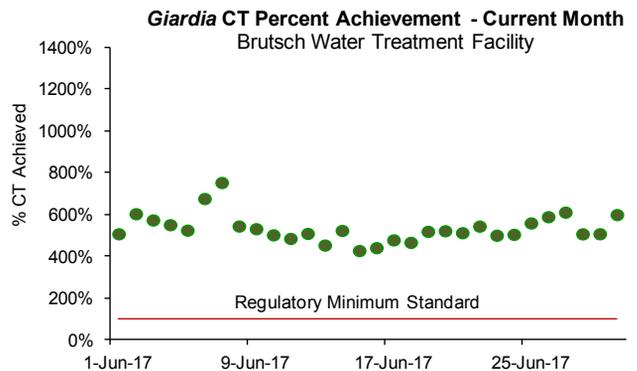
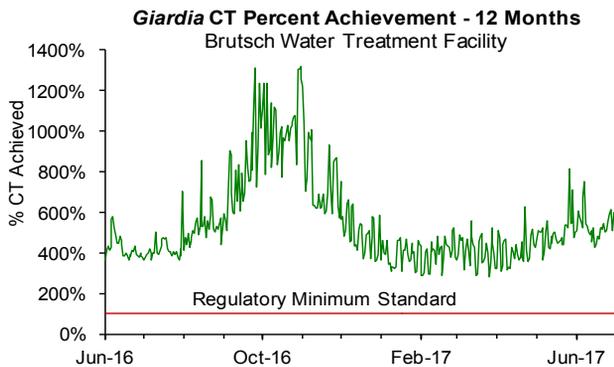
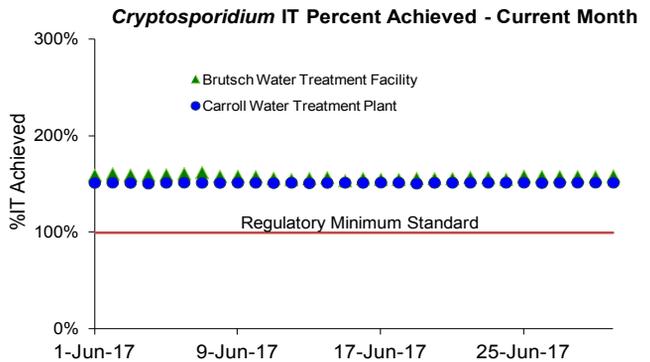
Wachusett Reservoir – MetroWest/Metro Boston Supply:

- Ozone dose at the CWTP varied between 1.4 to 2.5 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%.



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 ranged from 1.3 to 1.7 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%.

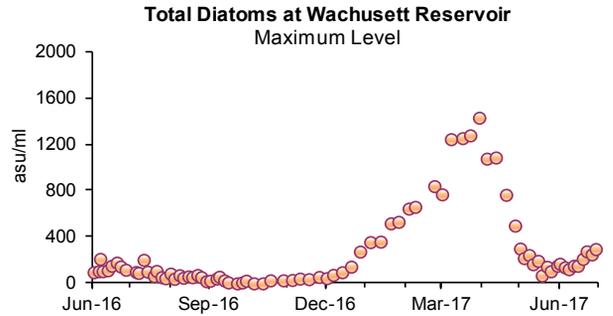
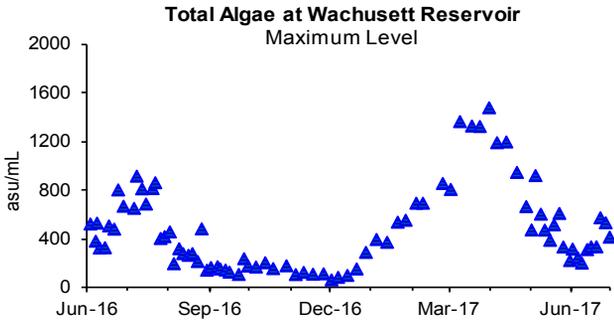


Source Water - Algae 4th Quarter – FY17

Algae levels in Wachusett 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 reservoir with copper sulfate, an algaecide. During the winter and spring, diatom numbers may increase. While not a taste and odor concern, consumers that use filters may notice a more frequent need to change their filters.

In the 4th Quarter, seventeen complaints which may be related to algae were reported from the local water departments.

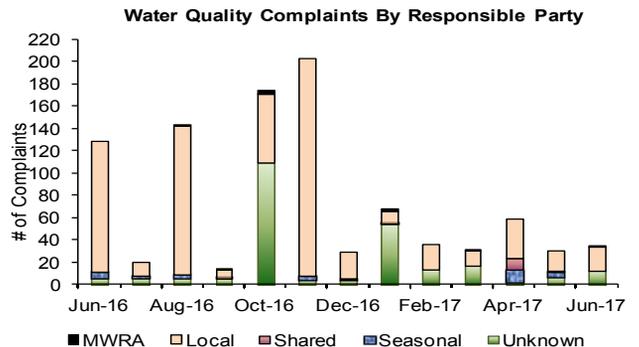
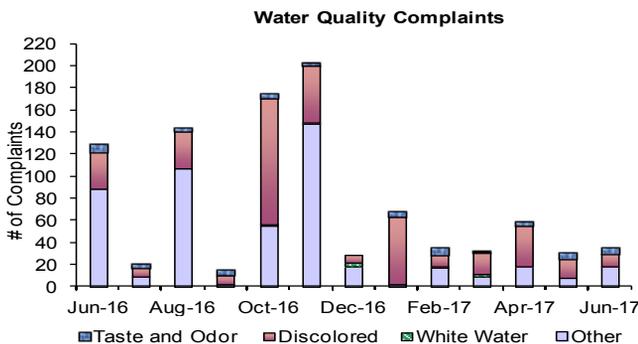


Drinking Water Quality Customer Complaints: Taste, Odor, or Appearance

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 125 complaints during the quarter compared to 182 complaints from 4th Quarter of FY16. Of these complaints, 66 were for "discolored water", 15 were for "taste and odor", and 44 were for "other". Of these complaints, 77 were local community issues, 1 was MWRA related, 12 were community and MWRA shared issues, 15 were seasonal in nature, and 20 were unknown in origin. The complaints were scattered amongst the communities.



Bacteria & Chlorine Residual Results for Communities in MWRA Testing Program

4th Quarter – FY17

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.

The TCR requires that no more than 5% of all samples in a month may be total coliform positive (or that no more than one sample be positive when less than 40 samples are collected each month). Public notification is required if this standard is exceeded.

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 follow-up tests confirm the presence of *E. coli* or total coliform.

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

Highlights

In the 4th Quarter, 10 of the 6,250 community samples submitted to MWRA labs for analysis tested positive for total coliform. Four of the 1,960 MWRA samples tested positive for total coliform. No sample tested positive for *E. coli*. Only 0.7% of the samples had a chlorine residual lower than 0.2 mg/L for the quarter.

		# Coliform Samples (a)	Total Coliform # (%) Positive	E.coli # Positive	Assessment Required ^e		Minimum Chlorine Residual (mg/L)	Average Chlorine Residual (mg/L)			
					Level 1 or 2	Violation ^f					
MWRA	d	MWRA Locations	369	1 (0.27%)	0			1.72	2.42		
		Shared Community/MWRA sites	1591	3 (0.19%)	0	Level 1 or 2		0.08	2.11		
		Total: MWRA	1960	4 (0.20%)	0			0.08	2.18		
Fully Served		ARLINGTON	169	0 (0%)	0			1.16	2.02		
		BELMONT	104	0 (0%)	0			1.20	2.02		
		BOSTON	780	0 (0%)	0			1.70	2.20		
		BROOKLINE	224	0 (0%)	0			1.09	2.10		
		CHELSEA	169	0 (0%)	0			1.46	2.24		
		DEER ISLAND	52	0 (0%)	0			1.32	2.09		
		EVERETT	168	0 (0%)	0			0.20	2.14		
		FRAMINGHAM	234	0 (0%)	0			0.44	2.11		
		LEXINGTON	116	0 (0%)	0			0.68	2.23		
		LYNNFIELD	18	0 (0%)	0			1.45	2.12		
		MALDEN	243	3 (1.23%)	0			0.30	2.01		
		MARBLEHEAD	72	0 (0%)	0			1.23	2.12		
		MEDFORD	221	0 (0%)	0			1.16	1.95		
		MELROSE	117	0 (0%)	0			0.75	2.05		
		MILTON	102	0 (0%)	0			0.57	1.96		
		NAHANT	30	0 (0%)	0			1.38	1.86		
		NEWTON	279	1 (0.36%)	0			0.08	2.03		
		NORTHBOROUGH	48	0 (0%)	0			1.67	2.21		
		NORWOOD	102	1 (0.98%)	0			1.20	2.18		
		QUINCY	299	0 (0%)	0			0.52	1.91		
		READING	130	0 (0%)	0			0.89	2.02		
		REVERE	180	0 (0%)	0			1.37	2.19		
		SAUGUS	104	0 (0%)	0			1.31	1.86		
		SOMERVILLE	273	0 (0%)	0			1.43	2.29		
		SOUTHBOROUGH	30	0 (0%)	0			0.59	2.03		
		STONEHAM	91	0 (0%)	0			1.88	2.25		
		SWAMPSCOTT	54	0 (0%)	0			1.71	2.12		
		WALTHAM	216	0 (0%)	0			1.59	2.18		
		WATERTOWN	133	1 (0.75%)	0			1.04	2.11		
		WESTBORO HOSPITAL	15	0 (0%)	0			0.06	0.59		
		WESTON	45	0 (0%)	0			1.92	2.44		
		WINTHROP	72	0 (0%)	0			0.21	1.95		
		Total: Fully Served	4890	6 (0.12%)	0						
	CVA & Partially Served		BEDFORD	57	0 (0%)	0			1.06	1.88	
			CANTON	87	0 (0%)	0			0.06	1.38	
			HANSCOM AFB	42	3 (7.14%)	0	Level 1	No	0.89	1.85	
			MARLBOROUGH	126	0 (0%)	0			1.88	2.42	
			NEEDHAM	123	0 (0%)	0			0.14	0.79	
			PEABODY	221	0 (0%)	0			1.02	2.03	
			WAKEFIELD	144	0 (0%)	0			0.89	1.74	
			WELLESLEY	114	0 (0%)	0			0.09	0.74	
			WILMINGTON	86	0 (0%)	0			0.57	1.94	
			WINCHESTER	91	0 (0%)	0			0.12	1.68	
			WOBURN	195	0 (0%)	0			0.12	0.96	
			SOUTH HADLEY FD1	74	1 (1.35%)	0			0.02	0.50	
			Total: CVA & Partially Served	1360	4 (0.29%)	0					
			Total: Community Samples	6250	10 (0.16%)	0					

- (a) The number of samples collected depends on the population served and the number of repeat samples required.
- (b) These communities are partially supplied, and may mix their chlorinated supply with MWRA chloraminated supply.
- (c) Part of the Chicopee Valley Aqueduct System. Free chlorine system.
- (d) MWRA total coliform and chlorine residual results include data from 125 community pipe locations as described above. In most cases these community results are accurately indicative of MWRA water as it enters the community system; however, some are clearly strongly influenced by local pipe conditions. Residuals in the MWRA system are typically between 1.0 and 2.8 mg/L.
- (e) The TCR requires an assessment to be completed if more than 5% of all samples in a month are total coliform positive (or two or more samples are positive when fewer than 40 samples are collected each month).
- (f) Some reasons a violation may occur: the required # of TCR samples is not collected; failure to report; an E.coli MCL violation; coliform treatment technique not followed properly; failure to conduct a level 1 or level 2 assessment within 30 days of trigger.

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

4th Quarter – FY17

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.

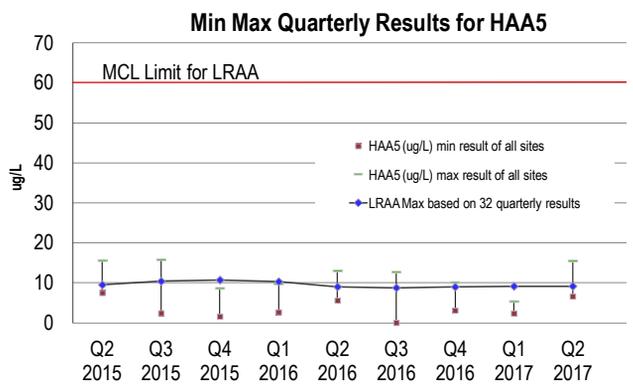
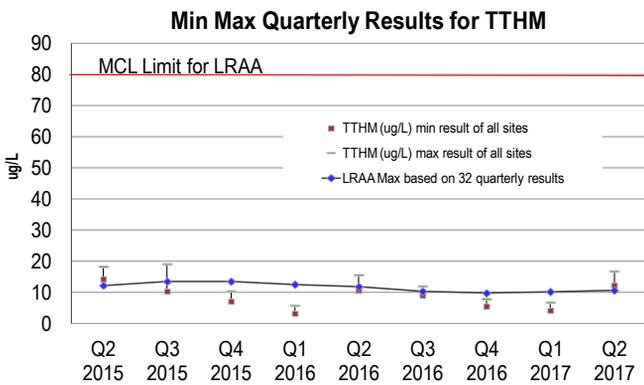
The locational running annual average at each individual sampling location must be below the standard. The charts below show the highest and lowest single values for all sites, and the LRAA of the highest location each quarter.

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 all three CVA communities data (Chicopee, Wilbraham and South Hadley FD1).

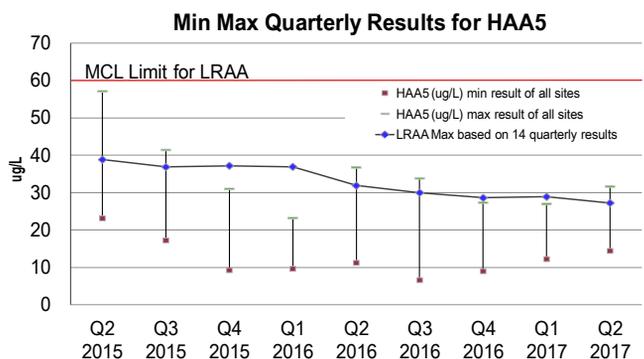
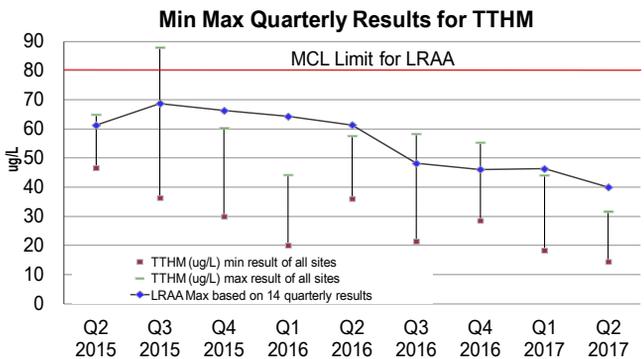
Bromate is tested monthly per DEP requirements for water systems that treat with ozone. Bromide in the raw water may be converted into bromate following ozonation. EPA’s RAA MCL standard for bromate is 10 µg/L.

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 = 10.7 µg/L; HAA5s = 9.2 µg/L. The current RAA for Bromate = 0.0 µg/L. CVA’s DBP levels continue to be below current standards.

MetroBoston Disinfection By-Products



CVA Disinfection By-Products (Combined Results)



Water Supply and Source Water Management

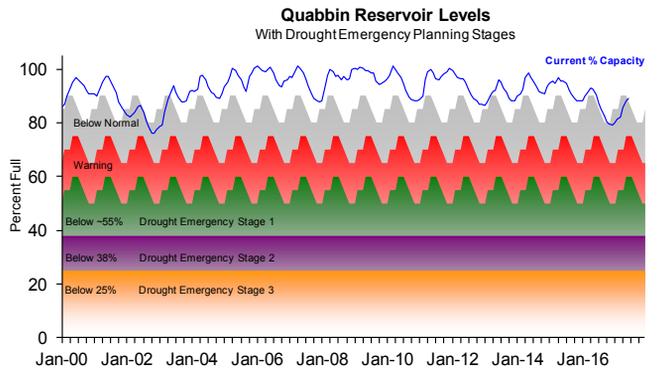
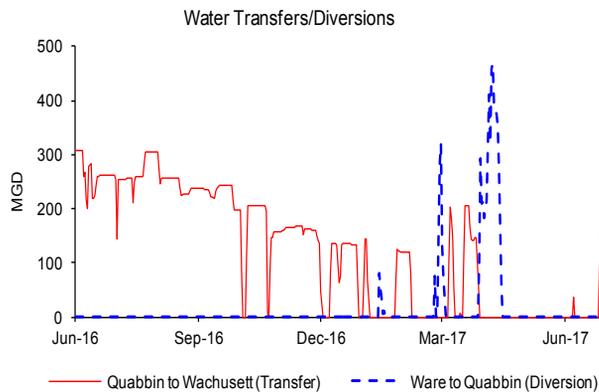
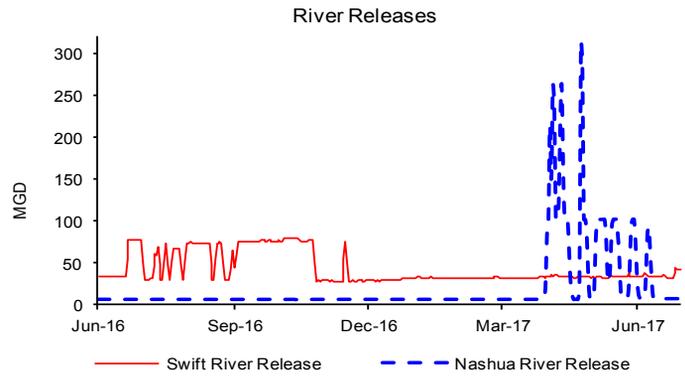
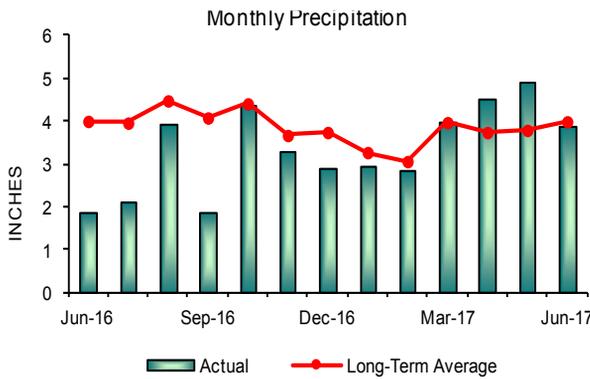
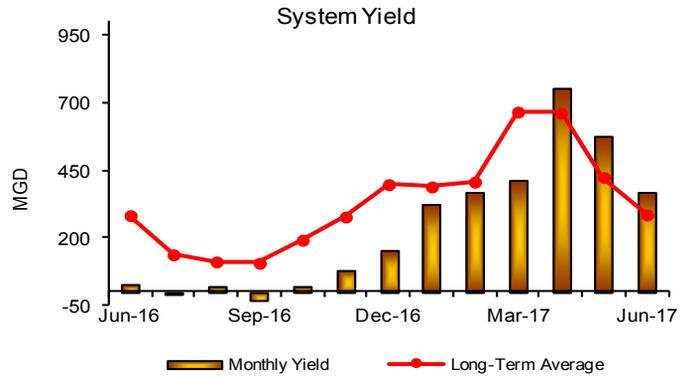
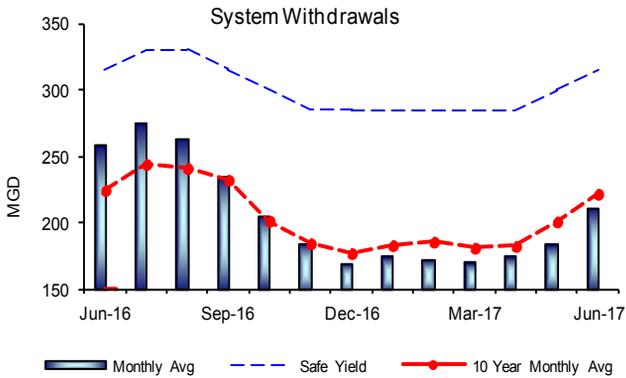
4th Quarter – FY17

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

Quabbin Reservoir level return to normal operating range on June 12th. The volume of the Quabbin Reservoir was at 89.3% as of June 30, 2017; a 7.2% increase for the quarter, which represents a gain of 29.4 billion gallons of storage. Yield and precipitation for the quarter were above their respective quarterly long term averages. System withdrawal for the quarter was below the 10 year monthly average.



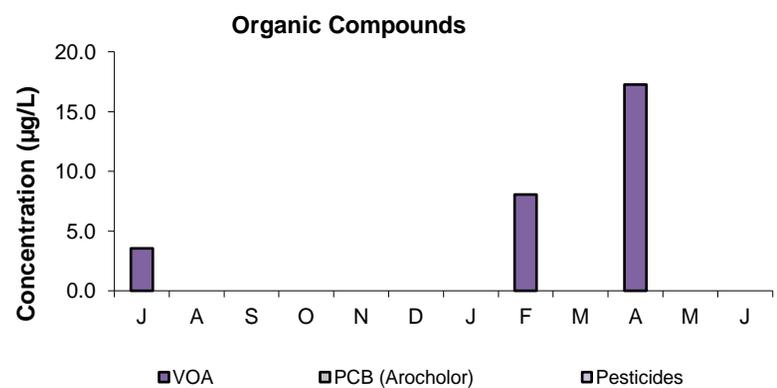
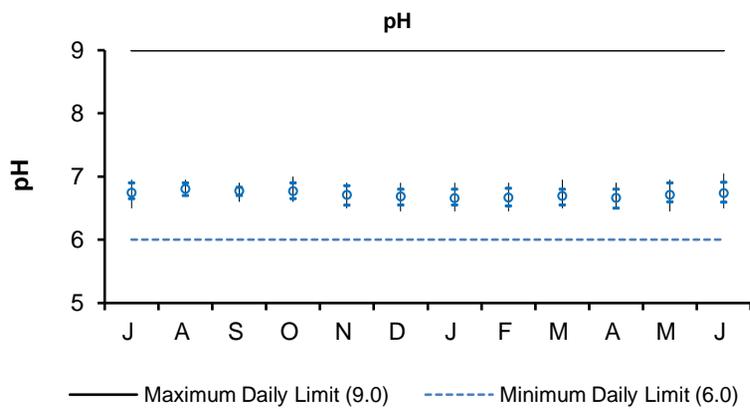
WASTEWATER QUALITY

NPDES Permit Compliance: Deer Island Treatment Plant 4th Quarter - FY17

NPDES Permit Limits

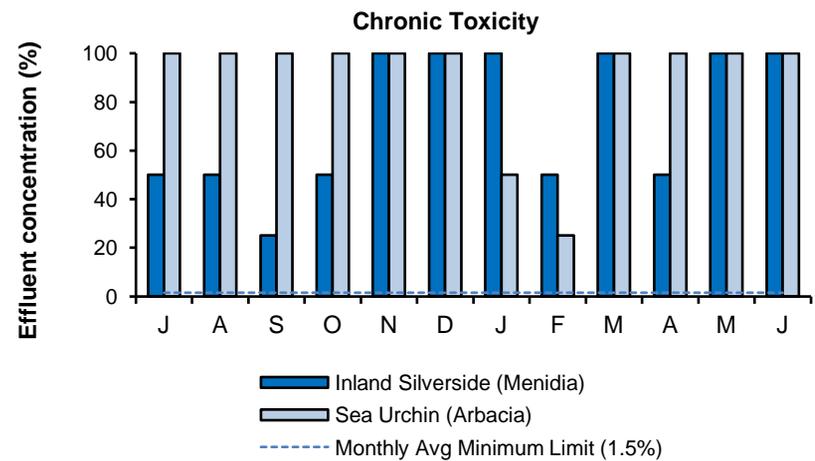
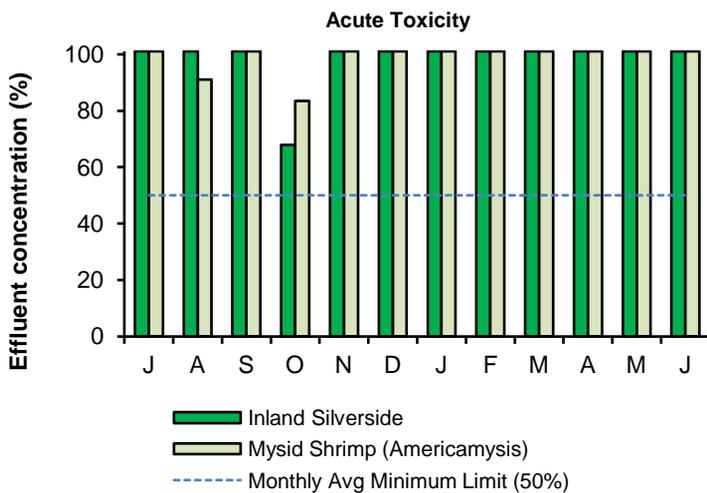
Effluent Characteristics		Units	Limits	April	May	June	4th Quarter Violations	FY17 YTD Violations
Dry Day Flow:		mgd	436	257.2	263.6	270.6	0	0
cBOD:	Monthly Average	mg/L	25	8.3	4.5	5.2	0	0
	Weekly Average	mg/L	40	12.6	5.9	5.8	0	0
TSS:	Monthly Average	mg/L	30	17.1	7.9	8.2	0	0
	Weekly Average	mg/L	45	29.3	11.5	10.8	0	0
TCR:	Monthly Average	ug/L	456	0	0	0.44	0	0
	Daily Maximum	ug/L	631	0	0	13	0	0
Fecal Coliform:	Daily Geometric Mean	col/100mL	14000	13	7	7	0	0
	Weekly Geometric Mean	col/100mL	14000	52	13	16	0	0
	% of Samples >14000	%	10	0	0	0	0	0
	Consecutive Samples >14000	#	3	0	0	0	0	0
pH:		SU	6.0-9.0	6.5-6.9	6.5-7.0	6.5-7.1	0	0
PCB, Aroclors:	Monthly Average	ug/L	0.000045	UNDETECTED			0	0
Acute Toxicity:	Mysid Shrimp	%	≥50	>100	>100	>100	0	0
	Inland Silverside	%	≥50	>100	>100	>100	0	0
Chronic Toxicity:	Sea Urchin	%	≥1.5	100	100	100	0	0
	Inland Silverside	%	≥1.5	50	100	100	0	0

There have been no permit violations in FY17 to date at the Deer Island Treatment Plant.



pH is a measure of alkalinity or acidity. Fluctuations in effluent pH are unlikely to impact on marine environments, which have significant buffering capacity. Because of the pure oxygen used in the activated sludge process, effluent pH tends to be at the lower end of the permit-required range. All pH measurements for the 4th Quarter were within the daily permit limits.

An important wastewater component monitored in the effluent is organic compounds, such as volatile organic acids, pesticides, and polychlorinated biphenyls, which are all sampled monthly. The secondary treatment process significantly reduces organic compounds in the effluent stream. In the 4th Quarter, some volatile organic compounds (acetone) were detected in the effluent in April. However, volatile organic compounds do not have discharge limitations in the Deer Island NPDES permit; they are to be reported only. All other organic compounds were below the detection limit for the quarter.



The acute toxicity test simulates the short-term toxic effects of chemicals in wastewater effluent on marine animals. The test measures the concentration (percent) of effluent that kills half the test organisms within four days. The higher the concentration of effluent required, the less toxic the effluent. For permit compliance, the effluent concentration that causes mortality to mysid shrimp and inland silverside must be at least 50%. Acute toxicity permit limits were met for the 4th Quarter for both the inland silverside and mysid shrimp.

Typically, effects of chronic exposures differ from those of acute exposures. Because of this, chronic toxicity responses are not necessarily related to acute toxicity. The chronic toxicity test simulates the long-term toxic effects of chemicals in wastewater effluent on marine animals. To meet permit limits, a solution of 1.5% effluent and 98.5% dilution water must show no observed effect on the growth and reproduction of the test species. Chronic toxicity permit limits were met for the 4th Quarter for both the inland silverside and sea urchin.

NPDES Permit Compliance: Clinton Wastewater Treatment Plant 4th Quarter - FY17

NPDES Permit Limits

Effluent Characteristics	Units	Limits	April	May	June	4th Quarter Violations	FY17 YTD Violations	
Flow:	mgd	3.01	2.30	2.33	2.38	0	0	
BOD:	Monthly Average:	mg/L	3.8	3.4	3.4	0	0	
	Weekly Average:	mg/L	4.9	4.2	3.7	0	0	
TSS:	Monthly Average:	mg/L	5.0	3.3	4.3	0	0	
	Weekly Average:	mg/L	7.5	3.7	4.8	0	0	
pH:	SU	6.5-8.3	6.9-7.4	7.1-7.8	7.0-7.7	0	0	
Dissolved Oxygen:	Daily Average Minimum:	mg/L	8.5	8.3	8.1	0	0	
E. Coli:	Daily Geometric Mean:	cfu/100mL	409	9.0	9.0	131.3	0	0
	Monthly Geometric Mean:	cfu/100mL	126	5.0	5.0	6.3	0	0
TCR:	Monthly Average:	ug/L	17.6	0.0	0.0	0.0	0	0
	Daily Maximum:	ug/L	30.4	0.0	0.0	0.0	0	0
Total Ammonia Nitrogen: June 1st - October 31st								
	Monthly Average:	mg/L	10.0	0.21	0.03	0.01	0	0
	Daily Maximum:	mg/L	35.2	0.63	0.13	0.04	0	0
Copper:	Monthly Average:	ug/L	11.6	3.2	4.1	7.5	0	0
	Daily Maximum:	ug/L	14.0	3.2	4.1	8.4	0	0
Phosphorus: April 1st - October 31st								
	Monthly Average:	mg/L	1.0	0.19	0.37	0.53	0	0
Acute Toxicity:	Daily Minimum:	%	≥100	*N/A	*N/A	>100	0	0
Chronic Toxicity:	Daily Minimum:	%	≥62.5	*N/A	*N/A	100	0	1

There have been no permit violations in FY17 at the Clinton Treatment Plant. March 2017 was the first month under the new NPDES permit.

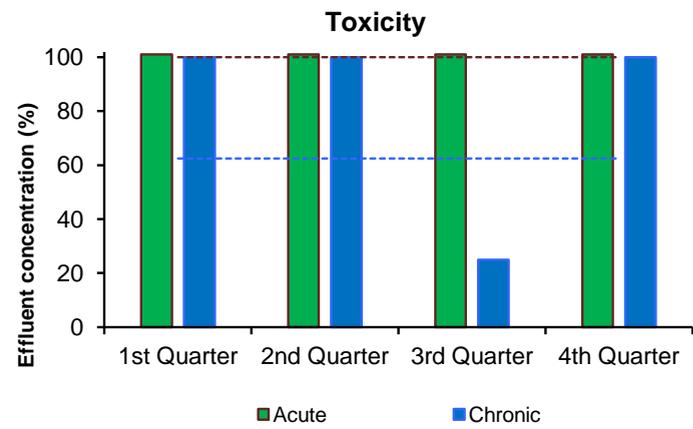
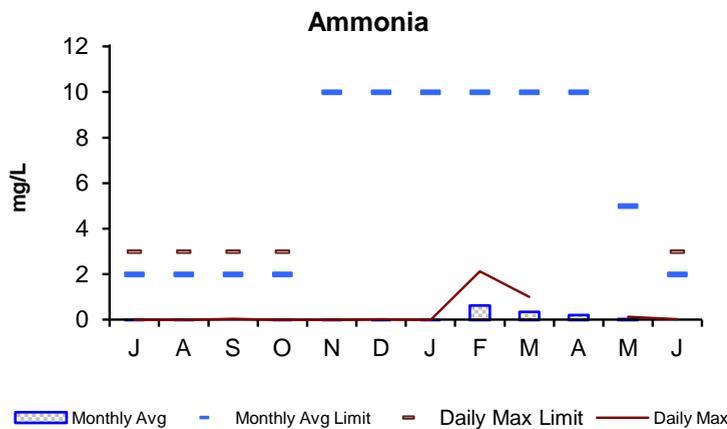
1st Quarter: There were no permit violations in the first quarter.

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

3rd Quarter: There was one permit violation in the third quarter; the chronic toxicity was 25%, which is below the permit limit of 62.5%

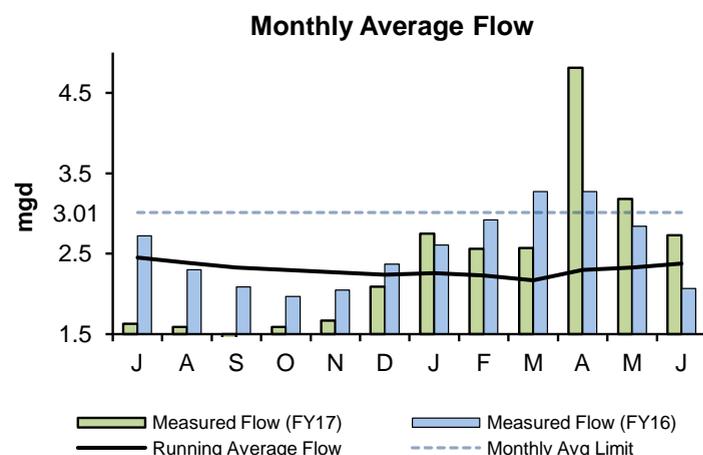
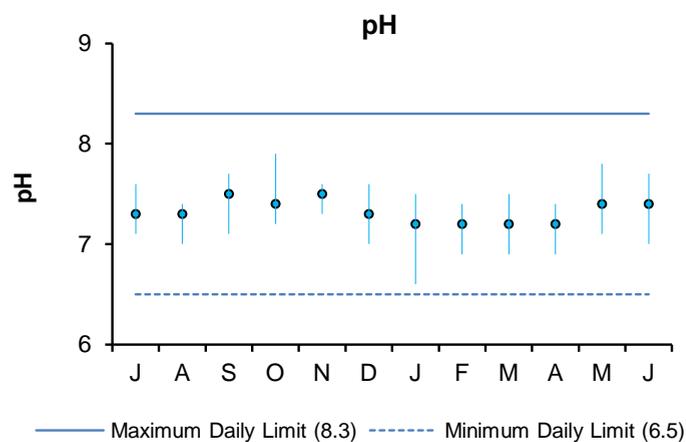
4th Quarter: There were no permit violations in the fourth quarter.

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



The 4th Quarter's monthly average and daily maximum concentrations were below the permit limits. The monthly average and daily maximum limits for the 4th Quarter are variable, dropping to 2 mg/L and 3 mg/L in June, respectively. The permit limits are most stringent from June to October when warm weather conditions are most conducive to potential eutrophication.

Acute and chronic toxicity testing simulates the short- and long-term toxic effects of chemicals in wastewater effluent on aquatic animals. For permit compliance, the effluent concentration that causes mortality to the daphnid in acute and chronic testing must be at least >100% and 62.5%, respectively. There were no violations in the 4th Quarter.



pH is a measure of the alkalinity or acidity of the effluent. All daily pH results for the 4th Quarter were within the range set by the permit.

The graph depicts the running annual average monthly flow, measured in million gallons per day, exiting the plant. The average monthly flows during this Quarter were below the NPDES permit limit.

COMMUNITY FLOWS AND PROGRAMS

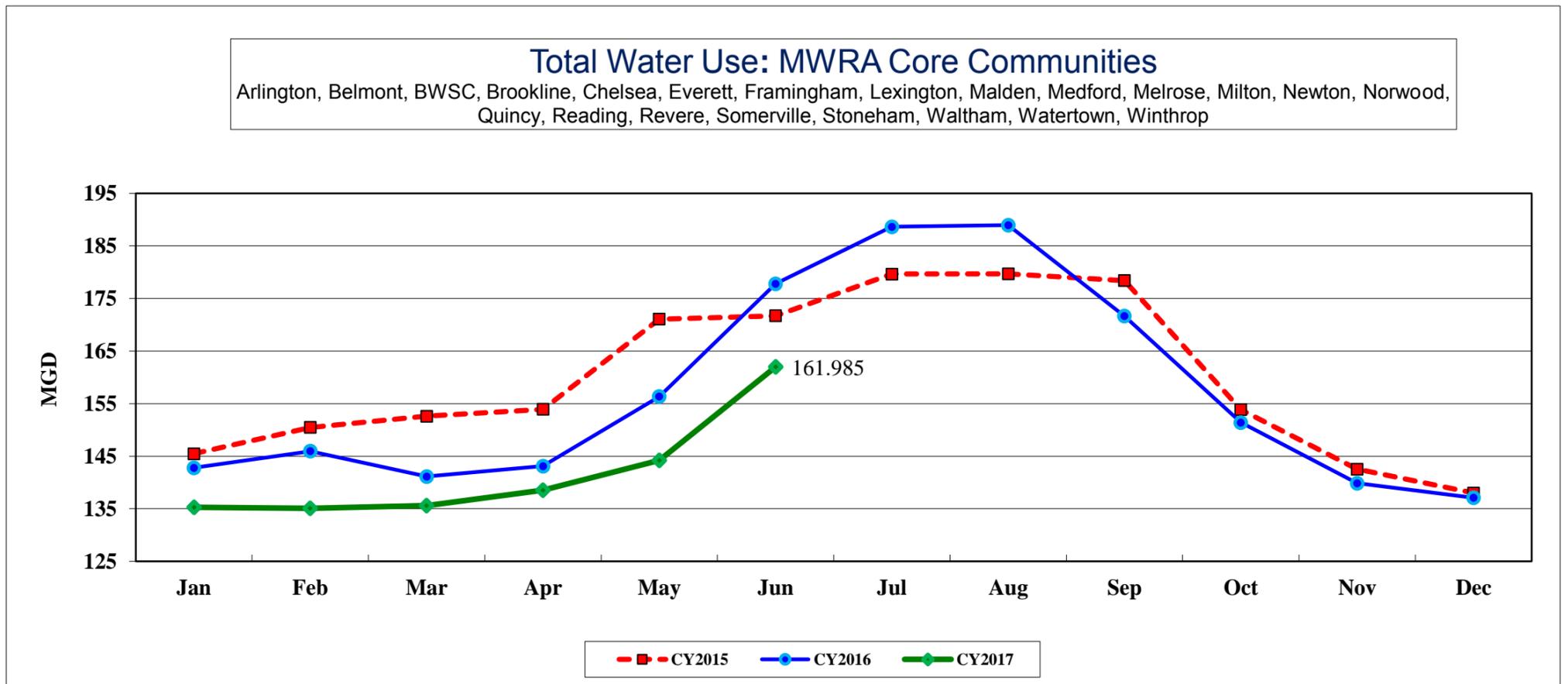
Total Water Use MWRA Core Customers 4th Quarter - FY17

Water USE : MWRA Fully Served Communities*

* Receive 100% MWRA Water Service

MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Average	Average
CY2015	145.466	150.488	152.603	153.932	171.068	171.693	179.652	179.689	178.407	153.846	142.547	138.005	159.839	159.839
CY2016	142.802	145.930	141.117	143.104	156.336	177.803	188.652	188.959	171.633	151.405	139.847	137.094	151.138	157.106
CY2017	135.309	135.085	135.580	138.527	144.182	161.985							141.795	141.795

MG	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD Total	Total
CY2015	4,509.447	4,213.655	4,730.692	4,617.960	5,303.114	5,150.793	5,569.210	5,570.350	5,352.198	4,769.225	4,276.398	4,278.141	58,341.183	58,341.183
CY2016	4,426.874	4,231.969	4,374.642	4,293.123	4,846.430	5,334.082	5,848.205	5,857.743	5,148.989	4,693.548	4,195.395	4,249.903	27,507.119	57,500.901
CY2017	4,194.586	3,782.379	4,202.965	4,155.824	4,469.647	4,859.559							25,664.960	25,664.960



Water Supplied: All MWRA Water Customer Communities

The June 2017 Community Water Use Report 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 2017 water use will be used to allocate the FY19 water utility rate revenue requirement.

June 2017 water supplied of 206.5 mgd (for revenue generating users) is down 30.1 mgd or 12.7% compared to June 2016.

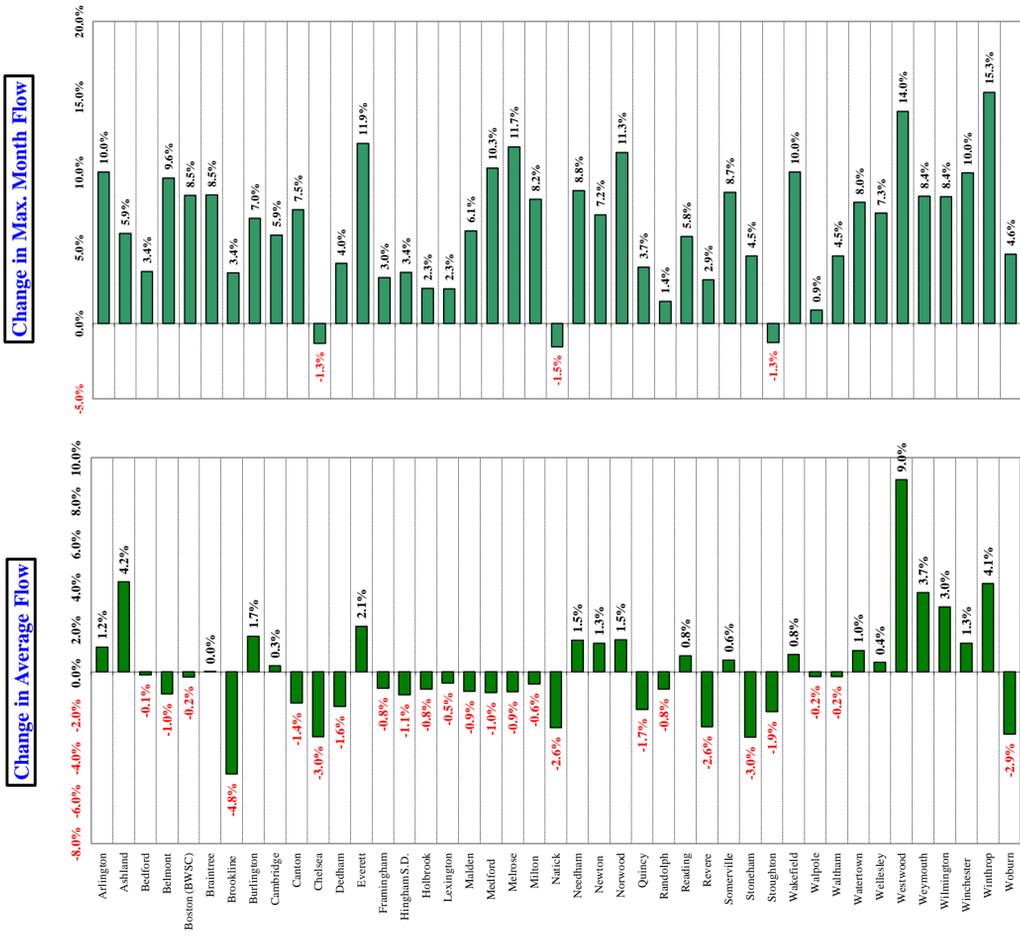
System-wide year to date consumption for CY17 remains lower than CY16 with 173.3 mgd being supplied to MWRA customers **through June**. This is 13.7 mgd lower than CY16 and is a decrease of **7.3%**.

Community Wastewater Flows

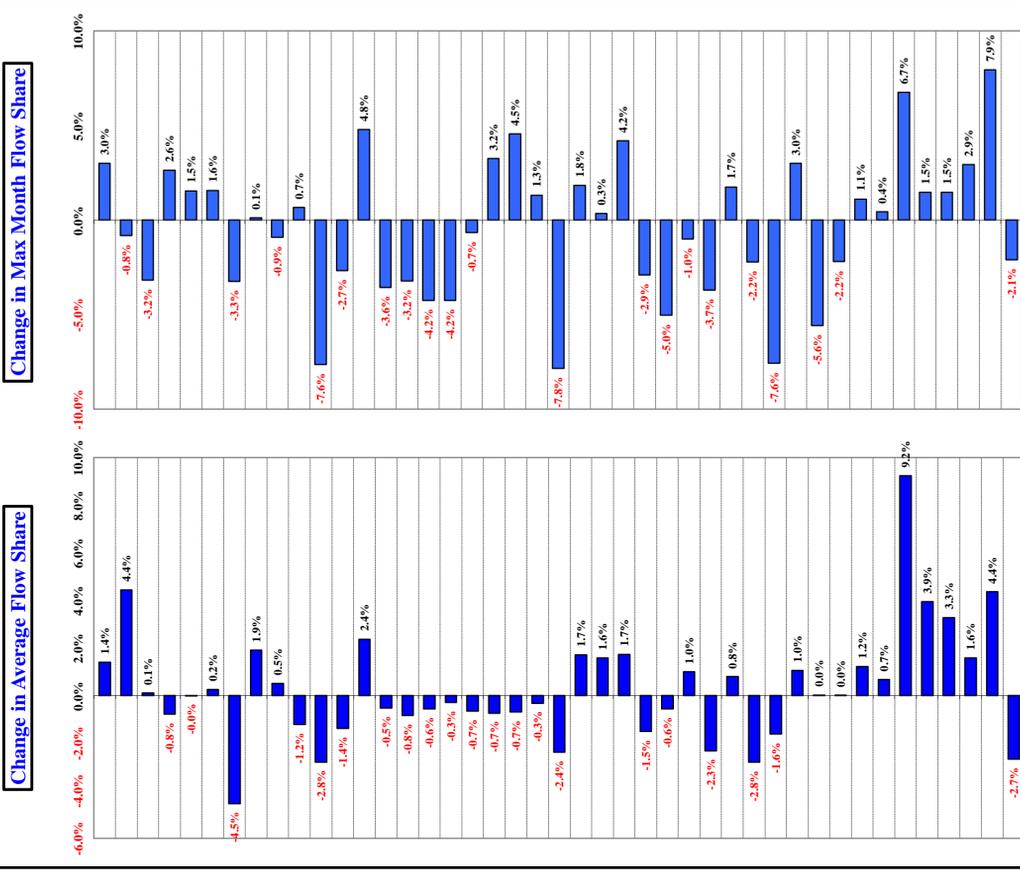
4th Quarter - FY17

How Projected CY2017 Community Wastewater Flows Could Effect FY2019 Sewer Assessments ^{1,2,3}

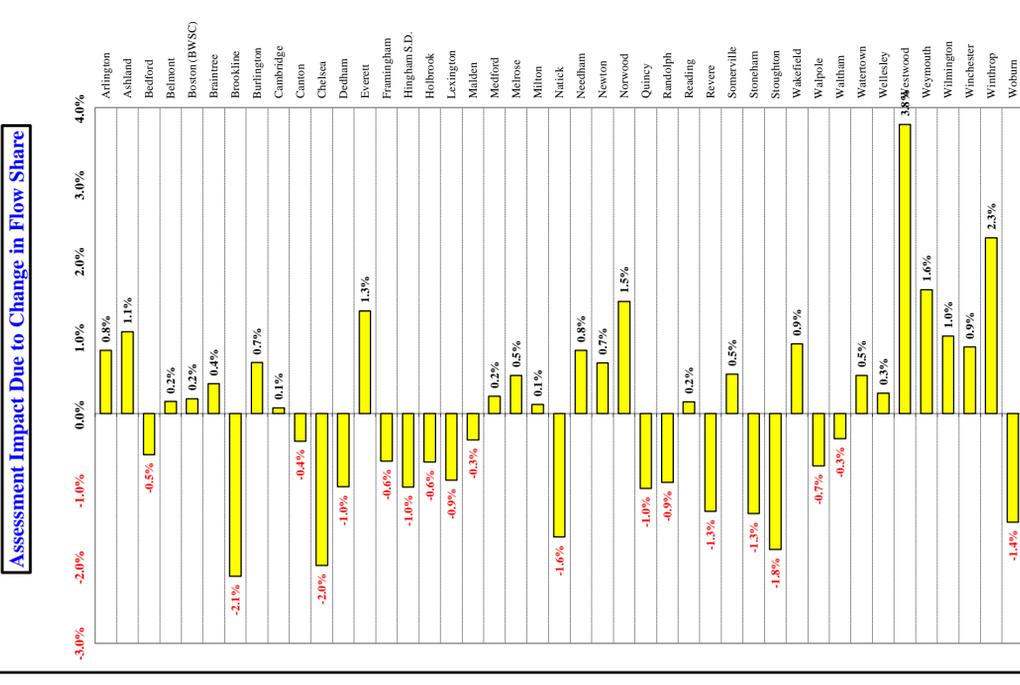
The flow components of FY2019 sewer assessments will be calculated using a 3-year average of CY2015 to CY2017 wastewater flows compared to FY2018 assessments that used a 3-year average of CY2014 to CY2016 wastewater flows.



But as MWRA's sewer assessments are a ZERO-SUM calculation, a community's assessment is strongly influenced by the RELATIVE change in CY2015 to CY2017 flow share compared to CY2014 to CY2016 flow share, compared to all other communities in the system.



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



Notes:

¹ MWRA uses a 3-year flow average to calculate sewer assessments. Three-year averaging smoothes the impact of year-to-year changes in community flow share, but does not eliminate the long-term impact of changes in each community's relative contribution to the total flow.

² Based on CY2014 to CY2017 average wastewater flows as of 08/03/17. Flow data is preliminary and subject to change pending additional MWRA and community review.

³ CY2014 to June CY2017 wastewater flows based on actual meter data. July-December CY2017 based on the average of the three prior years.

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

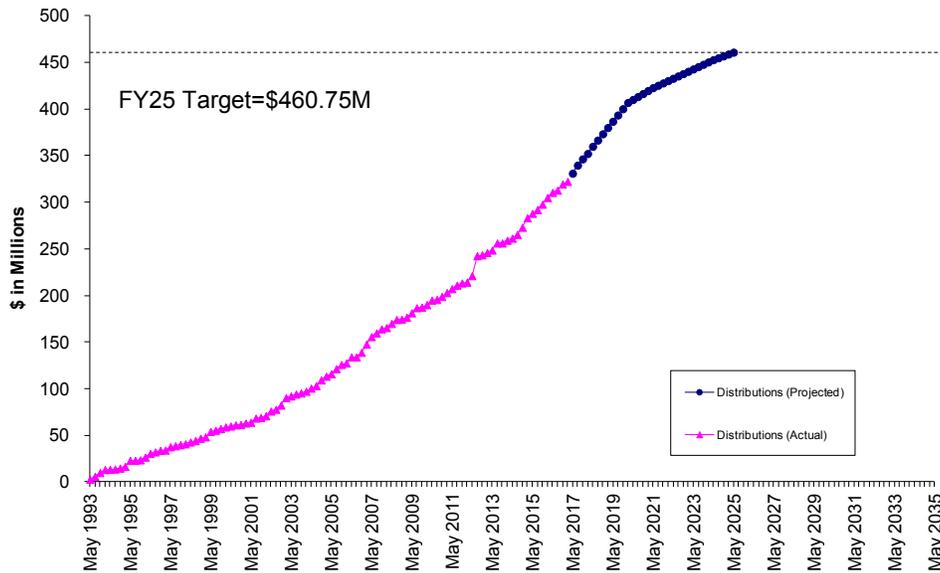
Community Support Programs

4th Quarter – FY17

Infiltration/Inflow Local Financial Assistance Program

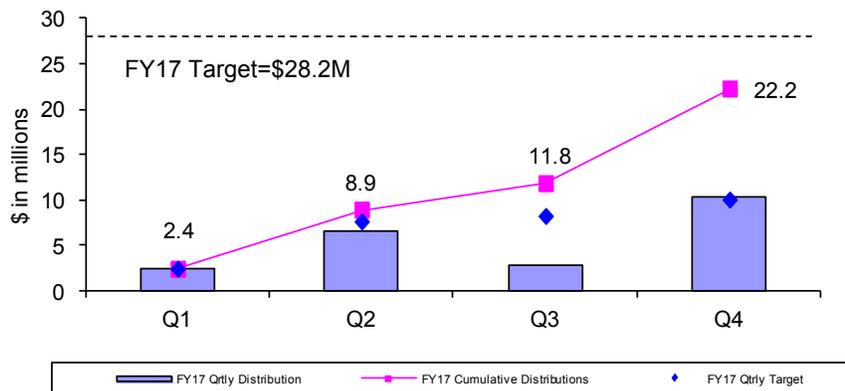
MWRA's Infiltration/Inflow (I/I) Local Financial Assistance Program provides \$460.75 million in grants and interest-free loans (average of about \$14 million per year from FY93 through FY25) to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned 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 and 10 funds (total \$160 million) are distributed as 75% grants and 25% loans with interest-free loans repaid to MWRA over a ten-year period.

I/I Local Financial Assistance Program Distribution FY93-FY25



During the 4th Quarter of FY17, \$10.4 million in financial assistance (grants and interest-free loans) was distributed to fund local sewer rehabilitation projects in Boston, Natick and Wakefield. Total grant/loan distribution for FY17 is \$22.2 million. From FY93 through the 4th Quarter of FY17, all 43 member sewer communities have participated in the program and more than \$332 million has been distributed to fund 528 local I/I reduction and sewer system rehabilitation projects. Distribution of the remaining funds has been approved through FY25 and community loan repayments will be made through FY36. All scheduled community loan repayments have been made.

FY17 Quarterly Distributions of Sewer Grant/Loans



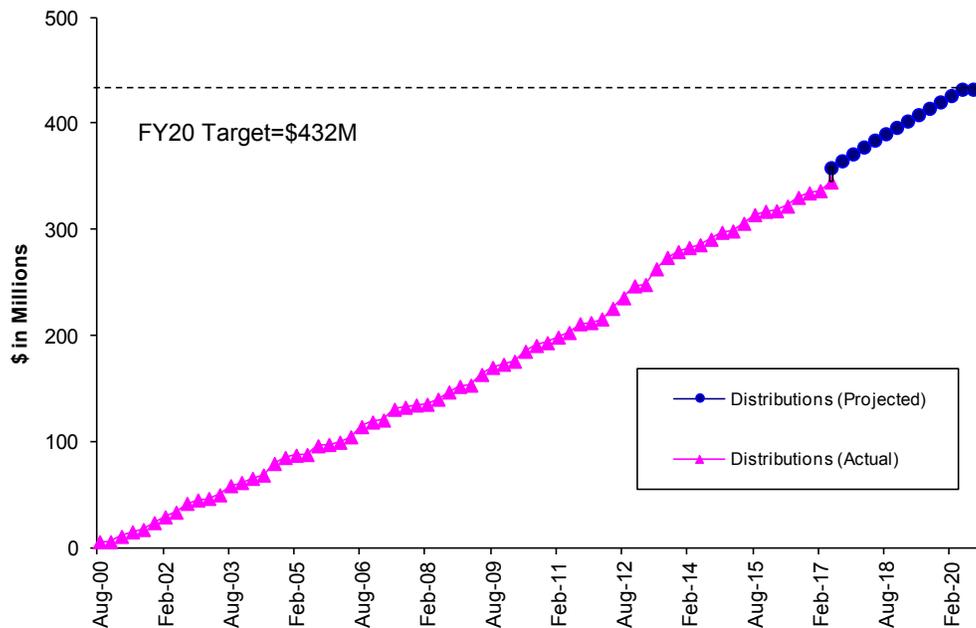
Community Support Programs

4th Quarter – FY17

Local Water System Assistance Program

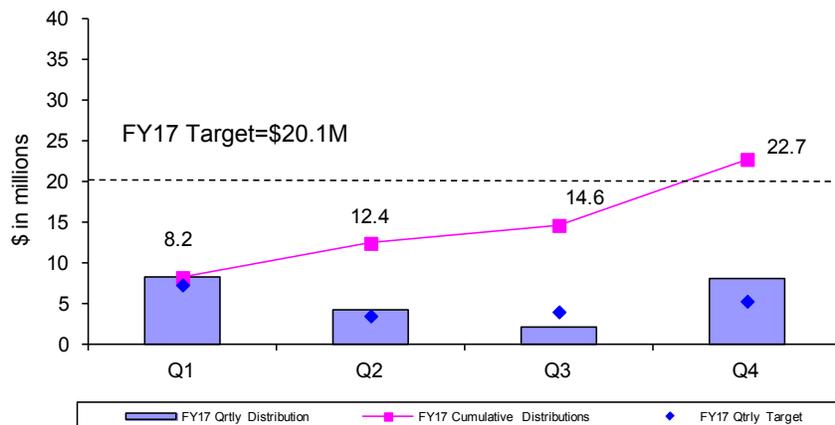
MWRA's Local Water System Assistance Programs (LWSAP) provides \$432 million in interest-free loans (an average of about \$22 million per year from FY01 through FY20) to member water communities to perform water main rehabilitation projects within their locally-owned water distribution systems. Eligible 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 FY20.

Local Water System Assistance Program Distribution FY01-FY20



During the 4th Quarter of FY17, \$8.1 million in interest-free loans was distributed to fund local water projects in Arlington, Chicopee, Northborough, Waltham and Woburn. Total loan distribution for FY17 is \$22.7 million. From FY01 through the 4th Quarter of FY17, more than \$344 million has been distributed to fund 385 local water system rehabilitation projects in 39 MWRA member water communities. Distribution of the remaining funds has been approved through FY20 and community loan repayments will be made through FY30. All scheduled community loan repayments have been made.

FY17 Quarterly Distributions of Water Loans



Community Support Programs

4th Quarter – FY17

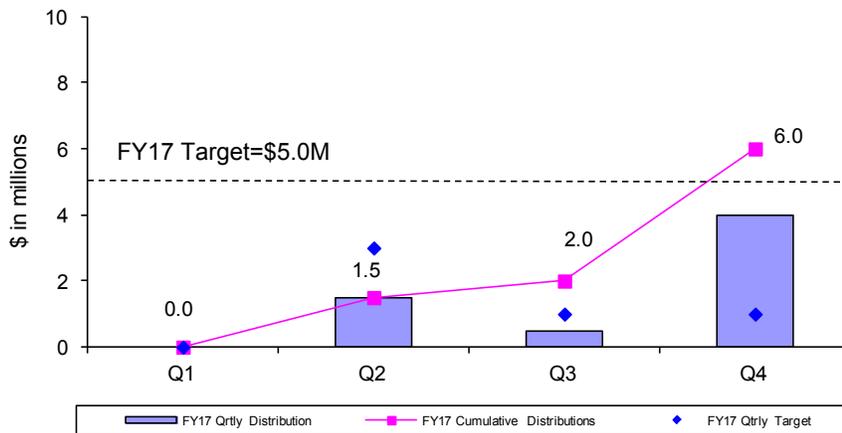
Lead Service Line Replacement Loan Program

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 is the first year of the Lead Service Line Replacement Loan Program. During the 4th Quarter of FY17, MWRA made the third Lead Loan Program distribution to Newton for \$4.0 Million.

FY17 Lead Loan Program distributions include:	Quincy:	\$1.5 Million
	Winchester:	\$0.5 Million
	<u>Newton:</u>	<u>\$4.0 Million</u>
	Total	\$6.0 Million

FY17 Quarterly Distributions of Lead Service Line Replacement Loans

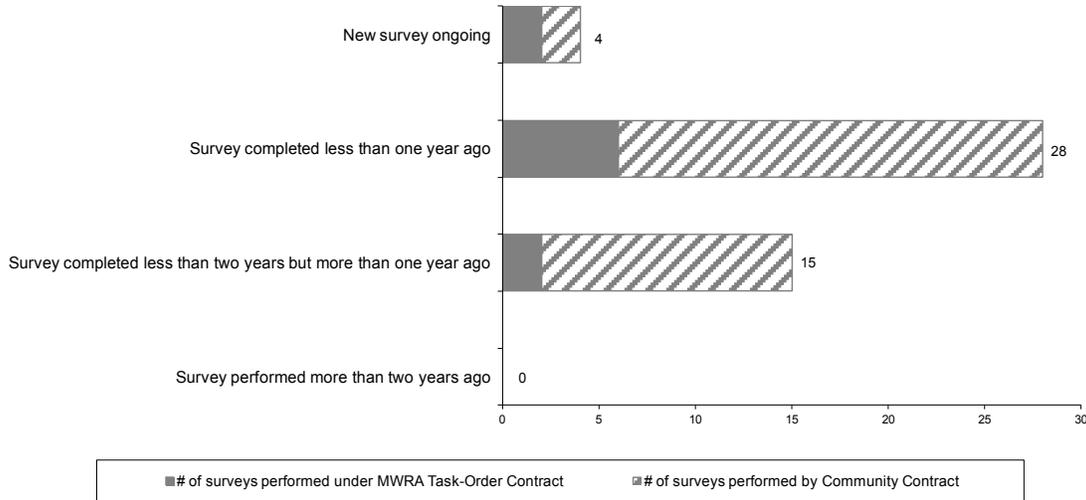


Community Support Programs

4th Quarter – FY17

Community Water System Leak Detection

To ensure member water communities identify and repair leaks in locally-owned distribution systems, MWRA developed leak detection regulations that went into effect in July 1991. Communities purchasing water from MWRA are required to complete a leak detection survey of their entire distribution system at least once every two years. Communities can accomplish the survey using their own contractors or municipal crews; or alternatively, using MWRA’s task order leak detection contract. MWRA’s task order contract provides leak detection services at a reasonable cost that has been competitively procured (3-year, low-bid contract) taking advantage of the large volume of work anticipated throughout the regional system. Leak detection services performed under the task order contract are paid for by MWRA and the costs are billed to the community the following year. During the 4th Quarter of FY17, 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	324	20,778	73,882	84,885	179,869
Low-Flow Fixtures (showerheads and faucet aerators)	10,000	3,162	1,944	3,972	1,907	10,985
Toilet Leak Detection Dye Tablets	-----	2,265	2,814	2,017	545	7,641

BUSINESS SERVICES

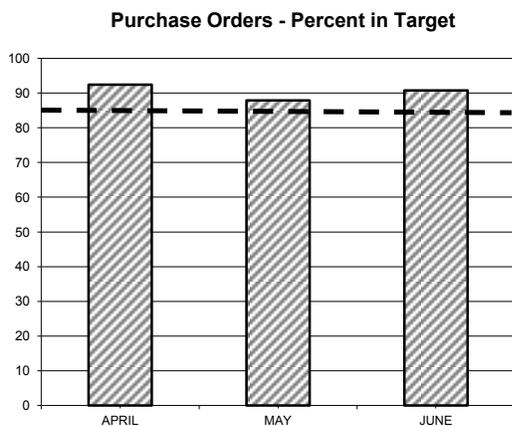
Procurement: Purchasing and Contracts

4th Quarter - FY17

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

Outcome: Processed 90% of purchase orders within target; Average Processing Time was 4.92 days vs. 5.46 days in Qtr 4 of FY16. Processed 81% (17 of 21) of contracts within target timeframes; Average Processing Time was 100 days vs. 92 days in Qtr 4 of FY16.

Purchasing



	No.	TARGET	PERCENT IN TARGET
\$0 - \$500	774	3 DAYS	94.7%
\$500 - \$2K	700	7 DAYS	94.1%
\$2K - \$5K	426	10 DAYS	94.8%
\$5K - \$10K	50	25 DAYS	88.0%
\$10K - \$25K	69	30 DAYS	88.4%
\$25K - \$50K	14	60 DAYS	100.0%
Over \$50K	30	90 DAYS	86.6%

The Purchasing Unit processed 2063 purchase orders, 240 less than the 2303 processed in Qtr 4 of FY16 for a total value of \$11,418,802 versus a dollar value of \$10,425,430 in Qtr 4 of FY16.

The purchase order processing targets were met for all purchase order dollar amount categories.

Contracts, Change Orders and Amendments

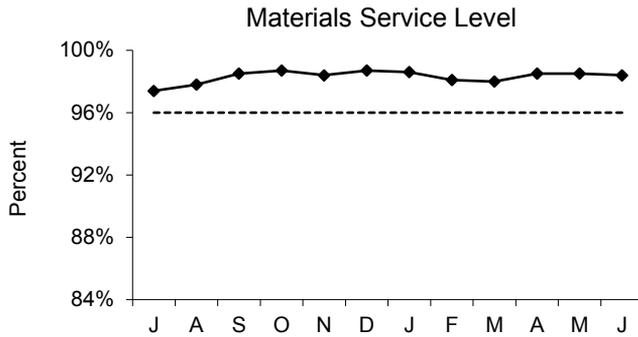
Four contracts were not processed within the target timeframes. One due to an extension of the bid date to increase competition, staff summary requirements and re-prioritization of assignments; another due to required changes to bid documents as a result of a change in contract type from a non-professional services contract to a construction contract; a third due to additional time required to answer bidder questions; and the fourth due to required revisions to the consultant's compensation tables.

Procurement processed twenty one contracts with a value of \$27,408,412 and eight amendments with a value of \$1,601,585. Twenty three change orders were executed during the period. The dollar value of all non-credit change orders during Q4 FY17 was \$1,304,133 and the value of credit change orders was (\$376,184).

Staff reviewed 66 proposed change orders and 29 draft change orders.

Materials Management

4th Quarter - FY17



The service level is the percentage of stock requests filled. The goal is to maintain a service level of 96%. Staff issued 8,676 (98.4%) of the 8,819 items requested in Q4 from the inventory locations for a total dollar value of \$1,282,868.

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 FY17 goal is to reduce consumable inventory from the July '16 base level (\$8.10 million) by 2.0% (approximately \$162,164), to \$7.94 million by June 30, 2017 (see chart below).

Items added to inventory this quarter include:

- Deer Island – expansion valves and power supplies for HVAC; abrasives, wire brushes, stainless steel knotted wheels for Machine shops; o-rings, thermal grease and transducers for I&C; flashlights, mitt dispensers and panel braces for Facilities; solar panels, swivel fittings, calibration gas and adjustable meters for Core.
- Chelsea – housing, stem nuts, intake valves, gaskets and o-rings for planning; input modules, output cards and power supplies for SCADA; engine oil, seals and belts for Maintenance; battery protector cleaner, power steering hoses and ducts, rotors and fan belts for Fleet Services; refrigerator for Field Operations.
- Southboro – badge holders for Administration; velcro for Fleet Services and bearings for Maintenance.

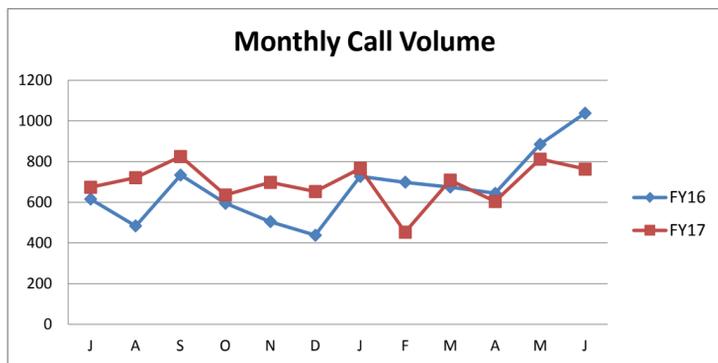
Property Pass Program:

- One audit was conducted during Q4.
- Scrap revenue received for Q4 amounted to \$14,367. Year to date revenue received amounted to \$39,270.
- Revenue received from online auctions held during Q4 amounted to \$264,364. Year to date revenue received amounted to \$478,446.

Items	Base Value July-16	Current Value w/o Cumulative New Adds	Reduction / Increase To Base
Consumable Inventory Value	8,108,240	7,954,061	-154,179
Spare Parts Inventory Value	8,841,332	8,837,452	-3,880
Total Inventory Value	16,949,572	16,791,513	-158,059

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.

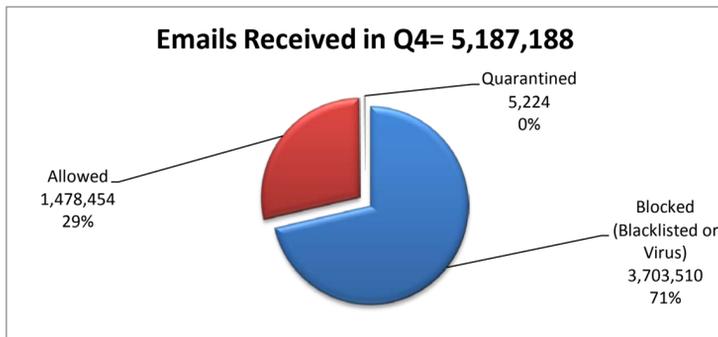
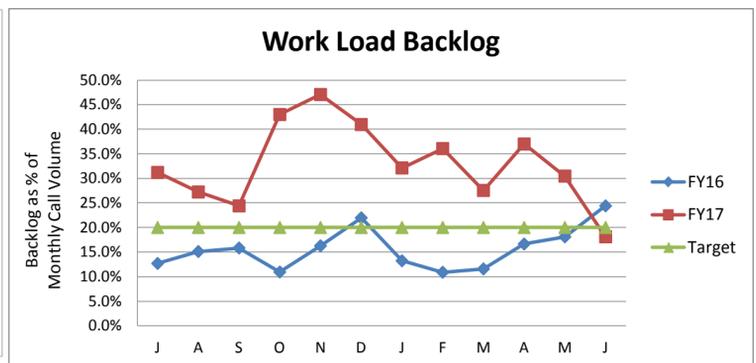
MIS Program 4th Quarter - FY17



Performance & Backlog

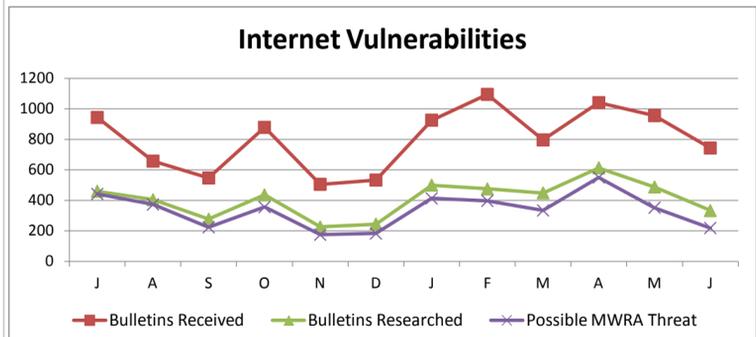
Call Volume: Peaked in May. FY17-Q4 call volume decreased by 15% from FY16-Q4.

Call Backlog: Peaked in May. FY17-Q4 backlog average is 8.5% above the targeted benchmark of 20%.



Information Security

In Q4, pushed security fixes/updates to desktops/servers protecting against 510 vulnerabilities. Landesk Antivirus quarantined 26 distinct viruses from 22 PCs. PCs are current with antivirus signatures for known malware.



Infrastructure:

Office 2016 Upgrade: Through the online training vendor, testers had training for 2016 Excel, Word, Access, Outlook, and PowerPoint available to them, effective 4/7/17. Continued supporting user testing of macros and databases.

Web Server Upgrade: Upgraded the hardware and software on the Web Server that hosts 68 internal web applications to Windows Server 2012 R2 and IIS 8.5. All applications were tested in this environment and are working without issue.

Wireless: New wireless infrastructure implemented for mobile application in the warehouses, laboratories, inspection truck bays and fleet management garages.

Information Security Program: 2017 Security Awareness training has been launched and consists of twelve training modules to be completed by March 30, 2018.

Applications/Training/Records Center:

Miscellaneous Infor/Lawson Support: Created custom retro program (MW288) due to the union contracts settlement and provided the Payroll department with information as requested. Applied the regulatory BSI bulletins across all three (DEV/PROD/DR) environments. The Regulatory Bulletin Tool is used to add new regulatory data to the system and to keep existing regulatory information current. Business Software, Inc. (BSI) is third-party software, used to maintain tax tables for the Infor Payroll application. BSI maintains tax changes such as tax rates, tax laws, and tax limits. Worked with Procurement Department to close over 700 old Purchase Orders for Inactive Buyers. Some of these Purchase Orders were accruing monthly. Closing these Purchase Orders improves MWRA's financial outlook and accuracy. Preparations to procure external vendor service for Lawson software upgrade started. This work is expected to begin in FY18-Q1.

Maximo Upgrade Project: Conducted Release 2 performance testing and Post-Release 2 Go-Live Support. Delivered "Spatial and Anywhere" training; this product allows for creation of spatially enabled work orders which identifies the location of the asset on the GIS map systems. "Anywhere Asset Audit" program was deployed to Citrix production environment. Asset Audit is used by MWRA staff for inventory (asset) validation. Version 7.6 Reports development is complete. 30% review and acceptance completed.

Maximo Control Desk: Continued supporting data migration efforts including extracting Magic Records, formatting records for vendor importing and preparing location files. Prepared a draft classification list for the service catalog and started to work on the Service Level Agreements for Control Desk on the development system. Completed testing Service Catalog process packs in new development environment and demonstrated the functionality to the project team. Completed use cases for selected workflows related to the current Magic Helpdesk application and created a template for the project team to use to document their processes. Completed a job aid on adding offerings in the Self Service Center.

LIMS & Electronic Library Notebook (ELN): Southborough Lab went Live in April allowing the replacement of 23 paper test logs with electronic logs. Two logs are remaining (pending user feedback) to be implemented to complete ELN Phase I, Drinking Water project. Implemented DEP Lab Auditors recommendation to increase Quality Control (QC) sampling volume. Notification defect with respect to Out Of Specs (OOS) reports rectified; real OOS results go to the clients, Quality Control (QC) OOS results go to laboratory staff.

PIMS: User acceptance testing for PIMS-Lawson interface modifications related to fee generation was completed.

Library & Records Center: The Library fulfilled 72 (207 YTD) research requests, and provided 521* (1,210 YTD) periodicals, standards, books & reports. Research topics included Brookline Reservoir Dam Drawings, Boston Harbor Cable boring data, copper sulfate treatment of algae, water and land rights for Wachusett Reservoir abutters. The Records Center added 214 (743 YTD) boxes, handled 289 (1,308 YTD) boxes, disposed of 245 (1,591 YTD) boxes and attended 3 (10 YTD) Records Conservation Board Meetings.

IT Training: For the quarter, 60 staff attended 11 classes. 49% of the workforce has attended at least one class year-to-date. 24 staff completed the Maximo Anywhere training. 15 staff completed the Maximo Spatial training. Completed Hands-on Introduction to MSWord 2016 and Introduction to Excel training manuals. Also completed Introduction to Maximo Work Orders student guide and taught the first/pilot class in Chelsea.

Legal Matters

4th Quarter - FY17

PROJECT ASSISTANCE

Court and Administrative Orders:

- **Boston Harbor Litigation and CSO:** Reviewed CSO Post Construction Compliance Scope of Work and drafted submittal letter. Reviewed and revised financial assistance agreement with BWSC for Dorchester Interceptor inflow removal. Reviewed and submitted semi-annual compliance and progress report.
- **Administrative Consent Order (DITP power outages):** Reviewed and submitted **final** semi-annual *Consultant's Deer Island Energy Recommendations Tracking Sheet* to DEP and EPA.

Real Estate, Contract, Environmental and Other Support:

- **NPDES:** Reviewed joint annual public notice on the progress of CSO control measures to improve the water quality of Alewife Brook required by Alewife Brook/Upper Mystic River CSO variance. Reviewed annual CSO discharge report for 2016 required by the Lower Charles River/Charles Basin and Alewife Brook/Upper Mystic River CSO variances. Reviewed MWRA's comments on the United States Environmental Protection Agency's retrospective review of its existing regulations pursuant to Executive Order 13777 (February 24, 2017). Reviewed letter to EPA and DEP notifying them of Harbor Electric Energy Company's plan to install a new electric power cable to supply DITP with power in lieu of relocating the existing cable and that MWRA will now only need to utilize its CTGs to supply DITP with power during the transition from old to new cable. Reviewed letter to EPA and DEP supplementing MWRA's application for renewal of its DITP NPDES Permit.
- **8(m) Permits:** Reviewed and approved sixty-five (65) 8(m) permits.
- **Wireless Cell Agreements:** Reviewed and revised template for wireless cell permit for the installation, operation, maintenance, replacement and removal of communications equipment on MWRA property. Reviewed and revised Sprint wireless cell permit agreement for the installation, operation, maintenance, replacement and removal of communications equipment at MWRA's Turkey Hill water facility.
- **Real Property:** Drafted MOA with Dedham-Westwood Water District for DWWD work that will be included as part of MWRA Contract 7505 – Dedham South related to Section 111 Southern Extra High Redundancy Pipeline Project. Recorded Order of Conditions DEP 337-1287 at Middlesex Registry of Deeds for work at 98 Riverside Road in Weston. Recorded affidavit and plans at Suffolk Registry of Deeds for Chelsea Creek Headworks pursuant to architectural access board's order. Recorded two temporary easements at Norfolk Registry of Deeds related to Section 111- Southern Extra High Redundancy Pipeline MWRA Contract 7505 in Dedham. Drafted letter agreement with the City of Malden related payment to MWRA by Malden for a portion of the cost of the abandonment and relocation of a portion of MWRA's Section 14 water main to accommodate the sale of the parcel of land at 200 Pleasant Street by the City of Malden to Malden Center LLC for development purposes. Reviewed MOU between Boston College and MWRA related to the Massachusetts Historical Commission's directive to Boston College concerning Boston College's construction of a new field house. Reviewed proposed DCAMM legislation releasing easement in Revere which was supplused by MWRA. Finalized MOA between the Town of Stoneham and MWRA related to the mitigation of impacts related to the construction of a new water main in Stoneham. Drafted license for Wynn, LLC. related to Wynn's potential placement of a time lapse camera at MWRA's DeLauri Pump Station in Boston. Reviewed deed from the United States to MWRA related to DITP parcels of land to confirm that MWRA met its 30 year obligations under the conveyance deed. Reviewed and revised letter agreement with the Town of Reading related to payment to MWRA from Reading for sidewalk rehabilitation work on Oak Street which will be performed under MWRA Contract 7471. Drafted license for Quincy Shipyard, LLC for the purpose of creating one entrance to Fore River Shipyard and for common use among Quincy Shipyard and MWRA for access to and egress from Fore River Shipyard. Drafted license for UMass for access to and use of areas at Deer Island Nut Island on the coastal side of the coastal protection and/or seawalls for the purpose of studying the community composition of intertidal communities living on human-engineered shorelines.
- **Watershed Preservation Restriction:** Reviewed Wachusett Reservoir Watershed Acquisition W-000504 located at 113 Temple Street in West Bolyston, MA. Reviewed Wachusett Reservoir Watershed Acquisition W-001055 and W-001056 located at Justice Hill Road in Sterling, MA.
- **Public Records Requests:** Responded to multiple public records requests. Denied one request re: disclosure of internal cost recovery procedures as protected by attorney-client privilege and work product doctrine.

Miscellaneous Assistance/Project Support:

- Assisted with c. 268A, section 7(e) disclosure options re: Water Supply Protection Trust
- Completed UCC search through D&B to determine non-existence of Ogin creditor rights in Deer Island wind turbine.
- Finalized release and indemnity agreement with Marlborough re: local fire department training exercise on MWRA premises.
- Reviewed draft Chapters 1, 2, 4, and 5 of MWRA's 2018 Wastewater Master Plan.

LABOR, EMPLOYMENT AND ADMINISTRATIVE

New Matters

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

Matters Concluded

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

LITIGATION/TRAC

New Matters Current Employee v. MWRA: Plaintiff, a current employee of MWRA, alleges that on February 2012, an arbitrator rendered an award in his favor as to retroactive pay and negotiation of an appropriate pay grade. Plaintiff seeks to confirm the alleged arbitration award and recover alleged lost income. The Complaint served by Plaintiff is devoid of supporting facts and a description of his claims; the summons and complaint are incorrectly headed as a Suffolk Superior Court filing when the case is actually filed in Middlesex County; and the Complaint fails to attach a copy of the alleged arbitration award.

Angelica Corporation: This is a bankruptcy matter as to which MWRA is monitoring developments and determining whether the debtor entity owes MWRA any funds.

Significant Claims There are no Significant Claims.

Army Corps of Engineers v. NSTAR, HEEC and MWRA, C.A No. 16-11470-RGS: On May 24, 2017, a Stipulation agreed to among all parties to the lawsuit was "lodged" with the federal court. The Stipulation includes the substance of the resolution of all claims of all parties concerning the Army Corps allegations that the installed position of the existing cable is not in conformance with the provisions of the Corps' 1989 permit. The Stipulation includes a schedule calling for the placement of a new cable through which electric power will be provided to MWRA's Deer Island facilities along a new route in Boston Harbor, but outside the Reserved Channel, and for the removal of portions of the existing cable to make way for upcoming dredging operations of Massport and the Army Corps. Just prior to the submission of the Stipulation, MWRA entered into an agreement with HEEC regarding MWRA's obligations regarding payment for the new cable following discounts for: (i) the lack of full use of the existing cable by MWRA for its expected remaining useful life, and (ii) for an over-payment made by MWRA to HEEC of the incentive payment for the successful "completion" of the placement of the existing cable allegedly "under budget" per the terms of the 1990 Interconnection Agreement among MWRA, HEEC and NSTAR. The Stipulation has been "lodged" with the federal court for a thirty day public comment period which expired on June 30. In that time frame no adverse comments were received. The Stipulation will be formally accepted by and entered as an Order of the Court which will result in a general stay of the claims of all parties pending full performance of HEEC's obligations with respect to installation of the new cable and removal of portions of the existing cable. MWRA will not be a permittee under a new Army Corps permit for the new cable and will have no responsibility with respect to permitting for or placement or construction of the new cable.

DaPrato v. MWRA, C.A. No. 15-3687-D: On May 22, 2017, after consultation with the Trial Division of the MA Attorney General's Office, MWRA filed a motion with the Superior Court seeking to protect, on behalf of three current MWRA employees, personal information relating to those employees under the MA FIPA statute sought by Plaintiff in connection with the designation of the parties' respective comparator witnesses. The motion was denied upon the ground that comparator witnesses had been sufficiently identified by Plaintiff as comparable to the facts and circumstances surrounding MWRA action taken re: Plaintiff's employment. Plaintiff subsequently took the depositions of three MWRA employees.

Cach, LLC v. Derick Olivar and MWRA: On June 19, 2017, the Court allowed MWRA's motion to dismiss the trustee process action based on Cach, LLC's failure to prosecute and late service of the trustee summons. Cach, LLC had also filed a motion seeking release of the monies withheld from the one-time deduction from the employee's wages after service of the trustee summons. MWRA requested that the Court permit MWRA to return the funds to the employee, under the circumstances. In the Order allowing MWRA's motion, the Court indicated that Cach, LLC was to "take nothing." Law division staff requested that Payroll return the funds withheld to the employee.

Closed Cases Bay State Regional Contractors, Inc., v. MWRA: On May 26, 2017, MWRA entered a settlement in which MWRA agreed to settle claims by Bay State arising out of MWRA's Gillis Pump Station Rehabilitation Project, including claims for alleged extra work and liquidated damages withheld by MWRA due to Bay State's failure to meet contract deadlines. The settlement allowed MWRA to retain out of the liquidated damages all but a small portion of MWRA's costs caused by Bay State's delays.

Subpoenas During the 4th Quarter of FY 2017, two new subpoenas were received, one subpoena was re-activated and one subpoena was pending at the end of the Fourth Quarter FY 2017.

Public Records During the Fourth Quarter of FY 2017, seventeen public records requests were received and ten public records requests were closed.

SUMMARY OF PENDING LITIGATION MATTERS

TYPE OF CASE/MATTER	As of Jun 2017	As of Mar 2017	As of Dec 2016
Construction/Contract/Bid Protest (other than BHP)	0	2	3
Tort/Labor/Employment	3	2	1
Environmental/Regulatory/Other	2	2	2
Eminent Domain/Real Estate	0	0	0
total – all defensive cases	5	6	6
Other Litigation matters (restraining orders, etc.) <u>MWRA v. Thomas Mercer</u> <u>MWRA v. NSTAR and HEEC</u>	2	2	2
total – all pending lawsuits	7	8	8
Claims not in suit: <u>Joel Chiet Claim</u> <u>Besnick Lalaj and Violeta Lalaj Claim</u> <u>Thang Viet Vu and Oanh Vu Claim</u>	3	3	3
Bankruptcy	2	1	1
Wage Garnishment	15	15	14
TRAC/Adjudicatory Appeals	2	3	0
Subpoenas	1	0	0
TOTAL – ALL LITIGATION MATTERS	30	30	26

TRAC/MISC.

New Appeals: One new TRAC appeal was received in the 4th Quarter FY 2017.
Leavitt Corporation; MWRA Docket No. 17-04.

Settlement by Agreement of Parties

Two TRAC Appeals were settled by Agreement of the Parties during the 4th Quarter FY 2017.
Smokehouse, Inc.; MWRA Docket No. 17-01
Constitution Seafoods, Inc.; MWRA Docket No. 17-02

Stipulation of Dismissal

No Stipulation of Dismissals.

Notice of Dismissal Fine paid in full

No cases of Notices of Dismissal, Fine paid in full.

Tentative Decision

No Tentative Decisions were issued in the 4th Quarter FY 17.
No Final Decisions was issued in the 4th Quarter FY 2017.

INTERNAL AUDIT AND CONTRACT AUDIT ACTIVITIES

4th Quarter - FY17

Highlights

During the 4th quarter, Internal Audit (IA) completed a follow-up review of several consultants' vulnerability assessments of MWRA facilities to determine which recommendations have been completed, rejected, or are in the process of being implemented. IA also prepared various analyses including engineering scheduling, thermal overtime and quality assurance/quality control practices of certain consultant firms. A project on the Affirmative Action and Compliance Unit's data visualization was completed.

The HEEC 2016 true-up was completed, and support was provided in the negotiations for a new cable. In addition, 2 consultant preliminary reports were issued and 3 construction labor burden reviews were conducted. The BWSC 2016 force account costs were audited under terms of the memorandum of understanding and financial assistance agreement and a review of the Viscom contract was completed.

Status of Recommendations

IA made 40 recommendations made in FY17 of which 19 have closed. An additional 31 recommendations from prior fiscal year audits were also closed.

IA follows-up on open recommendations on a continuous basis. All open recommendations have target dates for implementation. When a recommendation has not been implemented within 48 months, the appropriateness of the recommendation is re-evaluated during a subsequent audit. On closed assignments 98% of recommendations have been implemented.

Report Title (issue date)	Audit Recommendations		
	Open	Closed	Total
Follow-Up Report on Fleet Services Activities (12/31/13)	1	16	17
Records Management (12/5/14)	1	7	8
Unmatched Receipts and Accruals (6/30/15)	3	7	10
Warehouse Cycle Counts at DITP (11/5/15), Southboro (11/6/15) and Chelsea (12/4/15)	3	22	25
MIS Mobile Equipment Asset Tracking (9/26/16)	1	11	12
Wright Express (WEX) Fuel Card Purchases (11/16/16)	10	3	13
Purchase Card Activity on Deer Island (3/31/17)	10	5	15
Totals	29	71	100

Cost Savings

IA's target is to achieve at least \$1 million 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 work in prior years.

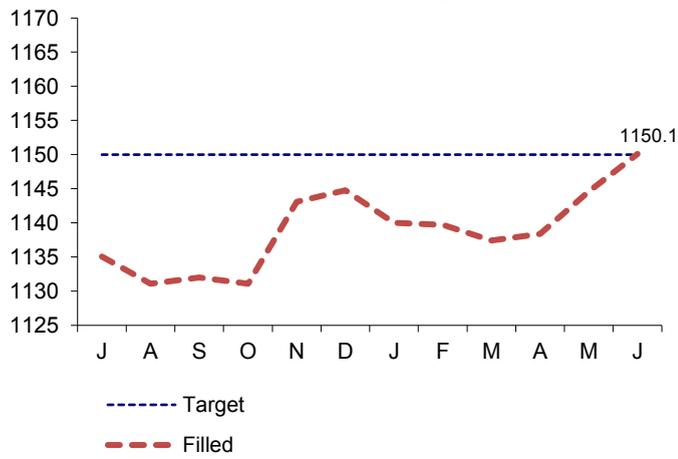
Cost Savings	FY13	FY14	FY15	FY16	FY17	TOTAL
Consultants	\$587,314	\$294,225	\$87,605	\$88,312	\$272,431	\$1,329,887
Contractors & Vendors	\$2,153,688	\$415,931	\$1,146,742	\$1,772,422	\$3,037,712	\$8,526,495
Internal Audits	\$391,083	\$923,370	\$543,471	\$220,929	\$224,178	\$2,303,031
Total	\$3,132,085	\$1,633,526	\$1,777,818	\$2,081,663	\$3,534,321	\$12,159,413

OTHER MANAGEMENT

Workforce Management

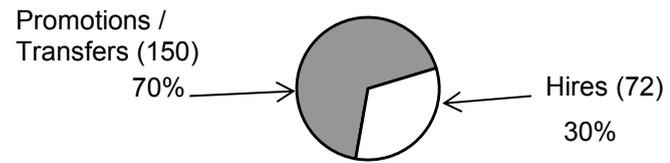
4th Quarter FY17

FTE Tracking



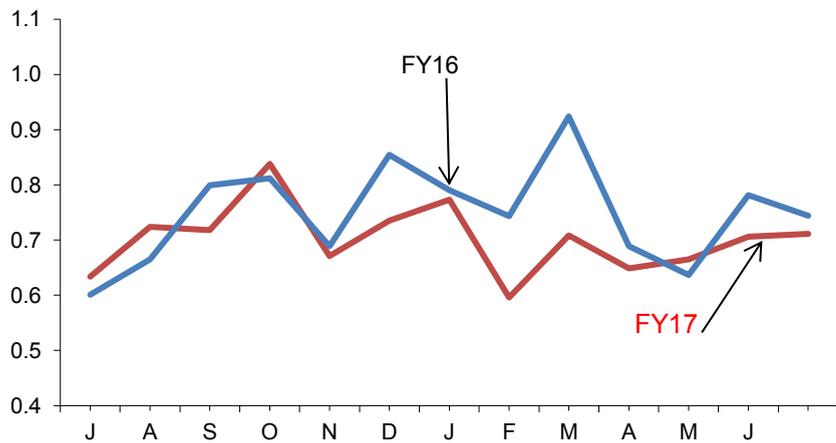
FY17 Target for FTE's = 1150
 FTE's as of June 2017 = 1150.1

Positions Filled by Hires/Promotions
 FY17-YTD



	Pr/Trns	Hires	Total
FY14	111 (69%)	51 (31%)	162
FY15	133 (67%)	65 (33%)	198
FY16	99 (62%)	60 (38%)	159
FY17	150 (70%)	72 (32%)	222

Average Monthly Sick Leave Usage
 Per Employee



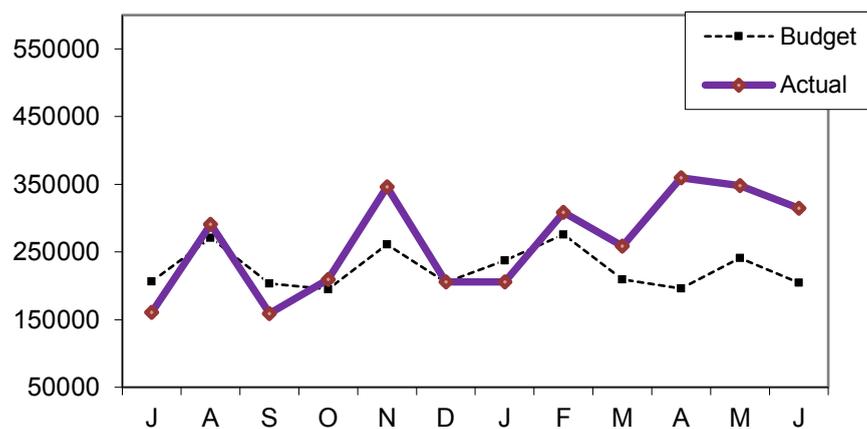
Average monthly sick leave for the 4th Quarter of FY17 decreased as compared to the 4th Quarter of FY16 (8.43 to 8.08 days)

In Q4 of FY17, the average quarterly sick leave usage decreased 7% from the same time last year.

	Number of Employees	YTD	Annualized Total	Annual FMLA %	FY16
Admin	136	7.75	7.75	14.7%	8.29
Aff. Action	4	6.29	6.29	0.0%	8.05
Executive	5	13.80	13.80	48.1%	10.97
Finance	36	8.50	8.50	30.1%	9.70
Int. Audit	7	6.51	6.51	52.6%	4.44
Law	14	8.98	8.98	8.9%	11.41
OEP	8	5.74	5.74	25.3%	6.62
Operations	942	8.55	8.55	16.2%	9.06
Pub. Affs.	13	6.31	6.31	15.2%	9.16
MWRA Avg	1165	8.42	8.42	16.7%	8.99

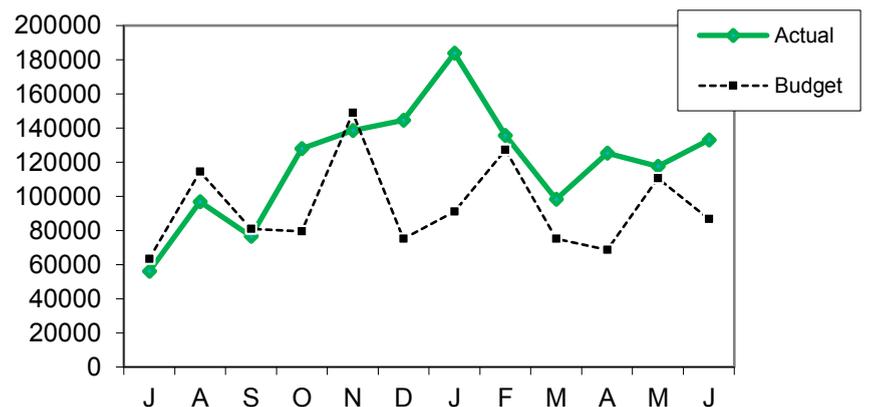
Percent of sick leave usage for FY17, attributable to Family and Medical Leave Act (FMLA) is 16.7% .

Field Operations
 Current Month Overtime \$



Total Overtime for Field Operations for the fourth quarter of FY2017 was \$1,022,253 which is \$381k over budget. Emergency overtime was \$584k, which was \$294k over budget. Rain events totaled \$409k, emergency maintenance was \$77k, emergency operations was \$34k. Coverage overtime was \$176k, which was \$42k over budget, reflecting the month's shift coverage requirements. Planned overtime was \$262k or \$45k over budget. Spending for the month includes maintenance off-hours work at \$109k, planned operations at \$35k, and maintenance work completion at \$35k. YTD, FOD has spent \$3,166,726 on overtime which is \$462k over budget.

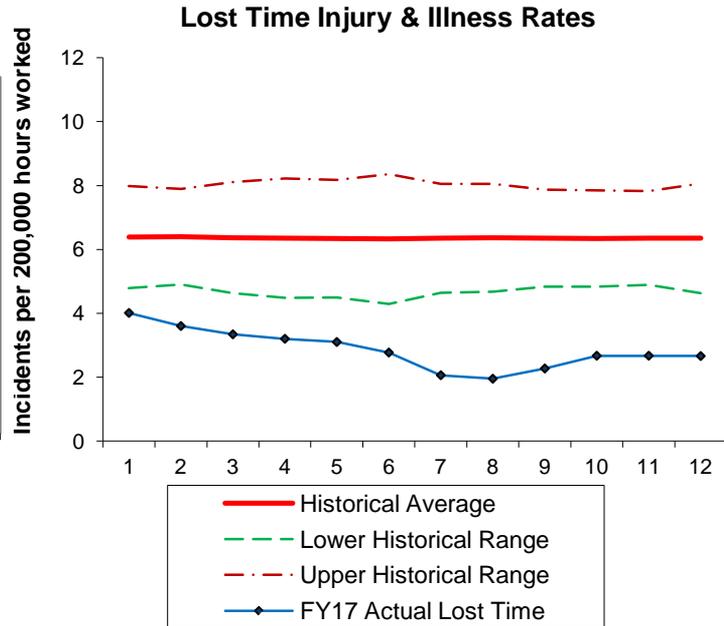
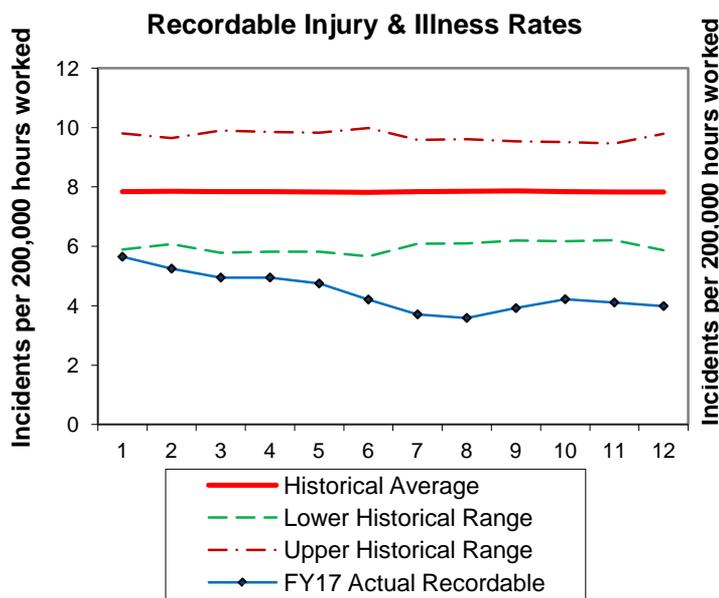
Deer Island Treatment Plant
 Current Month Overtime \$



Total overtime for Deer Island for the fourth quarter of FY17 was \$376K, which was \$110K over budget. A combination of planned/unplanned overtime which was \$55K over budget mainly due to maintenance and operations activities involving the Sail Boston event and higher shift coverage overtime, \$63K over budget, due to a 2nd Class Engineer on IA and several vacant operator positions. This is offset in part by, less than anticipated storm coverage overtime, (\$8K). YTD, Deer Island has spent \$1,433,753 on overtime which is \$313K over budget.

Workplace Safety

4th Quarter - FY17



- 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.
- 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.
- 3 The "Historical Average" is computed using the actual MWRA monthly incident rates for FY99 through FY14. The "Upper" and "Lower Historical Ranges" are computed using these same data – adding and subtracting two standard deviations respectively. FY15 actual incident rates can be expected to fall within this historical range.

WORKERS COMPENSATION HIGHLIGHTS

	4th Quarter Information		Open Claims
	New	Closed	
Lost Time	6	15	58
Medical Only	9	30	14
Report Only	40	40	
	QYTD		FYTD
Regular Duty Returns	3		21
Light Duty Returns	0		6

COMMENTS:

Regular Duty Returns

APRIL One employee returned to regular duty from IA

MAY One employee returned to regular duty from IA

JUNE One employee returned to regular duty from IA

Light Duty Returns

APRIL No employees returned to light duty from IA

MAY No employees returned to light duty from IA

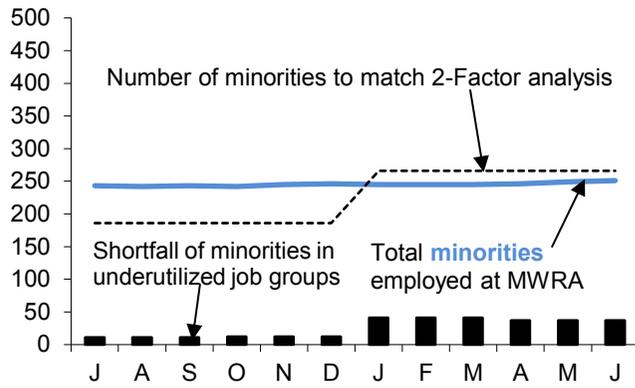
JUNE No employees returned to light duty from IA

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

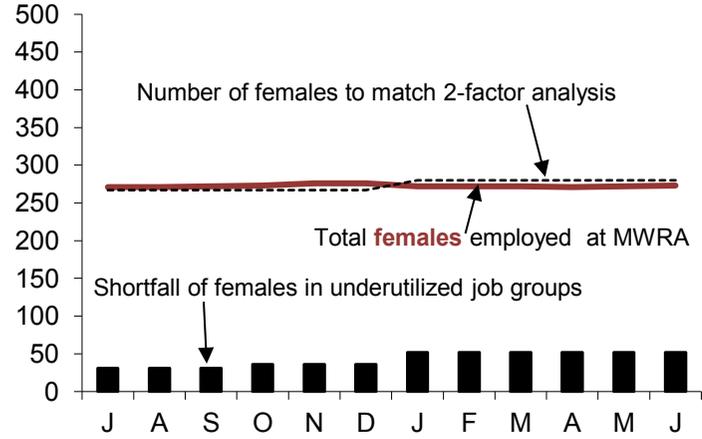
*Report only claims are closed the month they are filed.

MWRA Job Group Representation 4th Quarter - FY17

Minority - Affirmative Action Plan Goals



Female - Affirmative Action Plan Goals



Highlights:

At the end of Q4 FY17, 7 job groups or a total of 37 positions are underutilized by minorities as compared to 6 job groups or a total of 12 positions at the end of Q4 FY16; for females 7 job groups or a total of 52 positions are underutilized by females as compared to 9 job groups or a total of 36 positions at the end of Q4 FY16. During Q4, 1 minority and 4 females were hired. During this same period 1 minorities and 4 females terminated.

Underutilized Job Groups - Workforce Representation

Job Group	Employees	Minorities	Achievement Level	Minority	Females	Achievement Level	Female
	as of 6/30/2017	as of 6/30/2017		Over or Under Underutilized	As of 6/30/2017		Over or Under Underutilized
Administrator A	21	2	2	0	6	6	0
Administrator B	19	1	3	-2	4	6	-2
Clerical A	34	13	9	4	15	32	-17
Clerical B	27	7	7	0	8	15	-7
Engineer A	80	23	18	5	16	12	4
Engineer B	58	16	13	3	6	7	-1
Craft A	113	18	27	-9	8	7	1
Craft B	147	29	32	-3	8	4	4
Laborer	70	21	16	5	3	3	0
Management A	100	15	25	-10	41	25	16
Management B	47	9	7	2	6	12	-6
Operator A	68	4	11	-7	3	9	-6
Operator B	65	13	13	0	18	1	17
Professional A	33	5	7	-2	15	14	1
Professional B	164	45	43	2	54	67	-13
Para Professional	60	18	22	-4	52	32	20
Technical A	53	11	11	0	12	10	2
Technical B	6	1	1	0	2	2	0
Total	1165	251	267	21/-37	277	264	65/-52

AACU Candidate Referrals for Underutilized Positions

Job Group	Title	# of Vac	Requisition Int. / Ext.	Promotions /Transfers	AACU Ref. External	Position Status
Administrator B	Associate General Counsel, Litigation	1	Int/Ext	0	0	NH = WF
Craft A	M&O Specialist	1	Int/Ext	0	2	NH = WM
Craft B	Construction Pipelayer	1	Int	0	0	Promo = WM
Craft B	Heavy Equipment Operator I	1	Int/Ext	0	0	NH = WM
Craft B	HVAC Specialist	1	Int	1	0	Transfer = WM
Craft B	Facilities Specialist	2	Int	2	0	(2) Promo = WM
Craft B	Instrumentation Specialist	1	Int/Ext	0	0	NH = WM
Clerical A	Payables Coordinator	2	Int/Ext	0	0	NH = BF & WM
Clerical A	Secretary I	1	Int/Ext	0	0	NH = HF
Clerical A	Administrative Coordinator	1	Int/Ext	0	1	NH = BF
Clerical B	Warehouse Materials Handler	2	Int	2	0	(2) Promo = HM
Engineer A	Program Manager	1	Int/Ext	0	0	NH = WF
Engineer A	Mechanical Designer	1	Int/Ext	0	0	NH = HM
Engineer A	Project Engineer	1	Int	1	0	Promo = WM
Laborers	Buildings & Grounds Worker	2	Int/Ext	0	0	NH = HM & WM
Laborers	OMC Laborer	2	Int/Ext	0	0	(2) = WM
Management A	Deputy Contracts Manager	1	Int/Ext	0	0	NH = AM
Operator A	Area Supervisor	1	Int	1	0	Promo = WM
Operator B	Operator	2	Int/Ext	0	0	(2) NH = WM
Professional B	Sampling Associate	1	Int	1	0	Promo = WM
Professional B	Sr. Sampling Associate	1	Int	1	0	Promo = WF

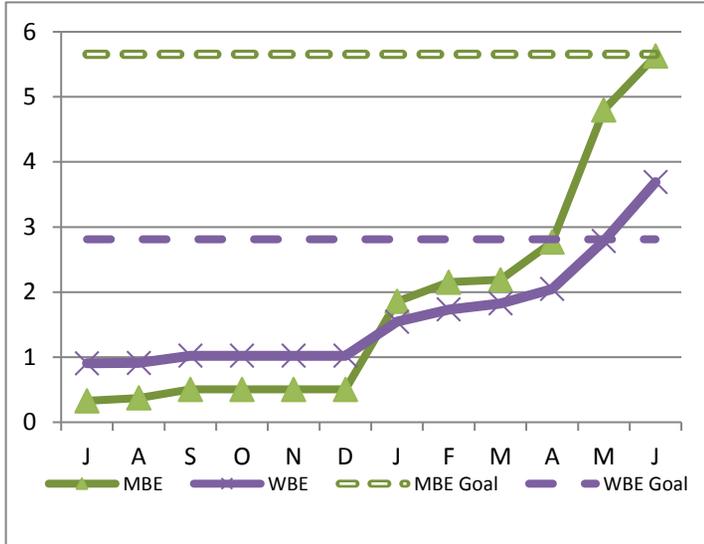
MBE/WBE Expenditures

4th Quarter - FY17

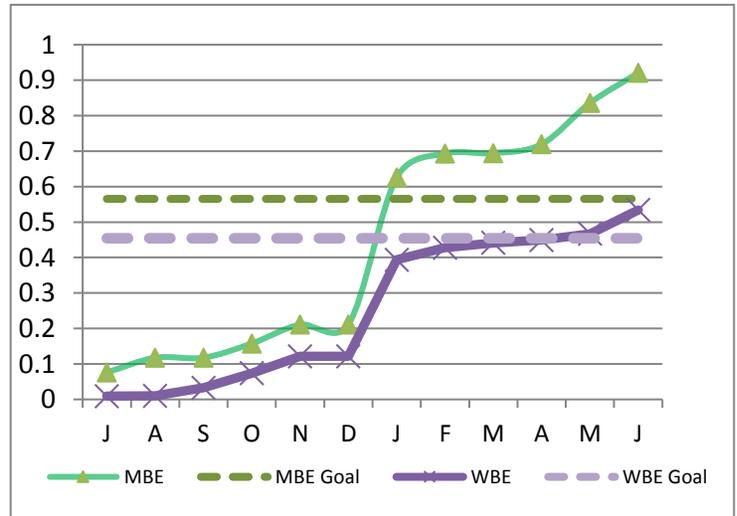
MBE/WBE targets are determined based on annual MWRA expenditure forecasts in the procurement categories noted below. The goals for FY17 are based on 85% of the total construction and 75% of the total professional projected spending for the year. Certain projects have been excluded from the goals as they 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 June.

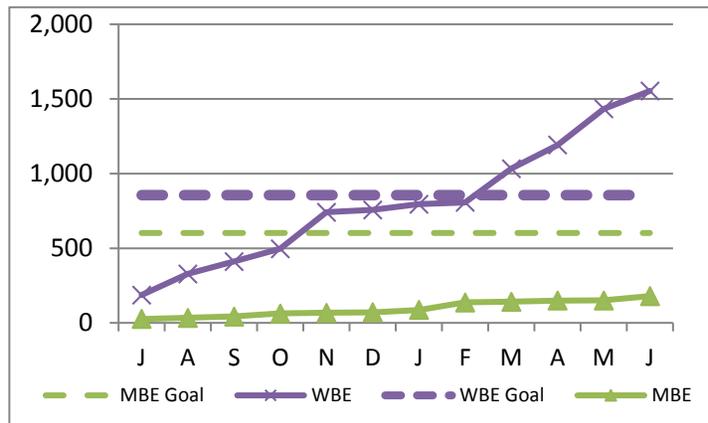
Construction



Professional Services



Goods/Services



FY17 spending and percentage of goals achieved, as well as FY16 performance are as follows:

MBE			
FY17 YTD		FY16	
Amount	Percent	Amount	Percent
5,628,738	99.5%	1,805,604	37.9%
920,597	162.8%	828,841	55.3%
179,359	29.8%	255,324	40.6%
6,728,694	98.6%	2,889,769	41.9%

WBE			
FY17 YTD		FY16	
Amount	Percent	Amount	Percent
3,690,334	131.3%	1,114,916	47.1%
533,917	117.5%	314,752	26.1%
1,553,214	181.6%	1,124,374	160.7%
5,777,465	140.2%	2,554,042	59.8%

Construction
Prof Svcs
Goods/Svcs
Totals

FY16 MBE/WBE dollar totals do not include MBE and WBE payments to prime contractors and consultants.

MWRA FY17 CEB Expenses 4th Quarter - FY17

	June 2017 Year-to-Date (\$000)					
	Budget	Actual	Variance	%	FY17 Budget	%
EXPENSES						
WAGES AND SALARIES	\$ 101,859	\$ 98,494	\$ (3,365)	-3.3%	\$ 101,859	96.7%
OVERTIME	4,193	4,952	759	18.1%	4,193	118.1%
FRINGE BENEFITS	20,242	19,624	(619)	-3.1%	20,242	96.9%
WORKERS' COMPENSATION	2,344	2,565	221	9.4%	2,344	109.4%
CHEMICALS	9,110	9,263	152	1.7%	9,110	101.7%
ENERGY AND UTILITIES	21,541	20,250	(1,291)	-6.0%	21,541	94.0%
MAINTENANCE	31,081	30,799	(282)	-0.9%	31,081	99.1%
TRAINING AND MEETINGS	435	360	(75)	-17.3%	435	82.7%
PROFESSIONAL SERVICES	6,532	6,699	167	2.6%	6,532	102.6%
OTHER MATERIALS	6,220	5,851	(368)	-5.9%	6,220	94.1%
OTHER SERVICES	22,975	21,865	(1,109)	-4.8%	22,975	95.2%
TOTAL DIRECT EXPENSES	\$ 226,532	\$ 220,722	\$ (5,810)	-2.6%	\$ 226,532	97.4%
INSURANCE	\$ 1,998	\$ 1,740	\$ (258)	-12.9%	\$ 1,998	87.1%
WATERSHED/PILOT	24,291	23,912	(380)	-1.6%	24,291	98.4%
BECo PAYMENT	774	789	15	2.0%	774	102.0%
MITIGATION	1,558	1,543	(15)	-1.0%	1,558	99.0%
ADDITIONS TO RESERVES	(168)	(168)	-	0.0%	(168)	100.0%
RETIREMENT FUND	4,633	4,633	-	0.0%	4,633	100.0%
POST EMPLOYEE BENEFITS	4,876	4,876	-	0.0%	4,876	100.0%
TOTAL INDIRECT EXPENSES	\$ 37,962	\$ 37,324	\$ (638)	-1.7%	\$ 37,962	98.3%
STATE REVOLVING FUND	\$ 86,972	\$ 80,460	\$ (6,512)	-7.5%	\$ 86,972	92.5%
SENIOR DEBT	268,473	287,932	19,459	7.2%	268,473	107.2%
CORD FUND	-	-	-	-	-	-
DEBT SERVICE ASSISTANCE	(874)	(1,265)	(392)	-44.8%	(874)	69.1%
CURRENT REVENUE/CAPITAL	12,200	12,200	-	0.0%	12,200	100.0%
SUBORDINATE MWRA DEBT	69,998	69,998	-	0.0%	69,998	100.0%
LOCAL WATER PIPELINE CP	4,149	859	(3,291)	-79.3%	4,149	20.7%
CAPITAL LEASE	3,217	3,217	-	0.0%	3,217	100.0%
DEBT PREPAYMENT	10,995	10,995	-	0.0%	10,995	100.0%
VARIABLE DEBT	-	(11,028)	(11,028)	-	-	0.0%
DEFEASANCE ACCOUNT	-	-	-	-	-	-
TOTAL DEBT SERVICE	\$ 455,130	\$ 453,367	\$ (1,763)	-0.4%	\$ 455,130	99.6%
TOTAL EXPENSES	\$ 719,624	\$ 711,413	\$ (8,211)	-1.1%	\$ 719,624	98.9%
REVENUE & INCOME						
RATE REVENUE	\$ 694,879	\$ 694,879	\$ -	0.0%	\$ 694,879	100.0%
OTHER USER CHARGES	8,753	8,809	57	0.6%	8,753	100.6%
OTHER REVENUE	6,519	13,088	6,569	100.8%	6,519	200.8%
RATE STABILIZATION	-	-	-	-	-	-
INVESTMENT INCOME	9,473	9,758	285	3.0%	9,473	103.0%
TOTAL REVENUE & INCOME	\$ 719,624	\$ 726,534	\$ 6,910	1.0%	\$ 719,624	101.0%

As of June 2017, total expenses are \$711.4 million, \$8.2 million or 1.1% lower than budget, and total revenue is \$726.5 million, \$6.9 million or 1.0% over budget, for a net variance of \$15.1 million.

Expenses –

Direct Expenses are \$220.7 million, \$5.8 million or 2.6% below budget.

- **Wages & Salaries** are under budget by \$3.4 million or 3.3%. At the end of June, the average Full Time Equivalent (FTE) positions were 1,139, 11 positions fewer than the 1,150 FTE's budgeted.
- **Utilities** are under budget by \$1.3 million or 6.0% due to lower than budgeted electricity costs of \$1.5 million at Deer Island, reflecting both lower electricity prices and reduced purchased electricity during the HEEC cable location work by Eversource partially offset by additional diesel purchases of \$380k also related to operation of the CTGs during the detection of the HEEC cable location project.
- **Other Services** are under budget by \$1.1 million or 4.8% due to lower Sludge Pelletization expenses of \$418k reflecting lower year to date quantities, lower Lease/Rentals of \$219k due to lower escrow payments at the Chelsea Facility for taxes and insurance, and lower pass through maintenance cost at the Charlestown Navy Yard Facility, \$207k for Other Services, and \$95k for Grit and Screenings disposal services due to lower quantities.
- **Overtime** expenses are higher than budgeted by \$759k or 18.1% mainly at the Deer Island Treatment Plant for the HEEC cable location project by Eversource and for off-hours maintenance projects primarily for Field Operations Metro Maintenance.
- **Fringe Benefits** are under budget by \$619k or 3.1% mainly due to fewer than budgeted participants.
- **Other Materials** expenses are \$368k under budget due to underspending for vehicle expense \$268k reflecting lower fuel prices and lower than budgeted computer hardware expenses of \$255k, offset by higher than budgeted spending of \$119k for lab and testing supplies.
- **Ongoing Maintenance** expenses are \$282k under budget, less than 1% for the fiscal year.
- **Professional Services** were higher than budget by \$167k or 2.6% due primarily to the HEEC Cable relocation work.

Indirect Expenses are \$37.3 million, \$638k under budget or 1.7%. Insurance Claims and Watershed Reimbursements/PILOT are under budget by \$254k and \$380k, respectively.

Debt Service Expenses totaled \$453.4 million, \$1.8 million under budget after the transfer of the \$20.1 million favorable variance to the Defeasance account. Variable rate savings accounted for \$11.0 million. MWRA also recognized \$6.5 million in YTD underspending due to the favorable impact of the August 2016 defeasance, lower SRF funding, and no senior debt borrowing in January.

Revenue and Income –

Total Revenue / Income is \$726.5 million, \$6.9 million higher than budget, primarily for non-rate revenue including \$4.8 million for water usage related to the summer drought, \$1.1 million for Nut Island fire insurance proceeds, \$299k for a class action lawsuit settlement for derivative agreements, \$528k for the disposal of surplus materials, and \$324k for energy efficiency incentives. Investment Income is over budget by a net \$285k as a result of higher short term interest rates offset for unanticipated calls re-invested at lower rates.

Cost of Debt

4th Quarter - FY17

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.

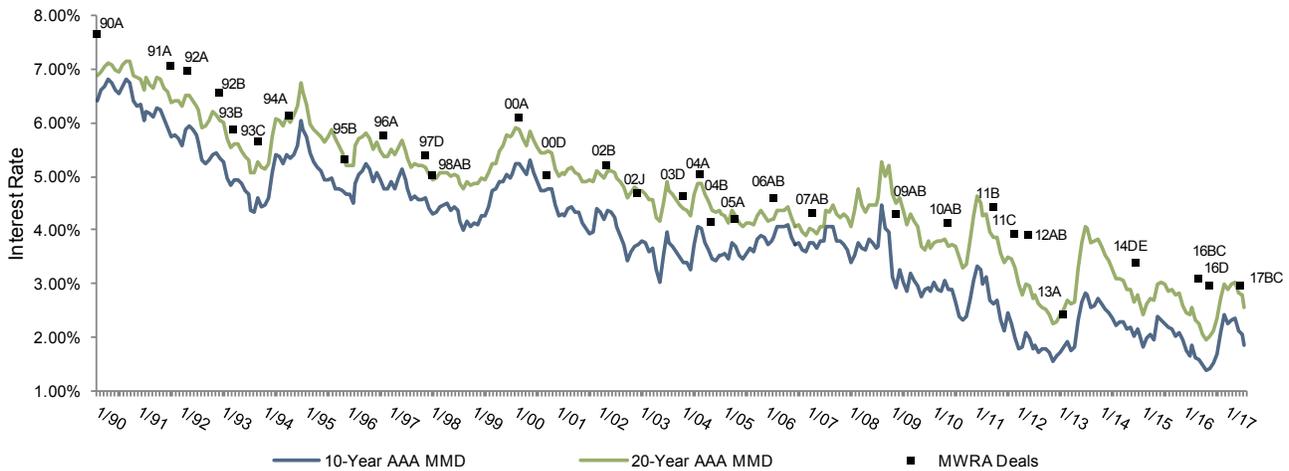
Average Cost of MWRA Debt FYTD

Fixed Debt (\$3,605)	3.82%
Variable Debt (\$481.2)	1.08%
SRF Debt (\$1,007)	1.41%
 Weighted Average Debt Cost (\$5,093)	 3.08%

Most Recent Senior Fixed Debt Issue May 2017

2017 Series B & C (\$322.9)	2.98%
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MWRA Fixed Rate Debt vs. 10 and 20 Year MMD Rates

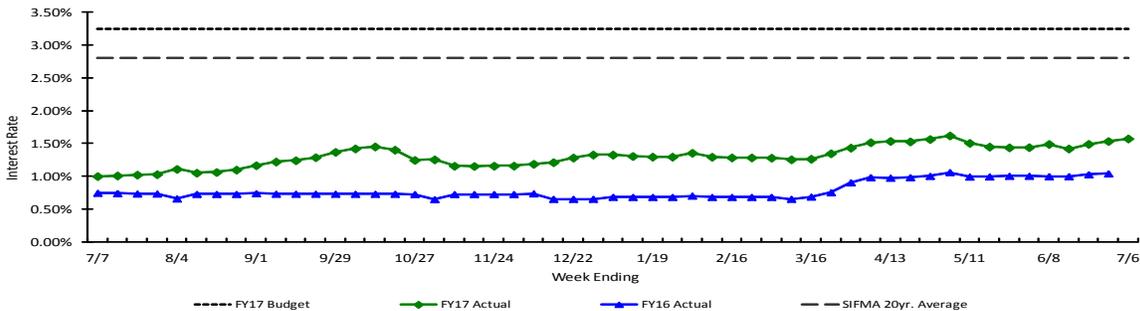


Bond Deal	1992B	1993B	1993C	1994A	1995B	1996A	1997D	1998AB	2000A	2000D	2002B	2002J	2003D	2004A
Rate	6.58%	5.89%	5.66%	6.15%	5.34%	5.78%	5.40%	5.04%	6.11%	5.03%	5.23%	4.71%	4.64%	5.05%
Avg Life	6.3 yrs	19.8 yrs	19.1 yrs	19.5 yrs	20.5 yrs	19.5 yrs	21.6 yrs	24.4 yrs	26.3 yrs	9.8 yrs	19.9 yrs	19.6 yrs	18.4 yrs	19.6 yrs

Bond Deal	2004B	2005A	2006AB	2007AB	2009AB	2010AB	2011B	2011C	2012AB	2013A	2014DEF	2016BC	2016D	2017BC
Rate	4.17%	4.22%	4.61%	4.34%	4.32%	4.14%	4.45%	3.95%	3.93%	2.45%	3.41%	3.12%	2.99%	2.98%
Avg Life	13.5 yrs	18.4 yrs	25.9 yrs	24.4 yrs	15.4 yrs	16.4 yrs	18.8 yrs	16.5 yrs	17.9 yrs	9.9 yrs	15.1 yrs	17.4 yrs	18.8yrs	11.2 yrs

Weekly Average Variable Interest Rates vs. Budget

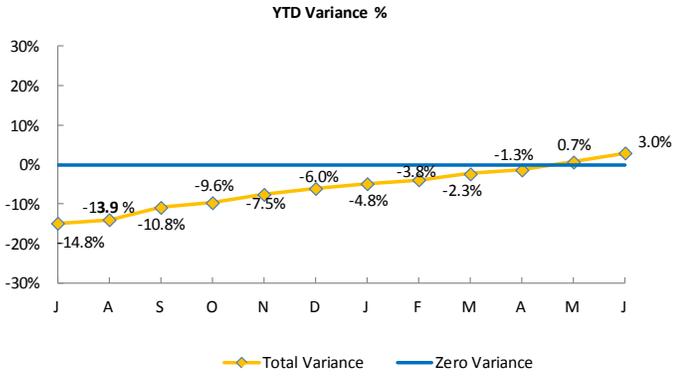
MWRA currently has eleven variable rate debt issues with \$903 million outstanding, excluding commercial paper. Of the eleven outstanding series, five have portions which have been swapped to fixed rate. Variable rate debt has been less expensive than fixed rate debt in recent years as short-term rates have remained lower than long-term rates on MWRA debt issues. In June, SIFMA rates ranged from a high of 0.87% to a low of 0.74% for the month. MWRA's issuance of variable rate debt, although consistently less expensive in recent years, results in exposure to additional interest rate risk as compared to fixed rate debt.



Investment Income

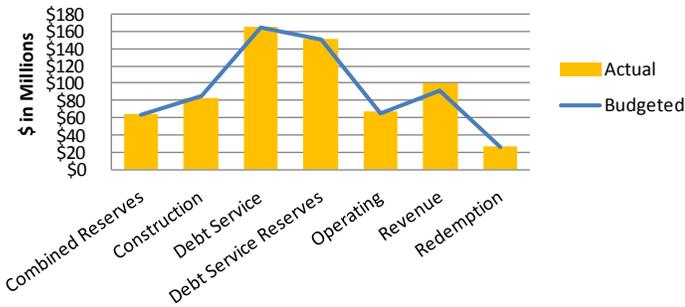
4th Quarter – FY17

Year To Date

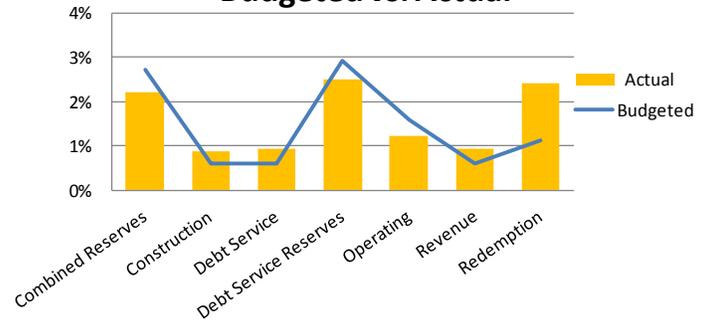


	YTD BUDGET VARIANCE			
	(\$000)			
	BALANCES IMPACT	RATES IMPACT	TOTAL	%
Combined Reserves	(\$0)	(\$308)	(308)	-17.9%
Construction	(\$19)	\$229	210	41.1%
Debt Service	\$6	\$561	567	57.7%
Debt Service Reserves	\$16	(\$624)	(608)	-13.9%
Operating	\$24	(\$364)	(339)	-33.0%
Revenue	\$40	\$386	427	77.3%
Redemption	(\$0)	\$338	337	113.3%
Total Variance	\$67	\$218	\$285	3.0%

YTD Average Balances Budgeted vs. Actual

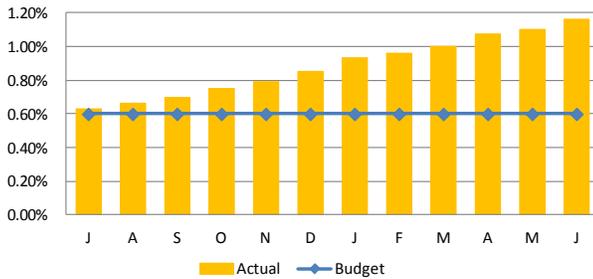


YTD Average Interest Rate Budgeted vs. Actual

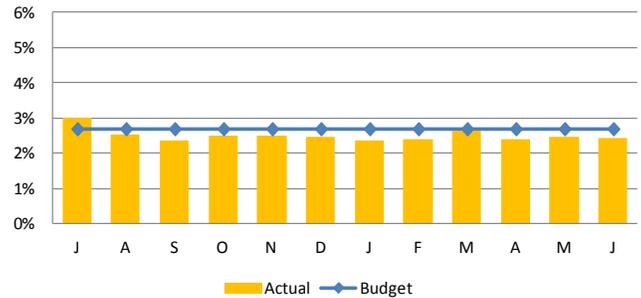


Monthly

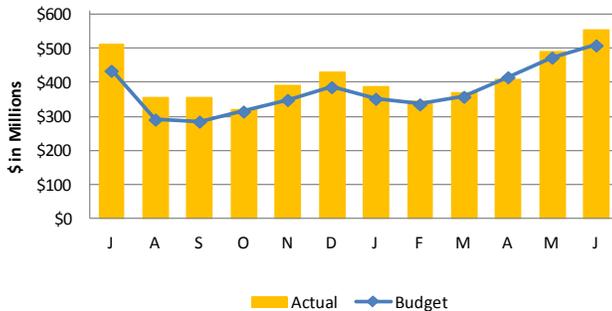
Short-Term Interest Rates



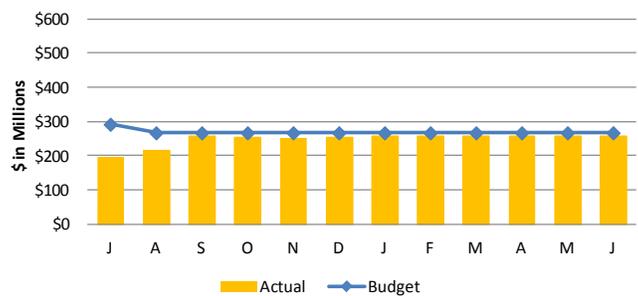
Long-Term Interest Rates



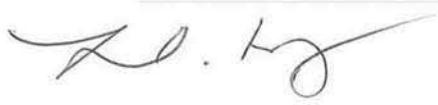
Short-Term Average Balances



Long-Term Average Balances



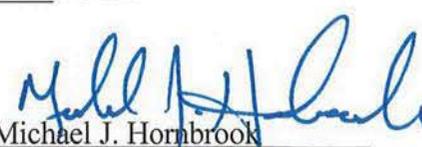
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: FY16-FY20 Strategic Business Plan Annual Update for FY17

COMMITTEE: Administration, Finance, and Audit

INFORMATION
 VOTE

Carolyn M. Fiore, Deputy Chief Operating Officer
Denise Breiteneicher, Program Manager, Energy and
Environmental Management
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

Staff presented an updated five-year business plan, covering FY16 through FY20, to the Board in March 2015. At that meeting, staff explained that this is a stream-lined plan that describes the MWRA's mission, identifies values, and outlines five key strategic priorities and eighteen goals, as well as specific initiatives associated with these goals that provide a framework for MWRA's business initiatives over the next five years. The Plan complements, rather than supplants, other MWRA planning tools including the Water and Wastewater Master Plans, the Capital Improvement Program, and the annual Current Expense Budget, among others.

RECOMMENDATION:

For information only. Staff are presenting a review of the second year of MWRA's five-year business plan, including progress made on initiatives and accomplishments, and new issues that have been identified.

DISCUSSION:

The MWRA Business Plan is a strategic blueprint that articulates the mission statement, values, and goals of the agency, as well as specific initiatives associated with these goals to be achieved or evaluated over the next five years. The document serves as a vehicle to communicate these goals and initiatives to all stakeholders. The Plan was developed as a tool to guide staff in prioritizing projects and programs within the broader framework of Authority goals and mandates, and to evaluate system-wide performance.

Five strategic themes integral to MWRA's mission form the basis of the Plan:

- I. Drinking Water Quality and System Performance
- II. Wastewater Management and System Performance

- III. Infrastructure Management and Resilience
- IV. Financial and Management
- V. Environmental Sustainability

MWRA identified a series of goals to help it achieve its stated priorities, as well as core and special initiatives that describe the specific projects and direction the MWRA intends to undertake over the next five years to continue manage to excellence. Core Initiatives address the activities that MWRA must do to meet its performance goals, regulatory requirements, and financial commitments. Special Initiatives address activities, projects, and emerging issues that staff will be assessing or undertaking in order to improve MWRA's performance of its core responsibilities. Existing reporting mechanisms, such as the Orange and Yellow Notebooks, will continue to be used to track monthly and quarterly performance.

The annual update allows and encourages staff to assess MWRA's progress broadly toward achievement of its goals, as well as assess progress made on individual projects within Core Initiatives, and on Special Initiatives. It also provides an opportunity for managers to review projects at a high level and decide whether the priority status of the project has changed (i.e. is more or less important) since the development of the Business Plan, and whether the level of resources devoted to the project should remain the same or be increased or reduced.

The attached document presents all the goals by priority areas with the associated initiatives. There is a graphic that shows progress made in FY17, and an associated list of highlights for each initiative. Some of the highlights for FY17, listed by strategic theme are:

Drinking Water Quality and System Performance

- Met all regulatory requirements for safe drinking water and received the 2017 Public Water System Award for Outstanding Performance and Achievement from the Massachusetts Department of Environmental Protection.
- Distributed \$6 million in funds targeting full removal of lead water service lines under a new provision of the Local Water System Assistance Program.
- Continued the School Sampling Program that provides assistance to MWRA member communities with analysis of drinking water from schools for lead that began in FY16. Over the first two years of this program, the Deer Island Lab analyzed 14,925 samples from 35 member communities.



Wastewater Management and System Performance

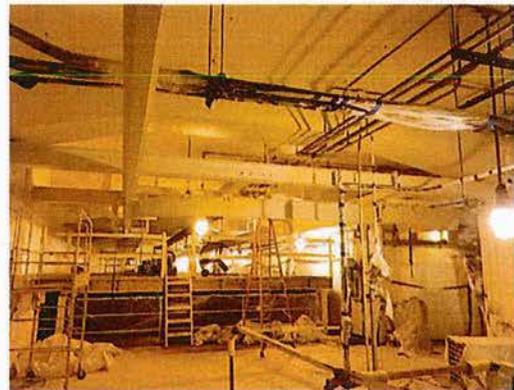
- Received EPA's Regional Industrial Pretreatment Program Excellence Award for 2016.
- Received the Platinum award for Deer Island Treatment Plant from NACWA for 10 consecutive years without a NPDES violation.

- Received the NACWA Gold Award for the second year in a row for no permit violations in one year at the Clinton Wastewater Treatment Plant.
- Continued construction on the phosphorus removal facility; approximately 75% complete.
- Developed a court ordered Scope of Work describing how MWRA proposes to conduct a 3-year CSO post-construction monitoring program and CSO performance assessment intended to verify compliance with the long-term levels of CSO control and submitted it to DEP on May 1, 2017.
- A new Clinton NPDES permit was issued and became effective March 1, 2017.



Infrastructure Management and Resilience

- Received approval from the Board of Directors to construct two new water supply tunnels to provide redundancy for the Metropolitan Tunnel system (City Tunnel, City Tunnel Extension and Dorchester Tunnel). Additional redundancy projects are in the works including work on sections of the Northern Intermediate High and the Southern Extra High.
- Continued construction on the Wachusett Aqueduct Pump Station, which began in FY16. The project is 49% complete, with substantial completion expected in February 2019.
- Installed new perimeter defenses for the SCADA system and PICS systems along with other security recommendations from Idaho National Labs/Department of Homeland Security.
- Awarded a contract for the complete rehabilitation of the Chelsea Creek Headworks, including new flood protection measures.
- Awarded contracts for the rehabilitation study of the Cambridge Branch Sewer and the North Metropolitan Trunk Sewer, as well as for the design of the Dorchester Interceptor Renewal.
- Completed the upgrade of MAXIMO, MWRA's work order system tracking and management program to enhance maintenance and workload tracking.
- Designed flood protection for ten facilities, and completed installation of flood protection at Alewife Pump Station and at Chelsea Screen House in line with the goal of reducing impacts of projected sea level rise and storm surge events on MWRA infrastructure. MWRA staff have installed flood protection barriers at Braintree-Weymouth Replacement Pump Station, Quincy Pump Station, Hough's Neck Pump Station, and Squantum Pump Station.

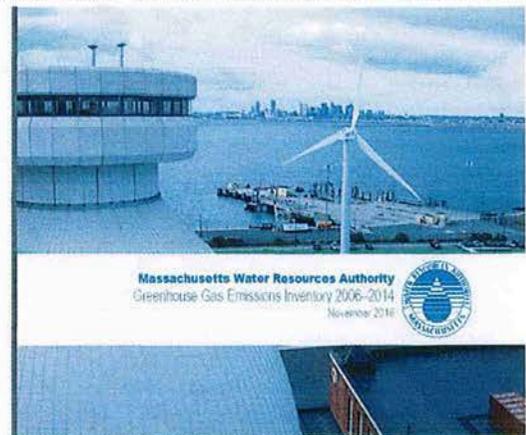


Financial and Management

- Launched a new web based on-line employment application system in order to expedite critical hiring and increase the applicant data base.
- Continued the Operator-on-the-job training program and one year of maintenance mechanic shadow training, and established a medium voltage training program.
- Developed and provided Safety Awareness Training to all employees.
- Realized, once again, a favorable Current Expense Budget balance, the majority of which will be used to defease debt and provide targeted rate relief for our member communities in the most challenging years. Assessments are projected to increase no more than 3.8% annually through FY2022.
- Maintained MWRA's strong credit ratings Aa1, AA+,AA+ from Moody's, Standard & Poor's and Fitch respectively. These high credit ratings enable MWRA to borrow at advantageous interest rates, minimizing future debt service expense.
- Continued aggressive management of operation and capital expenses enabling MWRA to lower the projected average community assessment increases from 3.8% to 3.2% in FY18.

Environmental Sustainability

- Reached agreement with Eversource to install a new Deer Island cross harbor cable to ensure uninterrupted power delivery to Deer Island for the long term.
- Completed over ten energy efficiency projects throughout the Authority, for which \$1.7 million in utility incentive was received, resulting in an expected annual reduction of over 6.2 million kWhs and \$569,000 in savings.
- Construction of a new CVA Fish Hatchery Pipeline and Hydroelectric Facility reached substantial completion in August 2017. Qualified Facility for Renewable Portfolio Standard.
- Completed and published, on the MWRA's webpage, a Green House Gas Report covering MWRA's operations.



BUDGET/FISCAL IMPACT:

The budgetary impacts of the initiatives in the Business Plan are accounted for in the CEB and CIP.

ATTACHMENT:

Attachment 1: Review of MWRA Five Year Strategic Business Plan, FY16-FY20 with FY17 updates

KEY:

Not started 

Initiated 

In progress 

Achieved 

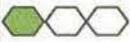
On-going Core Activities 

I. Drinking Water Quality and System Performance

Goal #1: Maintain drinking water quality to protect public health, and continue to ensure that MWRA water meets all applicable regulations.		
Objective	2017	Highlights/ Progress Updates
A. Optimize operation of water treatment facilities to produce high quality, safe drinking water while maximizing water aesthetics (e.g., taste, clarity, and odor).	→	<ul style="list-style-type: none"> MWRA met all regulatory requirements for safe drinking water. MWRA received the 2017 Public Water System Award for Outstanding Performance and Achievement.
B. Monitor drinking water quality in collaboration with member communities and the Department of Conservation and Recreation (DCR) in order to verify high quality water and provide guidance for operating decisions.	→	<ul style="list-style-type: none"> MWRA continues to coordinate monitoring efforts with DCR for both routine algae and algal toxin monitoring as well as reservoir emergency response planning. MWRA also continues to coordinate field and laboratory resources to aid local water departments in resolution of water quality complaints and issues. The MWRA logged 851 water quality complaints in FY17. There were 3 EnQual-Water staff-assisted complaint field response events and 9 EnQual-Water staff-assisted field support events. MWRA provided community training for water quality system complaints, Revised Total Coliform Rule, and low chlorine residual troubleshooting. MWRA's 2017 Biennial Sampler Training program took place and focused on proper sampling technique and chlorine residual testing.
C. Ensure reliability of data presented in required regulatory	→	<ul style="list-style-type: none"> Staff completed the automation of the Long Term 2 Enhanced Surface Water Treatment

<p>compliance reports.</p>		<p>Rule report generation process and submitted the final report for the program.</p> <ul style="list-style-type: none"> • Detailed specifications for Aquarius enhancements completed in coordination with MIS in 1st Qtr. FY17. • Contract for upgrade of Aquarius database and WQRS reporting system completed in coordination with MIS in 3rd Qtr. FY17.
<p>D. Work cooperatively with DCR and the Watershed Trust to ensure effective and transparent watershed management for water quality protection.</p>		<ul style="list-style-type: none"> • Staff are continuing to coordinate with DCR with a goal of revising and updating the existing Memorandum of Understanding between DCR and MWRA to reflect developments since it was signed and current understandings relating to separate and joint operations and management of the watershed system.
<p>E. Operate the reservoir system to optimize both quality and quantity of water available for water supply purposes and to meet statutory and regulatory requirements for downstream releases.</p>		<ul style="list-style-type: none"> • Met all statutory requirements for downstream releases. • MWRA achieves exceptional raw water quality through effective water transfer between the Quabbin and the Wachusett Reservoirs, based on amount and timing of transfers. Due to 2017 drought recovery and wet spring conditions, Quabbin transfer began later than typical. • MWRA assessed standby reservoir monitoring program through results obtained during annual water quality sondes profiling and grab sample analysis. • Sudbury Reservoir, Foss Reservoir, Chestnut Hill Reservoir, Fells Reservoir, and Spot Pond are all kept within their normal operating ranges. A winter drawdown of the Foss Reservoir and the Chestnut Hill reservoir did not occur as planned in the winter of FY16-17 due to drought conditions. Water has not been added to either Fells or Spot Pond since going into standby status in 1998. Level control has been maintained through the removal of excess water when the elevation has been above the normal operating range.

<p>F. Enhance the safety and security of the water supply and watershed system against accidental or intentional threats and hazards.</p>		<ul style="list-style-type: none"> • Implemented consequence management practices to guide responses to CMS alarms, providing a response strategy on how to respond to alarms. The consequence management strategy is a threat response matrix that helps to speed up actions in response to a terrorist threat or contamination events. • New water quality monitoring buoys have been deployed on the Wachusett Reservoir. Communication equipment on an older buoy was also upgraded, and a new scan unit has been installed at the reservoir site. • In 2016, MWRA added sondes that can detect and measure crude and refined petroleum, and deployed these at Wachusett reservoir.
<p>G. Identify potential transportation related contaminants to the source water and develop a response to potential contamination from these sources.</p>		<ul style="list-style-type: none"> • Funded U. Mass research project in 2015-2016, and continuing into 2016-2017, to evaluate impacts of an oil spill and treatment assessments. • Draft of a new contract for the U. Mass project is in progress to expand the list of contaminants investigated beyond crude oil for 2017-2020.
<p>H. Evaluate improved ways to monitor and manage the system to maintain high quality water all the way to the ends of the community systems.</p>		<ul style="list-style-type: none"> • Expanded both Reservoir Monitoring and Contaminant Warning systems throughout MWRA facilities and critical monitoring locations.
<p>I. Advocate for responsible and reasonable revised drinking water regulations.</p>		<ul style="list-style-type: none"> • MWRA staff have been active in state and federal review of the Total Coliform Rule, Lead and Copper Rule, and Unregulated Contaminant Monitoring Rule, as well as other proposed rule changes. • MWRA began planning for the 2018-2020 Unregulated Contaminant Monitoring Rule 4 sample program period. In 2018 staff will develop a training program for partial and CVA communities.
<p>J. Develop improved data handling, auditing, and reporting functionality.</p>		<ul style="list-style-type: none"> • Implemented new system for maintenance of electronic archives for all compliance reporting.
<p>K. Monitor drinking water quality of storage tank facilities during</p>		<ul style="list-style-type: none"> • MWRA monitored the Norumbega Covered Storage tank during April-June 2017

offline inspection activities	→	inspection activities. Staff utilized the CMS system to monitor the tank during reactivation periods. Drinking water and sediment samples were collected to facilitate a future tank cleaning project.
Goal #2: Continue to effectively report and communicate water quality information to our customers and public officials.		
Objective	2017	Highlights/ Progress Updates
A. Distribute the federally required annual water quality report, the Consumer Confidence Report (CCR), to all households.	→	<ul style="list-style-type: none"> • Completed Annual Water Quality report in June and distributed to homes, as well as posted on MWRA website. Additional focus this year on lead related issues and the drought.
B. Maintain and improve water quality and public health information on MWRA's web page, www.MWRA.com.	→	<ul style="list-style-type: none"> • In FY17, notices were posted regarding PFAs and lead, and monthly and annual water quality reports were prominently featured. Water quality reports were also sent directly to subscribers through the Everbridge application. • In FY17 a primary focus of the webpage was on water conservation due to the then ongoing drought. MWRA used its mobile drinking water fountain as a tool to talk directly with members of the public about water quality and conservation at dozens of events. Also, MWRA participated in AMWA's "Imagine a Week Without Water" in September 2016 and AWWA's "Drinking Water Week" in May 2017 utilizing the website and MWRA's Twitter account.
C. Investigate web-based and more real time reporting of data.		<ul style="list-style-type: none"> • Began investigating operational data sources and technologies for data management, integration and warehousing.
Goal #3: Assist member communities to improve local water distribution systems through ongoing financial, technical and operational support programs to maximize long-term water quality benefits.		
Objective	2017	Highlights/ Progress Updates
A. Provide technical and operational support through training, on-call contracts, and targeted assistance, as needed.	→	<ul style="list-style-type: none"> • Continued School Lead Sampling Program, providing assistance to MWRA member communities with analysis of drinking water from schools for lead. In the first two years of the program, MWRA's Central Lab analyzed 14,925 samples for lead from 35 MWRA communities opting to participate in

		<p>the Program. This special project is expected to continue in FY18.</p> <ul style="list-style-type: none"> • Provided technical assistance to communities during water quality events and water main breaks. • Provided assistance with leak detection and valve operations to communities as requested. Assisted over 15 municipalities in the MWRA's Service Area with leak detection in their systems in FY17. • Met with 17 out of 43 customer communities to review water quality and distribution support. • Conducted Community Forums on lead in concert with MWRA Advisory Board in March 2016 and June 2017.
<p>B. Promote and manage MWRA's Local Water System Assistance Program to help facilitate improvements in local community infrastructure.</p>	<p style="text-align: center;">→</p>	<ul style="list-style-type: none"> • In FY17, \$28.7 million in MWRA interest-free loans were distributed to member water communities. In total, \$352 million in loans have been distributed and 39 of 45 eligible water communities are participating. Since 1998, 511 miles of local water main have been replaced or cleaned and lined (about 8% of the regional system) via projects funded by MWRA financial assistance. In FY17, \$100 million lead service line replacement loan program began. Distributions totaled \$6.0 million in funds targeting full removal of lead water services. Annual updates to the Board of Directors and the MWRA Advisory Board are ongoing. • Conduct significant outreach associated with the addition of the lead service line replacement program, as well as additional outreach on other local lead issues. Presented information and provided updates to community officials during the June 2017 community forum on lead hosted by MWRA and MWRA's Advisory Board.

<p>C. Coordinate with MWRA's Advisory Board and develop a recommendation for a third phase of the community water financial assistance program for the FY21 to FY30 timeframe consistent with the Water Master Plan.</p>		<ul style="list-style-type: none">• Coordination with the Advisory Board on development of Phase 3 Local Water System Assistance Program was completed in FY17. Beginning with the Final FY18 CIP, a new \$192 million Phase 3 of the community water loan program has been approved by the Board of Directors.
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II. Wastewater Quality and System Performance

Goal #4: Meet or surpass environmental compliance standards at both MWRA treatment facilities and throughout the wastewater collection system.		
Objective	2017	Highlights/ Progress Updates
A. Continue to carry out the Pretreatment Program to protect receiving water quality, maximize the beneficial reuse of wastewater residuals, and protect workers and MWRA's wastewater treatment plants.	→	<ul style="list-style-type: none"> • MWRA's TRAC Program received the 2016 Regional Industrial Pretreatment Program Excellence Award from EPA. • Conducted a total of 1,893 industrial waste inspections (SIUs and non-SIUs), 895 gas oil separator inspections, and 139 septage and septage hauler inspections. • Saw a 31% decrease in SIUs in non-compliance with the Sewer Use Discharge Regulations in FY16 with FY17 data finalized in August. • Conducted a total of 2,883 sampling events for the following activities: <ul style="list-style-type: none"> ○ 1,501 industrial ○ 141 NPDES permit related ○ 32 for emergency response ○ 224 for local limits ○ 1,017 for special projects • Sampled 182 permitted Significant Industrial Users (SIU) with a discharge at least once in 2017. • Issued 284 permits
B. Continue to monitor DITP and Clinton Process Controls and quality of treated effluent to optimize plant performance and ensure that all applicable NPDES permit limits continue to be attained.	→	<ul style="list-style-type: none"> • Deer Island was awarded a Platinum award from the National Association of Clean Water Agencies (NACWA) for 10 consecutive years without a NPDES permit violation. • The Clinton Treatment Plant was awarded its second consecutive NACWA Gold Award for no permit violations in a calendar year.
C. Implement enhanced phosphorus control at the Clinton Wastewater Treatment Plant.		<ul style="list-style-type: none"> • Construction of phosphorus removal facility (Contract 7411) approximately 75% complete. Project is on schedule to meet the planned completion date of September 2017.
D. Develop a molybdenum (Mo) control strategy to enable more widespread biosolids reuse.		<ul style="list-style-type: none"> • In FY17, DEP simplified its Mo limits from two separate limits into one and raised the limit to 40 ppm, which was expected to enable MWRA to use its biosolids in-state year-round. However,

		since then, the MWRA pellets exceeded 40 mg/kg for the first time since 2005; presumably due to excessive heat/drought that may have increased cooling tower usage of Mo products. The major source of Mo in the influent remains cooling tower blowdown, so staff are planning a meeting/workshop with chemical suppliers, while simultaneously reviewing feasible regulatory options.
E. Comply with I/I mapping and planning requirements in state environmental regulations and NPDES permits. New Initiative		<ul style="list-style-type: none"> Submitted Collection System Operation and Maintenance Plan outline by 9/1/2017, and plan to submit full plan by 3/1/2019, and collection system map by 9/1/2019, to comply with Clinton NPDES permit. Submit I/I control plan for MWRA collection system by 12/31/2017, to comply with 314 CMR 12.04(2).
F. Conduct an evaluation of the CSO treatment processes to determine potential opportunities to better meet permit limits.		<ul style="list-style-type: none"> Evaluation of the CSO treatment processes was conducted in FY16 under MWRA Contract #7400, Task Order No. 15. The evaluation of each CSO facility involved reviewing both the equipment and operation of each CSO facility, as well as performing additional sampling during activations. A final report was submitted with the findings and recommendations for each facility. Next steps: <ul style="list-style-type: none"> Several key recommendations have been carried forward into the Prison Point Improvement Project (induction mixers, additional post chlorination sample locations, etc.). This improvement project is currently in design. Lessons learned as a result of the PP Improvement Project will be applied at Cottage Farm. Staff are working to implement improvements to total residual chlorine measurement at Somerville Marginal CSO.
Goal #5: Continue to initiate plans and studies to prepare for regulatory changes; identify opportunities to refine monitoring requirements; and improve effluent quality.		
Objective	2017	Highlights/ Progress Updates
A. Prepare updated Local Limits Studies for Clinton and Deer Island in accordance with EPA		<ul style="list-style-type: none"> New Clinton permit was issued and became effective March 1, 2017. Local limits reassessment submitted to EPA in August, 2017

<p>guidelines to confirm appropriate discharge limits from industries.</p>		<p>and may result in revised local limits.</p> <ul style="list-style-type: none"> • Awaiting EPA's issuance of new NPDES permits for DITP. Data continues to be collected for each Plant; however Clinton sampling has been scaled back now that the new permit has been issued.
<p>B. Continue to review all Ambient Monitoring Plan questions and conduct evaluations to ensure they address MWRA needs and public concerns</p>		<ul style="list-style-type: none"> • This work has started, but progress has been delayed by resignations and retirements of scientists on EPA and DEP's Outfall Monitoring Science Advisory Panel.
<p>C. Continue to closely follow potential permit issues such as the impact of changes in bacterial and nutrient water quality standards, NPDES delegation to MA, stormwater permitting, and endangered species designations</p>		<ul style="list-style-type: none"> • Key issues in FY17 included bacterial indicators of pathogens in wastewater and expected future limit on <i>Enterococcus</i>, mixing zone, and NPDES delegation. • MWRA staff met with EPA and DEP to discuss potential DITP permit issues.
<p>D. Develop a plan to respond to emerging contaminants as they are identified and frame an approach to respond to the public's concerns about these constituents.</p>		<ul style="list-style-type: none"> • Enqual is responsive to the public's concerns to emerging contaminants and perform investigations as needed to address these concerns.
<p>E. Review new organic waste treatment technologies as they arise.</p>		<ul style="list-style-type: none"> • No new technologies to review in FY17.
<p>F. Prepare for the Dental Amalgam Rule change.</p>		<ul style="list-style-type: none"> • The final rule was issued with an effective date of July 14, 2017. It requires only dentists who begin discharge to the sewer after July 14, 2017 to comply immediately with a certification statement that they have an approved amalgam separator. Existing dentists have until July 14, 2020 to comply. DEP currently manages the dental program. TRAC will reach out to them for their list of dentists within the MWRA's service area. • The rule does not require TRAC to inspect, permit or monitor these dentists, though TRAC may be more restrictive if they believe it necessary. • TRAC is considering a group permit for dentists, perhaps with a five year duration. This would require a new fee structure.

Goal #6: Complete all CSO milestones by 2020 and demonstrate that the CSO Plan meets its performance objectives at all outfalls. Ensure compliance with CSO NPDES permit requirements.		
Objective	2017	Highlights/ Progress Updates
A. Complete implementation of the remaining 3 of the original 35 CSO control projects.		<ul style="list-style-type: none"> Attained substantial completion of the last 3 CSO projects in FY16, in compliance with Schedule Seven, with the cooperation of BWSC and the City of Cambridge.
B. Attain levels of CSO discharge frequency and annual volume specific to each of the 84 CSO outfalls addressed in the long-term CSO plan by 2020		<ul style="list-style-type: none"> Staff continue to report CSO discharge estimates to EPA and DEP annually and track and evaluate performance against the court-ordered long-term levels of control. Staff are also coordinating discharge predictions and measurements with CSO communities and working with the communities where need and opportunity exists to optimize system performance.
C. Complete final eligibility reviews and closeout of each completed community-implemented CSO Project.		<ul style="list-style-type: none"> In FY17, staff completed final eligibility reviews and certifications for the 43 BWSC construction contracts funded in part by MWRA under the CSO MOU and Financial Assistance Agreement, which ended on June 30, 2017. Staff completed the final eligibility review and certification for the Brookline sewer separation Phase II construction contract in FY15. In FY18, staff will perform final eligibility reviews for the City of Cambridge CSO contracts.
D. Develop scope for the court-ordered CSO verification assessment by FY16 and implement the assessment during the period CY 18-20.		<ul style="list-style-type: none"> MWRA developed a Scope of Work describing how it proposes to conduct a 3-year CSO post-construction monitoring program and CSO performance assessment intended to verify compliance with the long-term levels of CSO control. MWRA submitted the scope of work to DEP on May 1, 2017, in compliance with the CSO variances for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River. MWRA also commenced the preparation of procurement documents, including a RFQ/P and a detailed scope of services for a professional services contract that will assist MWRA in conducting the 3-year monitoring program and assessment. The RFQ/P and scope of services are scheduled to be advertised in July 2017.
Goal #7: Assist member communities to improve their wastewater collection systems through ongoing technical, financial, and operational support programs.		
Objective	2017	Highlights/ Progress Updates
A. Provide technical and operational support including TV		<ul style="list-style-type: none"> Staff routinely provide technical assistance when requested. In FY17, staff provided

inspections, field work assistance, or other targeted assistance, as needed.		assistance to Somerville and Cambridge.
B. Promote and manage MWRA's Inflow/Infiltration Local Financial Assistance Program to facilitate reduced I/I in local community infrastructure.	→	<ul style="list-style-type: none"> • In FY17, \$22.3 million in MWRA grants and interest-free loans were distributed to member sewer communities. In total, \$332.9 million in grants and loans have been distributed and all 43 sewer communities are participating. Since 1989, average annual wastewater flow to DITP has been reduced by about 75 mgd, a 20% reduction. (See more information in the Annual NPDES I/I Reduction Report.) Annual updates to the Board of Directors and the Advisory Board are ongoing.

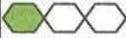
III. Infrastructure Management and Resilience

Goal #8: Maintain and enhance water and wastewater system assets over the long term at the lowest possible life cycle cost and acceptable risk, consistent with customer, community, and regulatory support service levels.

Objective	2017	Highlights/ Progress Updates
<p>A. Continue to ensure proper operations and maintenance of the water and wastewater systems and minimize system downtime by performing Preventative, Predictive, and Corrective maintenance on equipment and linear assets, water system leak surveys, valve inspections and exercise, and performing inspections and cleaning of wastewater pipelines, structures, water storage tanks, and inverted siphons inspections, and cleaning.</p>	<p style="text-align: center;">→</p>	<ul style="list-style-type: none"> • Completed renovation of the Southborough Lab, Contract 6650A, and (one component of CP-7) in the second Qtr. of FY17. Work included replacing the roof, fire protection, HVAC and other equipment. • Replaced 7 water blow-off retrofits and 14 main line valves, entailing excavating and isolating the main from the valve, cutting out the old valve and installing a new one. • Inspected 140 Miles of MWRA water mains and located 22 leaks, repairing 18 of them. The four remaining leaks could not be repaired due to isolating and supply issues. Ten mainline valves in the distribution system were also replaced. • Performed independent water meter testing to confirm the accuracy of the meters supplying the municipalities in MWRA Service Area. • Inspected 33.2 miles of MWRA wastewater interceptors and 49 siphon barrels. • Cleaned approximately 35 miles of wastewater interceptors and 81 siphon barrels. • Replaced 117 wastewater manhole frames and covers
<p>B. Inspect, maintain, and improve the dams, dikes, and other facilities constituting the infrastructure of the watershed system through ongoing maintenance and an adequate multi-year capital improvement program in order to ensure system reliability and limit</p>	<p style="text-align: center;">→</p>	<ul style="list-style-type: none"> • Since 2005, over \$20M has been invested in Capital and major maintenance of source and distribution water supply dams across the system. Continue to ensure the Dam Safety Compliance Program is followed for periodic regulatory inspections and reporting to MA Office of Dam Safety, ensure inspection findings of any

<p>potential flood hazards.</p>		<p>deficiencies and needed maintenance issues are addressed. Ensure the dams' Emergency Action Plans are routinely updated and exercised.</p> <ul style="list-style-type: none"> • MWRA was awarded a Northeast Regional Award of Merit by the annual Association of State Dam Officials. • In FY18, staff will develop a 5 year asset management budget plan to better plan and anticipate budgeting of regular maintenance.
<p>C. Continue use of Condition Monitoring for Deer Island and expand Condition Monitoring techniques for all other water and wastewater facilities to provide earlier indication of asset degradation.</p>		<ul style="list-style-type: none"> • Condition Monitoring techniques are already being utilized in normal business practices at DITP. • Initiated Condition Monitoring in FOD, including all the headworks, pump stations, and CSO facilities. Actions include oil sampling to determine the remaining life expectancy of the oil, and vibration analysis. In FY17, staff rolled out infrared thermography and laser alignment of pumps and fans. Initial staff training has already been instituted, but training will continue in FY18, specifically on vibration analysis.
<p>D. Conduct an updated benchmarking analysis in order to identify gaps and sustain the goal of maximizing asset protection while potentially identifying new best practices in the industry.</p>		<ul style="list-style-type: none"> • No work on this initiative to date.
<p>E. Update the wastewater metering system and evaluate new technologies to ensure continued accurate flow accounting and to enhance its usefulness for operational and evaluation purposes by adding additional monitoring locations.</p>		<ul style="list-style-type: none"> • Contract #6739 for wastewater metering system replacement was awarded by the Board of Directors in May 2017. Phase one includes the evaluation, planning and design of the wastewater metering system of approximately 225 permanent meter sites. Phase two consists of the installation of the new metering system.
<p>F. Continue to research and develop Key Performance Indicators (KPI) to compare our performance internally and against the industry.</p>		<ul style="list-style-type: none"> • The new MAXIMO, developed in FY16, went live in FY17, and is assisting MWRA in making KPI's easy to track, display and compare with other industries.
<p>G. Enhance and monitor water</p>		<ul style="list-style-type: none"> • In FY16, MWRA began the process of

<p>pipeline protection to maximize pipeline lifetime.</p>		<p>replacing old cathodic protection on MWRA water mains. In FY17, this work continued in force, with the following activities:</p> <ul style="list-style-type: none"> ○ Designed eleven replacement cathodic protection systems for Section 57, a 79 year old 48-inch diameter steel water main in the northern low service area. In-house construction staff have replaced three of these systems. ○ Replaced the cathodic protection system at Shaft 5 of the City Tunnel. ○ Initiated design of a replacement cathodic protection system at Shafts E and L of the MWWST. ○ Continue testing and evaluating cathodic protection test stations.
<p>H. Upgrade MWRA’s Authority-wide Computerized Maintenance Management System (MAXIMO) to increase functionality to track assets, improve work flow and augment the use of handheld units to increase productivity.</p>		<ul style="list-style-type: none"> ● The upgraded MAXIMO went live January 30, 2017 in support of Asset and Maintenance Management. In April a second deployment added MAXIMO Anywhere (mobile) and MAXIMO Spatial (GIS) capabilities. ● PI system was also updated to the latest version which includes enhanced security features with Data Diodes.
<p>I. Continue to upgrade and improve upon the Supervisory Control and Data Acquisition (SCADA) hardware and software to meet the current industry standard and to address cyber security concerns.</p>		<ul style="list-style-type: none"> ● DITP - Expanded data diode solution to include Deer Island PI System ● FOD – PLC upgrade was completed at Comm. Ave West Pump Station; A new PLC Panel was designed and purchase for in-house installation at BWTF which will installed by year’s end; A scope for the JJCWTP PLC replacement is being finalized with plan of hiring a consultant during first quarter 2018. Additional PLC replacements are being performed as part of facility rehabilitation project (Alewife, Comm. Ave. East, etc), and will be developed in future

		PLC upgrade projects for water and wastewater facilities.
Goal #9: Move forward with design and construction of major wastewater infrastructure rehabilitation and renewal projects.		
Objective	2017	Highlights/ Progress Updates
A. Continue to design and implement the rehabilitation projects for various pump stations, headworks, and CSO facilities.	→	<ul style="list-style-type: none"> • Major facility rehabilitation and equipment upgrade construction projects are underway at Caruso PS, Chelsea Creek Headworks, Prison Point PS, and Alewife Brook PS. <ul style="list-style-type: none"> ○ Caruso upgrade, Contract 7362, was substantially complete in June, 2017. ○ Chelsea Creek Headworks Upgrades, Contract 7161, is underway and approximately 7.5% complete with substantial completion expected for November, 2020. ○ Prison Pt. Suction and Discharging Piping Rehab, Contract 7459, is ongoing but behind schedule due to several wet weather events during the project timeframe. ○ Alewife Brook PS, Contract 6797, is ongoing and was expected to be completed by May 2018, but will be delayed due to issues with the bypass pumping system.
B. Develop ongoing program review, prioritize, and accelerate the implementation of interceptor renewal projects.		<ul style="list-style-type: none"> • Evaluated wastewater interceptors and prioritized them for rehabilitation. In the FY 16 CIP a number of project schedules were accelerated. The Reading Extension Sewer Rehab, Contract 7164, was awarded in May, 2017. The award of contracts for the rehabilitation study of the Cambridge Branch Sewer and the North Met Trunk Sewer, as well as for the design of the Dorchester Interceptor Renewal were all awarded in FY17.
C. Implement feasible recommendations from the North System Hydraulic Study to maximize conveyance of wastewater to Deer Island.		<ul style="list-style-type: none"> • MWRA is continuing to implement feasible operational opportunities for system optimization within the North System wastewater conveyance system and provides funding for Inflow/Infiltration projects to North Metropolitan Communities.

<p>D. Complete DITP valve and piping replacement project including operationally complex North Main Pump Station/Winthrop Terminal valve replacement.</p>		<ul style="list-style-type: none"> • 90% complete on the DITP valve and piping replacement project. Entire project expected to be completed by the first quarter of FY18.
<p>Goal #10: Prepare for catastrophic events that could affect the water and wastewater delivery systems.</p>		
<p>Objective</p>	<p>2017</p>	<p>Highlights/ Progress Updates</p>
<p>A. Continue to improve and incorporate redundancy in the water system to ensure uninterrupted service by developing and implementing plans to eliminate or mitigate single points of failure within MWRA's water transmission and distribution system, including the Northern Intermediate High, the Southern Extra High, and the Metro Tunnel System.</p>		<ul style="list-style-type: none"> • In February 2017, the Board of Directors approved a plan for construction of two new water supply tunnels to provide redundancy for the Metropolitan Tunnel system (City Tunnel, City Tunnel Extension and Dorchester Tunnel). • Construction on the Wachusett Aqueduct PS, Contract 7157, began in FY16 and continued in FY17, with 49% of the project complete. Substantial completion still expected for February 2019. • Construction continued on various sections of the Northern Intermediate High: <ul style="list-style-type: none"> ○ Work on Section 110 is underway with expected completion in September 2018. ○ Bids for NIH Stoneham were received and a contract awarded in June, 2017. • Work on Section 111 Boston of the Southern Extra High pipeline project, Contract 6454, is about 36% complete with substantial completion anticipated in August, 2018. • Section 111 Dedham North, contract 7504, was awarded in early FY18.
<p>B. Continue to train staff on various potential emergency scenarios and participate in broader Massachusetts Emergency Management Agency (MEMA) and other training exercises.</p>		<ul style="list-style-type: none"> • Staff participated in MEMA and other externally hosted training, covering topics such as hurricanes, active shooters, and extended power outages. Internal training included site characterization drills, emergency pump deployment, and two-day Emergency Response Plan training sessions for 29 staff and 228 participants from 22 communities.

		<ul style="list-style-type: none"> Continued work on response planning for metro tunnels incidents.
<p>C. Continue to implement a comprehensive security and emergency preparedness program.</p>		<ul style="list-style-type: none"> Staff continue to upgrade and expand the MWRA security system, and provide security orientation to new hires. Facility Emergency Plans are updated annually. Staff performed facility security audits at approximately 70 facilities. The intrusion monitoring, video monitoring and card access system was extended to the Quabbin area.
<p>D. Develop and implement an Information Security Plan (ISP) to increase the resiliency and sustainability of the MWRA's data security practices.</p>		<ul style="list-style-type: none"> The MWRA's ISP was established with the issuance of ADM31 - MWRA Information Security Policy. Since that time 10 additional policies have been drafted along with 12 standards, and 30 procedures. These continue to be expanded and developed for all Information Technology (IT) areas (e.g. MIS, SCADA, PICS and OEP/Security). The next phase of this effort is to apply the standards to each IT system. IT and OT staff meet monthly to discuss cyber security issues.
<p>E. Enhance cyber security defense in-depth strategy to mitigate and manage new and evolving threats.</p>		<ul style="list-style-type: none"> The Managed Security Services Contract began on July 1st, 2016 and runs for three years. New perimeter defenses have been installed for the SCADA system and PICS systems along with other security recommendations from Idaho National Labs/DHS. The MWRA participated in a 5-day cyber security incident response drill with the National Guard. MWRA staff continued to be trained in basic cyber security awareness and advanced cyber security technical topics.

IV. Finance and Management

Goal #11: Ensure Financial Sustainability, Integrity, and Transparency.		
Objective	2017	Highlights/ Progress Updates
A. Continue the long-term strategic budgeting practice to ensure sustainable and predictable sewer and water assessments to our member communities.	→	<ul style="list-style-type: none"> Community Assessments are increasing 3.2% in FY2018 and are projected to increase no more than 3.8% annually through FY2022. Assessments for the Water and Sewer utilities are now "smoothed" reducing the volatility of year to year assessment changes thereby improving the sustainability and predictability for member communities.
B. Manage debt and investment portfolios to maximize savings/returns in compliance with all applicable rules and regulations.	→	<ul style="list-style-type: none"> Staff continue to explore opportunities for refunding for interest rate saving. Most recently issuing \$228.8M in refunding bonds in May 2017 for a net present value savings of \$20.7M.
C. Continue diversification strategy to insulate against overexposure and promote resiliency to changing market conditions.	→	<ul style="list-style-type: none"> Staff continue to seek prudent diversification. Investment diversification has proved challenging as Government Securities supply has decreased and interest rates remain at low levels.
D. Maintain a system of internal controls to best protect the organization's resources.	→	<ul style="list-style-type: none"> Staff continue to review and monitor key controls and limit physical and electronic access to assets.
E. Continue to employ budget and expense control practices to manage expenses.	→	<ul style="list-style-type: none"> Continued to drive cost improvement and containment measures throughout FY17 that allowed MWRA to achieve the projected rate revenue requirement level for FY18.
F. Identify and pursue optimization in all aspects of MWRA financial operations		<ul style="list-style-type: none"> Continued the effort of reducing the use of paper by publishing documents on-line. Staff are actively evaluating the electronic financial system's existing and possible additional software modules to optimize operations.
G. Continue to conduct strategic energy procurements.	→	<ul style="list-style-type: none"> Continued to procure electricity based on competitive bid process and took advantage of electricity rebates from utilities pertaining to installation of more efficient equipment. Completed procurement of new electricity contracts for Deer Island and Interval Accounts contracts (96% of MWRA purchased demand) in FY16 with expiration in FY19.
H. Continue to fund the pension fund at the annual required	→	<ul style="list-style-type: none"> The pension fund is funded at 98.7%. However, due to recent actuarial losses, the

contribution level and to develop strategies to address the growing Other Post- Employment Benefits (OPEB).		contribution level and full amortization timetable will be reevaluated. In April 2015, an irrevocable OPEB Trust was established by the Board of Directors. The current OPEB Trust balance is \$17.5 million, which represents approximately 12% funding level. The annual funding practice has been and is projected to be half the annual required contribution. This practice will be evaluated annually and may be changed according to overall budgetary conditions.
Goal #12: Ensure Cost-Effective Operational and Resource Management.		
Objective	2017	Highlights/ Progress Updates
A. Maintain and expand MWRA-wide recycling efforts.		<ul style="list-style-type: none"> MWRA continues to recycle paper and cardboard at facilities as well as scrap metal at Chelsea, Deer Island and Southborough.
B. Work with staff MWRA-wide to update construction and professional services contract documents.		<ul style="list-style-type: none"> Procurement staff have begun to work with the Law Division to update construction contract documents. Completion of update of construction document expected by the end of 2017. Procurement and Law Division staff will work on updating professional services contract documents in the latter half of FY18.
C. Develop, implement, and transition to fully automated, virtually paperless procurement and purchasing system.		<ul style="list-style-type: none"> All Ch. 30 construction and Ch. 149 without filed sub bids and non-professional contracts are now electronic. Chapter 149 Contracts with sub bids to be fully electronic by January 2018. RFPs for Professional Services will be much more difficult to automate due to the variability of each proposal.
D. Expand use of electronic platforms for the purchase of all goods and services.		<ul style="list-style-type: none"> Virtually all goods are now purchased via electronic platforms.
Goal #13: Maintain an Excellent Workforce.		
Objective	2016	Highlights/ Progress Updates
A. Prioritize Succession Planning in anticipation of critical retirements over the next five years.		<ul style="list-style-type: none"> Continue to identify succession planning initiatives including training programs, leadership program, and expedited replacement hiring processes in advance of critical retirements.
B. Continue to provide programs and procedures to ensure employee safety.		<ul style="list-style-type: none"> Developed and provided Safety Awareness Training to all employees. Added to new employee orientation program. Provide on-going safety training programs

		that address confined space entry, lockout/tagout, electrical safety, Right to Know, Tower and Wind Turbine climbing, OSHA-10 Construction Safety and training in railroad track area safety procedures from both the MBTA and Keolis.
C. Provide effective training necessary for employees to obtain and maintain required licenses and certifications to ensure a highly skilled workforce.	→	<ul style="list-style-type: none"> • Wastewater and Collection Operator certification and license prep courses are provided at least twice per year on premises. • Employees are sent to vendor throughout the year for training prep on Water Distribution and Treatment. Classes are regularly offered to employees to meet continuing education requirements for license renewals and required hours.
D. Continue MWRA's efforts to develop new recruitment and retention strategies to foster diversity, including traditionally underrepresented categories, people with disabilities, and veterans.	→	<ul style="list-style-type: none"> • Staff attended numerous job fairs and continued to expand social media and other online recruitment efforts to increase access to diverse pools of candidates. Job postings are now sent to numerous web based sites and professional associations. <ul style="list-style-type: none"> ○ Developed twelve (12) additional recruitment sources for minorities, women, individuals with disabilities, and veterans in addition to its existing fifty-three (53) recruitment sources identified in the Affirmative Action Plan. ○ Participated in four all-veterans career fairs sponsored by RecruitMilitary. • Out of 71 positions for both new hires and promotions, 39 were filled with protected class individuals.
E. Continue to expand on MWRA's in-house Job Shadowing and career development training programs.	→	<ul style="list-style-type: none"> • Continued the Operator on-the- job training program and maintenance mechanic shadow training programs. • Established a medium voltage training program. Continue to offer interview skills training, supervisory development programs and water and wastewater prep courses. Provided a project management certification preparatory class for engineering staff.
F. Create programs with a focus on professional and leadership development.		<ul style="list-style-type: none"> • Implemented Non-Union managers Leadership Development Program through Bentley University.

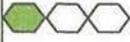
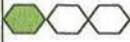
G. Upgrade MWRA's employment application system to expedite critical hiring and increase applicant data base.		<ul style="list-style-type: none"> Launched ApplicantPro, a new online employment applicant tracking program.
H. Continue intern initiative.		<ul style="list-style-type: none"> Hired 34 interns for 2016 summer intern program and 31 for 2017 summer intern program designed to increase future applicant pools.
Goal #14: Leverage Information Technology to Improve Organizational Effectiveness.		
Objective	2017	Highlights/ Progress Updates
A. Deliver Information Technology (IT) services and solutions efficiently and effectively.		See highlights under specific initiatives below.
B. Provide Information Technology solutions to streamline work processes while ensuring the security and integrity of MWRA data by leveraging the use of existing or emerging technologies.		<ul style="list-style-type: none"> Implemented Authority Mobile Device Management and Application Management system. 79 iPads and 214 iPhones are being managed with the associated Mobile Device Management platform. Twenty six applications are available through mobile application delivery and are being used by appropriate subgroups of mobile device users. A Secure file sharing application has been implemented which provides MWRA the ability to securely share large files internally and with external parties, as necessary. This is being used in a number of departments such as Procurement, SCADA and E&C.
C. Obtain feedback from users on satisfaction levels and desired new services and implement changes accordingly.		<ul style="list-style-type: none"> Implemented monthly and bi-monthly meetings with department managers soliciting feedback on satisfaction along with what improvements in services can be accomplished.
D. Maintain current technology hardware, software, and network infrastructure.		<ul style="list-style-type: none"> Deployed over 1200 updates to existing hardware and software throughout the year to ensure currency and mitigate vulnerabilities.
E. Enhance Information Technology workforce capabilities through new certification and license requirements.		<ul style="list-style-type: none"> Maintaining a three year rolling training plan in order to maintain staff skill sets. In FY17, staff were sent to 21 training classes, obtained 7 certifications and participated in 6 conferences to ensure that the IT workforce capabilities are up to date.
F. Implement an Application Improvement Program that will continue MWRA's efforts to update and enhance the myriad		<p>The following is a list of applications that were either updated or had functionality changes throughout FY2017:</p> <ul style="list-style-type: none"> Automatic Vehicle Location (AVL)

<p>applications used by MWRA to improve efficiencies of business processes and effectiveness of staff.</p>		<p>System with Networkfleet.</p> <ul style="list-style-type: none"> • Computerized Maintenance Management System (CMMS) Enhancements: Maximo Upgrade. • GIS functionality • Infor/Lawson • Telog • e-Procurement - Strategic Sourcing and Contracts Management • Library Catalog System • Tiscor InspectNTrack • Portia Upgrade • Amicus Attorney Upgrade • Electronic Laboratory Notebook (ELN) Phase 1 • LIMS • PI Upgrade
<p>G. Implement an e-Discovery, Archive and Purge System that will provide an automated and integrated solution for archiving electronic content that will allow the Authority to intelligently store, manage and discover email and all critical business information sources, while providing easy and intuitive access for end users.</p>		<ul style="list-style-type: none"> • MIS staff participated in project kickoff. A workshop was held in January for the infrastructure design. A draft solution design document draft has been developed by the vendor. A test is being built and the Pilot will begin in Q2 of FY18.
<p>H. Execute a Technology Infrastructure Improvement Program that will assess and implement consolidated and optimized versions of MWRA's core IT infrastructure elements and improve data management practices.</p>		<ul style="list-style-type: none"> • Print, Fax, Scan and Copy: Installed new multi-function devices (MFDs) throughout MWRA facilities consolidating services (Print, FAX, Scan, Copier) onto one platform. Purchase 24 MFDs to replace expiring leases. Will be replacing an additional 19 in early FY18.
<p>I. Improve the organization of Information Technology and the oversight processes for selecting and implementing IT solutions throughout the MWRA.</p>		<ul style="list-style-type: none"> • Information Technology Steering Committee: As the first step in establishing IT governance, the Business-IT Project Prioritization Committee was established. It is made up of senior staff representing the Authority's Divisions. The committee meets quarterly to assess project progress and set priorities for which applications/business functionality will be worked on next. • MIS Reorganization: With the hiring of a

		<p>Manager of Application & System Development, other PCR amendments being approved by the Board, and some final staff reporting changes, MIS has completed the organizational transformation recommended in the 5-year Strategic Plan.</p> <ul style="list-style-type: none"> • ITSM Process Improvement: Formalized the Change Management Process for all production releases.
<p>J. Implement real-time SSO reporting system to provide public information and ensure reporting timeframes meet regulatory req.</p>		<ul style="list-style-type: none"> • Began near-real-time SSO web reporting in December 2015. The system has been expanded to include web reporting of CSO treatment facility activations (September 2016). Development continues on a system to streamline SSO field data collection and volume calculations, to make regulatory reporting faster and easier.

V. Environmental Sustainability

Goal #15: Continue to maximize energy efficiency of MWRA operations, renewable energy production, and revenue generation opportunities using MWRA's energy assets.		
Objective	2017	Highlights/ Progress Updates
A. Continue to conduct energy audits at all facilities and establish regular audit schedules.	→	<ul style="list-style-type: none"> • Several energy audits were conducted on general pump efficiency and the Thermal Power Plant at Deer Island. • Energy audit planned for DITP North Main Pump Station in FY18. • Energy audits of all other Operations facilities (e.g. water and wastewater pump stations, CSOs, office buildings, etc) substantially complete in Metro Ops, but on-going in Western Ops. • Energy savings expected as a result of projects undertaken completed facility audits resulted in approximately 6.2 million kWh saved
B. Optimize processes to save energy.	→	<ul style="list-style-type: none"> • Operational setpoints on the return sludge pumps were adjusted by raising the header pressure slightly, resulting in about 1 million kWh annually.
C. Incorporate energy efficiency into new construction, rehabilitation projects, and equipment replacement.	→	<ul style="list-style-type: none"> • Completed installation of VFDs on eighteen 100 hp DITP secondary motors for expected savings of 3.5M kWh annually. Installed OSTPP DITP compressed air dryer equipment replacement purchase contract executed. Included specifications for energy efficiency improvements. • Chelsea Creek Headworks upgrade, Contract 7161, is on-going and contains several energy efficiency components including LED lighting, occupancy sensors, a building energy management system, and VFDs on the odor control fans, HVAC, and hot water pumps.
D. Continue to invest in the production and utilization of cost effective renewable energy at MWRA facilities.	→	<ul style="list-style-type: none"> • An interconnection agreement for the proposed 75 kW PV array at the Wachusett Aqueduct Pump Station was executed between MWRA and NGRID in FY17.

		<ul style="list-style-type: none"> • Construction of a new CVA-Fish Hatchery Hydroelectric Facility with start-up scheduled for July/August 2017. Qualified Facility for Renewable Portfolio Standard. • Commented on DPA proceedings to allow net metering for small hydroelectric facilities.
E. Continue to reduce greenhouse gas emissions that result from MWRA operations.	→	<ul style="list-style-type: none"> • MWRA GHG inventory completed and report drafted. Published on MWRA's webpage in FY17. • In FY17, MWRA reduced its GHG emissions by approximately 4,357 metric tons by implementing over 16 energy conservation projects.
F. Continue to maximize revenue from generation assets.	→	<ul style="list-style-type: none"> • In FY17, all green assets, with the exception of hydro were in operation greater than 95% of the time. Hydro assets were in operation 73% of the year.
G. Take full advantage of utility energy efficiency rebate opportunities.	→	<ul style="list-style-type: none"> • Utility incentives received in FY17 totaled \$1.7 million, including: <ul style="list-style-type: none"> ○ \$878K at Deer Island for VFDs ○ \$590K at Deer Island for lighting ○ \$306K in incentives for 13 energy conservation projects in Metro and Western Ops. ○ \$15K for Clinton blower VFD project.
H. Incorporate employee education on energy efficiency in MWRA training outlets, e.g. tool box talks and HR training classes.		<ul style="list-style-type: none"> • Staff developed outline of tool box talks for Metro and Western Ops staff. Talks are scheduled to be given in the second and third quarter of FY18.
I. Determine technical and economic feasibility of co-digestion at Deer Island Wastewater Treatment Plant to ensure it is compatible with existing MWRA wastewater and sludge treatment processes while producing a significant amount of additional high quality gas for energy production.		<ul style="list-style-type: none"> • Co-digestion on Deer Island was found to be financially unsustainable due to limitation on receiving material via barge. • Continuing to follow Greater Lawrence Sanitary District's pilot co-digestion project to relate to DITP and Clinton WWTP in the future. • Evaluating the economics of co-digestion at Clinton WWTP.

<p>J. Move forward with the design of new gas turbine technology combined heat and power equipment to take advantage of the higher power and thermal efficiencies of new equipment, maximizing the production of additional electric power for on-site use at Deer Island, as well as cost savings while reducing maintenance spending on aging equipment.</p>		<ul style="list-style-type: none"> • Prepared bid documents for a design project to perform a comprehensive energy study on DITP reviewing how DITP receives electricity and generates heat and power to determine future course of action for the plant. Initial scope of work to be modified due to changes in HEEC negotiations. Will be rebid in the fall of 2018, with a final report due before the end of FY20.
<p>K. Investigate the potential energy savings from installing new, larger residuals drying trains at the Pelletizer Plant compared to the operational cost of running them.</p>		<ul style="list-style-type: none"> • MWRA is evaluating upgrading to larger dryers at the Pelletizer Plant (100 ton/day on average). Detroit's WWTP has installed these new energy efficient dryers. Using Detroit's experience MWRA is now conducting a study on their use at the Pelletizer Plant. Study expected to be completed in FY18.

Goal #16: Continue to monitor climate change research and move forward with plans to reduce impacts of projected sea level rise and storm surge events on MWRA infrastructure.

Objective	2017	Highlights/ Progress Updates
<p>A. Incorporate design modifications into facility renovations and maintenance activities to address sea level rise and storm surge.</p>		<ul style="list-style-type: none"> • Continued to update flood elevations as FEMA revised its projections. Now regularly including these design parameters in all renovation and new construction projects.
<p>B. Plan and install flood protection barriers at water and wastewater sites which fall below expected elevations of flood waters under condition of a FEMA 100 year storm plus 2 ½ feet to minimize damage and still provide service.</p>		<ul style="list-style-type: none"> • Flood protection designed by in-house staff for 10 facilities. • Flood protection is also being incorporated into facility rehabilitation projects, when appropriate, with procurement and installation completed for Alewife Brook PS and Chelsea Creek Screen House in FY17.
<p>C. Work with State and regional organizations and academic institutions to identify how MWRA's existing long-term environmental data sets can be used to help assess and project impacts of climate change.</p> <p>New Initiative</p>		<ul style="list-style-type: none"> • Staff participated with regional regulators and scientists on the development of an integrated Sentinel Monitoring Network (ISMN) identifying key datasets and parameters that can be used to identify climate change impacts. Existing MWRA monitoring data were identified as important long-term monitoring datasets in the ISMN plan, which was completed in FY17.

<p>D. Participate in regional activities aimed at preparing for the potential impacts of climate change and ensuring the resiliency of MWRA’s facilities.</p>		<ul style="list-style-type: none"> • MWRA is an active member of the Metro Mayors Coalition and has participated in several discussions and workshops to establish a common framework to prepare for the impacts of climate change. Staff are integrating this framework into MWRA’s planning initiatives and project reviews. In FY17, participated in the second Metro Mayors Climate Preparedness Summit. • MWRA continues to work with key stakeholders, including the City of Boston, MassPort, UMass Boston and others, to share progress on vulnerability assessments.
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Goal #17: Advance reasonable water system expansion.

Objective	2017	Highlights/ Progress Updates
<p>A. Continue to provide assistance to communities seeking admission to the MWRA’s water system or seeking emergency withdrawals.</p>		<ul style="list-style-type: none"> • Assistance with Water System Admission process provided to North Reading, Ashland, and the Weymouth Naval Air Station Redevelopment, now called Union Point. • Emergency water supply withdrawals from several non-MWRA communities occurred in the first two quarters of FY17.
<p>B. Work with prospective communities to inform them of the benefits of admission.</p>		<ul style="list-style-type: none"> • Work continues on this initiative, primarily via requests from consultants representing the communities.
<p>C. Advocate for a more streamlined regulatory review procedure, including expediting the Massachusetts Environmental Policy Act and Interbasin Transfer Act review process.</p>		<ul style="list-style-type: none"> • Staff continue to work with regulatory staff on proposed Interbasin Transfer Act regulations, which include a streamlined regulatory review, and provided comments on proposed regulations in December 2016.
<p>D. Work with MWRA’s Advisory Board on legislative initiatives to pursue funding for connection assistance for new communities connecting to the water system.</p>		<ul style="list-style-type: none"> • Work with the Advisory Board continues.

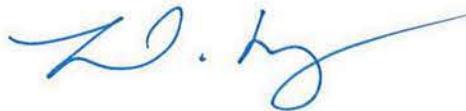
Goal #18: Continue to recognize the environmental, cultural, historical, and recreational importance of the watershed lands, the aqueduct system, and the unique location on Boston Harbor of the Deer Island Treatment Plant and Nut Island Headworks, to the citizens of the Commonwealth.

Objective	2017	Highlights/ Progress Updates
<p>A. Continue to work cooperatively with DCR and cities and towns to ensure that these lands are</p>		<ul style="list-style-type: none"> • Staff have participated in the DCR Land Acquisition Panel (LAP) offering guidance since 1995. The MWRA Board has had

<p>available for appropriate public access.</p>		<p>approval oversight of watershed land purchases under the CIP since FY07. Staff continue to be active in the LAP attending quarterly meetings and offering MWRA viewpoints on land purchases, preservation restrictions and disposition. <i>This update also supports Goal #1, assisting MWRA to maintain drinking water quality.</i></p>
<p>B. Continue to work with cities and towns to implement the Public Access Initiative on the Wachusett, Weston, Sudbury, and Cochituate Aqueducts.</p> <p>This program creates a partnership between MWRA and communities that host each piece of infrastructure, granting access to applicant communities to use MWRA controlled aqueduct right-of-ways of the Cochituate, Sudbury, Wachusett, and Weston Aqueducts, along with the lands surrounding the Weston and Norumbega distribution reservoirs.</p>	<p>→</p>	<ul style="list-style-type: none"> • The MWRA Aqueduct Trails Program is an innovative initiative that has opened up new recreational opportunities in communities across Metro West on appropriate MWRA aqueduct infrastructure. • Since 2011, MWRA staff has been working with aqueduct communities to provide technical assistance through the 8(m) permit process and have had great success opening access to these resources for the first time. • To date, MWRA staff has issued many Section 8 (m) Permits as part of the Aqueducts Trails Program authorizing approximately 30 miles of Aqueduct Trails. MWRA estimates that approximately 23 miles are currently open to the public.
<p>C. Continue to provide public access to Boston Harbor at Deer and Nut Islands, while ensuring appropriate security for MWRA's operations.</p>	<p>→</p>	<ul style="list-style-type: none"> • The Division of Marine Fisheries permitting for the Deer Island pier was completed in the Spring of 2017. Funds (\$1M) from the Marine Recreational Fisheries Development Fund were included in the Governor's Spending Bill in August 2017, which is still pending. • Staff installed a 600 ft x 60 ft section of soil/grass area in public access with rip rap stone to prevent severer erosion as has been exhibited in past 20-years.

STAFF SUMMARY

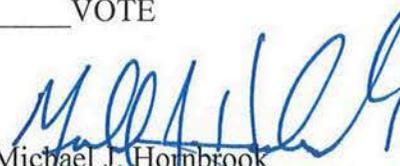
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Fiscal Year 2017 Amendment and Change Order Report



COMMITTEE: Administration, Finance & Audit

X INFORMATION
 VOTE

John P. Vetere, Deputy Chief Operating Officer
A. Navanandan, P.E. Chief Engineer
Corinne M. Barrett, Director, Construction
David Duest, Director, DITP
Preparer/Title



Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

For information only.

DISCUSSION:

Below is the annual report on contract amendments and construction contract change orders issued in Fiscal Year 2017.

The attached Table 1, Design Amendments Fiscal Year 2017, provides detailed information for each professional design contract amendment that was issued in FY17. A summary of the amendment activities is provided below:

- There are 34 active design contracts in FY17;
- 23 contracts active in FY17 where no amendments were issued;
- 11 design contracts had amendments in FY17;
- 9 contracts had a single amendment;
- 2 contract had two amendments; and
- 5 of the amendments were for time extensions only with no increase in contract costs.

The detailed information includes amendments approved by the Board and approved by the Executive Director under delegated authority. The table provides the initial contract value, the value of any amendment(s) issued before FY17, the value of each amendment issued during FY17, the revised total contract value, the percent value of amendment(s) issued in FY17 compared to the initial contract value, a brief description of the reason for each amendment, and the total percentage of amendments to date.

The total value of all FY17 amendments was \$2.5 million. The largest amendment in FY17 was for the Northern Intermediate High Redundant Pipeline Design, Construction Administration and Resident

Inspection Services, Contract 6906, Amendment 2 for \$900,854. The amendment was required because the original plan consisted of two concurrent construction contracts of 36 month duration, which were repackaged into four sequential construction contracts.

The attached Table 2, Construction Change Orders Fiscal Year 2017, provides detailed information for each construction change order that was issued in FY17. A summary of change orders issued in FY17 is below:

- There were 32 active construction contract in FY17;
- 26 construction contracts had change orders in FY17;
- 6 construction contracts were active in FY17 where no change orders were issued;
- 9 contracts had a single change order;
- 17 contracts had more than one change order (range of 2 to 15 per contract);
- 4 of the change orders did not result in any increase in contract costs; and
- 13 of the change orders resulted in contract credits.

The detailed information in the table includes change orders approved by the Board and approved under delegated authority. The table provides the initial contract value, the value of any change order(s) issued before FY17, the value of each change order issued in FY17, the percent value of change order(s) issued in FY17 compared to the initial contract value, a brief description of the reason for each change order, and the total percentage of change orders to date.

The total value of all change orders in FY17 was \$2.96 million. Three contracts with the most noteworthy change (combination of cost and/or percentage increase) resulting from change orders issued in FY17 were:

- Contract 7157, Wachusett Aqueduct Pump Station, (\$173,000), or (0.4%), Change Order 1 was a credit for (\$1.5 million) resulting from changes to the steel sheeting to support the excavation for the pump station. The credit was off-set by 14 additional change orders amounting to \$1.3 million for various items encountered during construction.
- Contract 7471, Northern Intermediate High Pipeline Section 110 Reading and Woburn, \$1.2 million, or 12%, due to greater quantities than projected for contaminated excavated materials and unanticipated drainage modifications due to high groundwater.
- Contract 7338, Quabbin Power and Security, \$369,000, or 11.5%. The increase was primarily due to a greater quantity of excavated material than projected. In addition, unanticipated lighting and dock de-icing equipment was installed to support the dock area used by DCR and the State Police.

ATTACHMENTS:

Table 1, Design Amendments FY17

Table 2, Construction Change Orders FY17

Table 1 - Design Amendments FY2017

Table 1 Design Amendments FY2017													
Contract	Contract Name	Firm	Amendment No.	Approved By	Date	Initial Contract Value	Amendments Prior to 7/1/2016	Contract Value 7/1/16	FY17 Amendments	% Amendments in FY 17	Reason	Revised Total	Total % Amendments
6598	Valve and Piping Replacements at Various Facilities	AECOM	1	D	2/16/2017	\$ 2,299,946	\$0	\$ 2,299,946	\$ 50,000	2.2%	Increase witness shop inspections of valves	\$ 2,349,946	2.2%
6906	NIH Redundant Pipeline Design CA/RI	Stantec Consult SVCS	2	B	1/18/2017	\$ 4,644,381	\$ 778,000	\$ 5,422,381	\$ 900,854	19.4%	Additional REI/ESDS services, project administration and a 39 month time extension	\$ 6,323,235	36.1%
7017A	Hatchery Pipeline & Hydroelectric	Stantec/FST	2	D	1/18/2017	\$ 749,409	\$ 64,699	\$ 814,108	\$ -	0.0%	Time extension of three months, transfer of Allowances, Settlement	\$ 814,108	8.6%
7034	Alewife Brook Pump Station Rehabilitation	Stantec/FST	3	B	4/12/2017	\$1,558,446	\$254,579	\$1,813,025	\$ 95,266	6.1%	Additional contractor submittal review services	\$1,908,291	22.4%
7037	Caruso Pump Station Improvements	Dewberry Engineers	3	B	9/14/2016	\$773,396	\$91,700	\$865,096	\$ -	0.0%	Time extension of 283 days	\$865,096	11.9%
7156	Wachusett Aqueduct Pump Station	Stantec Consult SVCS	3	B	12/14/2016	\$4,542,283	\$1,999,957	\$6,542,240	\$ 349,743	7.7%	Change in support of excavation, front canopy and photovoltaic system	\$6,891,983	51.7%
7206	Remote Headworks Upgrades Design/CA	Arcadis US Inc.	4	B	9/14/2016	\$6,682,531	\$1,207,100	\$7,889,631	\$ 897,200	13.4%	Construction administration/management and 38 month time extension	\$ 8,786,831	31.5%
7277B	Rehab of digesters clinton WWTP	Stantec Consult SVCS	1	D	6/30/2017	\$387,343	\$0	\$387,343	\$0 & 45 Days	0.0%	Time extension to complete facility handbook	\$ 387,343	0.0%
7377	Clinton Wastewater Treatment Plant Phosphorus Reduction	Stantec Consult SVCS	2	D	9/28/2017	\$1,144,465	\$68,394	\$1,212,860	\$ 107,425	9.4%	Modify specs after 90% submission to include gas conversion	\$1,320,284	15.4%
			3	D	4/10/2017	\$1,144,465	\$68,394	\$1,212,859	\$ 69,087	6.0%	Review and processing of additional submittals during construction	\$1,389,371	21.4%
7394	DITP Clarifier Rehabilitation, Phase II, Design/ESDC	CDM Smith, Inc.	1	D	1/17/2017	\$2,237,401	\$0	\$2,237,401	\$ 43,116	1.9%	Additional design based on the recommendations of the PDR.	\$ 2,280,517	1.9%
7416	REI Services for Electrical Equipment Upgrade Construction 4 at DITP	AECOM	1	D	10/4/2016	\$1,039,371	\$0	\$1,039,371	\$ -	0.0%	Time extension of 60 days	\$ 1,039,371	0.0%
			2	D	12/2/2016	\$1,039,371	\$0	\$1,039,371	\$ -	0.0%	Time extension of 45 days	\$1,039,371	0.0%
Average Amendment Rate:												26.8%	

B = Board approval
D = Delegated

Table 2 - Construction Change Orders FY2017

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
6438	Cathodic Protection Testing and Evaluation Program	ARK Engineering & TEC SVCS	1	DD	5/22/2017	\$217,750	\$0	\$217,750	\$9,750	4.48%	Test and evaluate an additional 150 cathodic protection stations.	\$227,500	4.48%
6650A	Southborough Water Quality Lab Upgrades	Paul J. Rogan	4	DD	8/3/2016	\$3,125,840	\$259,243	\$3,385,083	\$10,867	0.35%	Miscellaneous electrical work to meet the Electrical Building Code.	\$3,395,950	8.64%
			5	DD	9/29/2016	\$3,125,840	\$259,243	\$3,385,083	\$21,304	0.68%	Relocate the lightning protection conduit, F&I a moisture vapor barrier on concrete floor, remove (4) sprinkler heads and replace with high temperature sprinkler heads.	\$3,417,254	9.32%
			6	D	10/31/2016	\$3,125,840	\$259,243	\$3,385,083	\$57,747	1.85%	Modify HVAC heating hot water system. F&I (2) additional emergency battery lighting units, remove the autoclave disconnect switch and relocate; F&I a smoke detector in Corridor 102.	\$3,475,001	11.17%
			7	D	12/22/2016	\$3,125,840	\$259,243	\$3,385,083	\$26,267	0.84%	F&I two sections of lab cabinetry and a new island unit	\$3,501,268	12.01%
			8	DD	2/27/2017	\$3,125,840	\$259,243	\$3,385,083	\$17,078	0.55%	F&I water pipe, drain pipe and electrical hook-ups in Laboratory. Install autoclave and dishwasher.	\$3,518,346	12.56%
			9	D	4/7/2017	\$3,125,840	\$259,243	\$3,385,083	(\$126,817)	-4.06%	Decrease the allowances to reflect actual quantities used.	\$3,391,529	8.50%
6821	DSL Pump Replacement	Walsh Construction	1	D	12/16/2016	\$2,591,100	\$0	\$2,591,100	\$88,761	3.43%	F&I two Insertion Valves and One Tap Bleeder Valve on the thickened digested sludge (TDS) pipe and provide vacuum truck and accessories to remove sludge.	\$2,679,861	3.43%
6877	VFD Additions Secondary Batteries A, B, & C, DITP	Daigle Electrical Construction Corp.	1	D	7/5/2016	\$2,243,243	\$0	\$2,243,243	\$30,828	1.37%	Removal of existing deteriorated load side motor feeder conductors & installation of new conductors	\$2,274,071	1.37%
			2	D	8/19/2016	\$2,243,243	\$0	\$2,243,243	\$36,000	1.60%	Furnish and install DV/DT output filters	\$2,310,071	2.98%
			3	DD	11/30/2016	\$2,243,243	\$0	\$2,243,243	(\$9,331)	-0.42%	Underrun in quantities for fire watch during burning activities.	\$2,300,740	2.56%
6903	North Main Pump Variable Frequency Drive	J. F. White	14	D	1/31/2017	\$24,079,200	\$343,067	\$24,422,267	\$20,288	0.08%	Increase depth of beams, programming to temp override of vibration during start-up	\$24,442,555	1.51%
			15	D	2/28/2017	\$24,079,200	\$343,067	\$24,422,267	(\$8,926)	-0.04%	Temp control wiring systems, damper to new fan coil	\$24,433,629	1.47%
7061A	DITP Fuel System Upgrade	J. F. White	1	D	2/2/2017	\$4,550,000	\$0	\$4,550,000	\$92,534	2.03%	Increase the difference between the allowance specified for the Division 5 filed subcontractor and actual amount of the subcontract	\$4,642,534	2.03%
			2	D	3/22/2017	\$4,550,000	\$0	\$4,550,000	\$45,353	1.00%	F&I panel GB:FOS.PV-1 and associated conduit and wire in the Thermal Power Plant's Control Room.	\$4,687,887	3.03%
			3	D	5/24/2017	\$4,550,000	\$0	\$4,550,000	(\$62,901)	-1.38%	F&I conduit, wire and cable tray to route power and control wires through the Thermal Power Plant's in lieu of F&I conduit and wire through the Digester Gas	\$4,624,986	1.65%
7063C	Heat Loop 20-inch Diameter Expansion Joint Replacement	William M Collins Inc.	1	DD	9/29/2016	\$113,700	\$0	\$113,700	\$1,089	0.96%	Provide staging rental for an additional 30 calendar days.	\$114,789	0.96%
			2	DD	11/30/2016	\$113,700	\$0	\$113,700	(\$3,955)	-3.48%	Decrease the allowance of Bid Item 1B to reflect actual quantities used	\$110,834	-2.52%

B = Board approval
 D = Delegated
 DD = Lower level delegated

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
7157	Wachusett Aqueduct Pump Station	BHD/BEC JC 2015 Joint Venture	1	D	7/25/2016	\$47,011,000	\$0	\$47,011,000	(\$1,500,000)	-3.19%	F&I interlocking steel sheeting Support of Excavation (SOE). Decrease the contract time by 180 calendar days. Disposal of all surplus excavated soils off site.	\$45,511,000	-3.19%
			2	DD	10/25/2016	\$47,011,000	\$0	\$47,011,000	\$14,766	0.03%	F&I rip rap and 150 linear feet of (RGS) conduit. F&I new 12' X 12' stainless steel bar rack.	\$45,525,766	-3.16%
			3	D	11/14/2016	\$47,011,000	\$0	\$47,011,000	\$24,822	0.05%	F&I recessed entrance mats. Remove and transport ammonia. Furnish two (2) pipe supports.	\$45,550,588	-3.11%
			4	D	12/6/2016	\$47,011,000	\$0	\$47,011,000	\$199,630	0.42%	Revise pump station foundation mat and wall size. F&I 2,000 linear feet of poly vinyl chloride (PVC) coated conduit, 16,000 linear feet of electrical wiring, and 4,500 linear feet of data cable.	\$45,750,218	-2.68%
			5	B	12/14/2016	\$47,011,000	\$0	\$47,011,000	\$328,039	0.70%	Perform a soil boring in the front entrance required for the micro-pile design. F&I two concrete piers and pile cap and six micro piles in lieu of the specified concrete piers and footings.	\$46,078,257	-1.98%
			6	DD	1/10/2017	\$47,011,000	\$0	\$47,011,000	\$23,202	0.05%	F&I roof drains for the guard house. F&I additional steel reinforcement.	\$46,101,459	-1.93%
			7	DD	1/27/2017	\$47,011,000	\$0	\$47,011,000	\$24,533	0.05%	F&I (4) radar level pipe sleeves in the Ozone Building.	\$46,125,992	-1.88%
			8	D	3/2/2017	\$47,011,000	\$0	\$47,011,000	\$189,495	0.40%	Suspend installation of exterior formwork, remove and replace formwork as required to F&I additional horizontal reinforcing steel in the Butterfly Valve Vault. F&I 2,100 linear of wiring, in an existing buried conduit. F&I additional rebar in concrete beams.	\$46,315,487	-1.48%
			9	B	3/15/2017	\$47,011,000	\$0	\$47,011,000	\$100,080	0.21%	F&I membrane waterproofing and protection board on the exterior foundation walls of the Butterfly Valve vault. Attach the Surge Tank structural steel column to the steel plate at the top of the tank.	\$46,415,567	-1.27%
			10	DD	3/31/2017	\$47,011,000	\$0	\$47,011,000	\$24,521	0.05%	F&I waterstop in vertical concrete joints inside of the inlet channel and wetwell area. F&I (2) 304 stainless steel PLC cabinets.	\$46,440,088	-1.21%
			11	DD	4/11/2017	\$47,011,000	\$0	\$47,011,000	\$24,455	0.05%	Increase the entrance door opening at the Guardhouse and increase the width of the concrete curbs. F&I additional rebar in the concrete wall between the electrical room and the pipe gallery.	\$46,464,543	-1.16%
			12	DD	4/19/2017	\$47,011,000	\$0	\$47,011,000	\$24,659	0.05%	F&I four precast top banding sections; cast abrasive aluminum nosing; and sixteen (16) Schlage 20-740 door locks.	\$46,489,202	-1.11%
			13	DD	4/21/2017	\$47,011,000	\$0	\$47,011,000	\$22,491	0.05%	F&I steel angle plates around the perimeter of the guard house roof; column base plate for PVC schedule 40 rain leader; two additional data monitoring output connections in each of the two Programmable Logic Controller (PLC) panels.	\$46,511,693	-1.06%

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
			14	DD	5/11/2017	\$47,011,000	\$0	\$47,011,000	\$19,515	0.04%	F&I metal framing and trusses, decking and exterior plywood at the covered storage roof; galvanized steel channels at the underside of roof soffits; electrical wiring to combine two high temperature alarms outputs; F&I an additional 7.61 feet of 72-inch diameter cement lined prestressed concrete cylinder pipe.	\$46,531,208	-1.02%
			15	B	6/7/2017	\$47,011,000	\$0	\$47,011,000	\$306,664	0.65%	Remove and dispose of an existing metal bar rack and F&I a new stainless steel bar rack located inside the Hultman Aqueduct Intake Structure. F&I fiber optic cable for the fire alarm system in an existing ductbank.	\$46,837,872	-0.37%
7161	Chelsea Creek Headworks Upgrade	BHD/BEC JC 2015 Joint Venture	1	B	6/28/2017	\$72,859,000	\$0.00	\$72,859,000	\$252,512	0.35%	Relocate the electrical gear associated with the existing odor control scrubber fans and air compressor. Relocate the existing grit and screenings piping, control valves and discharge bins to avoid conflicts with construction of the second floor electrical room, third floor mechanical room and Stair A structure.	\$73,111,512	0.35%
7222	Watertown Section Rehab CP-1	J D'Amico Inc.	6	B	10/12/2016	\$2,580,900	\$87,397.59	\$2,668,298	\$150,000	5.81%	Assist in the investigation and repair leak at River Street and Seyon Street within the western half of the Watertown Section. Extend the correction period to April 1, 2018	\$2,818,298	9.20%
7235	Fish Hatchery Pipeline and Hydroelectric Project	Waterline Industries Corp	1	D	1/11/2017	\$3,657,677	\$0.00	\$3,657,677	\$29,557	0.81%	F&I epoxy coated reinforcing steel in areas of the approach slab; redesign, F&I additional staging and welding related to the bridge crossing.	\$3,687,234	0.81%
			2	DD	1/27/2017	\$3,657,677	\$0.00	\$3,657,677	\$5,666	0.15%	Install accent colored split-faced masonry blocks at the corners of the Generator Building. F&I a NEMA 4X enclosure.	\$3,692,901	0.96%
			3	D	2/23/2017	\$3,657,677	\$0.00	\$3,657,677	(\$146,124)	-3.99%	Delete the requirement to F&I a trailer, desk, chair and computer. Furnish a Koyo Control Panel in lieu of the specified Allen Bradley control panel.	\$3,546,777	-3.03%
7275	Valve and Piping Replacement	Carlin	4	D	7/25/2016	\$16,960,425	\$100,608	\$17,061,033	\$141,775	0.84%	F&I (2) grooved tees in lieu of the specified flanged tees. Install replacement plug valves. Demolish, F&I (4) elbows; a new 48" pipe support beam in the Winthrop Terminal Facility.	\$17,202,808	1.43%
			5	B	9/14/2016	\$16,960,425	\$100,608	\$17,061,033	\$136,884	0.81%	Clean and disinfect working surfaces inside Secondary Effluent Channels, demolish existing Secondary Scum piping (SSC) coupling hardware and replace with stainless steel coupling hardware, replace couplings and	\$17,339,692	2.24%
			6	B	5/8/2017	\$16,960,425	\$100,608	\$17,061,033	\$108,855	0.64%	Install new lower linkage pins in the check valves for SSPS Pump No.1 and Pump No. 3. Extend the contract time by 90 days.	\$17,448,547	2.88%
			7	D	5/30/2017	\$16,960,425	\$100,608	\$17,061,033	\$146,899	0.87%	D&I (3) 16-inch elbows on the WSL piping system. Demolish, F&I (1) 42-inch BFV on the RSL piping system. Increase Bid Item 1B to reflect the amount estimated to be necessary to complete the Work. F&I temporary bypass piping section due to a conflict with the existing pipeline.	\$17,595,446	3.74%

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
7277A	Rehabilitation of Anaerobic Digesters, Clinton WWTP	R. H. White	11	D	12/2/2016	\$4,347,571	\$252,551	\$4,600,122	(\$48,895)	-1.12%	Underrun in quantities	\$4,551,227	4.68%
7338	Quabbin Power and Security	Ewing Electric Co. Inc.	1	D	9/30/2016	\$3,199,000	\$0	\$3,199,000	\$241,320	7.54%	Removal, handling, transportation and disposal of 200 cubic yards of Rock and Boulder Excavation. F&I buried conduit from the Quabbin Administration Building to existing spare conduit near the CVA Intake Structure.	\$3,440,320	7.54%
			2	B	10/12/2016	\$3,199,000	\$0	\$3,199,000	\$30,000	0.94%	Perform (3) test pits and F&I non-shrink cemetitious grout.	\$3,470,320	8.48%
			3	DD	11/10/2016	\$3,199,000	\$0	\$3,199,000	\$0	0.00%	Extend Milestone B by 110 calendar days.	\$3,470,320	8.48%
			4	D	12/16/2016	\$3,199,000	\$0	\$3,199,000	\$68,999	2.16%	F&I (4) video recorders in lieu of the specified video recorders. F&I (2) aluminum light poles and (4) LED flood lights, and (2) dock de-icers.	\$3,539,319	10.64%
			5	DD	1/18/2017	\$3,199,000	\$0	\$3,199,000	\$12,862	0.40%	Furnish and install one additional #4/0 conductor from the Quabbin Lookout Tower to the Restroom.	\$3,552,181	11.04%
			6	DD	1/27/2017	\$3,199,000	\$0	\$3,199,000	\$5,481	0.17%	Perform additional electrical work at the Chicopee Valley Aqueduct Intake Structure (CVA IS).	\$3,557,662	11.21%
			7	DD	2/10/2017	\$3,199,000	\$0	\$3,199,000	\$21,850	0.68%	F&I additional conduit, wire, fiber optic cable, concrete, reinforcing, and earth work.	\$3,579,512	11.89%
			8	DD	2/27/2017	\$3,199,000	\$0	\$3,199,000	(\$11,595)	-0.36%	F&I two utility poles (BC-11 and BC-12) and 80 feet of trenching and electrical ductbank in lieu of the specified trenching, ledge removal, and electrical ductbank.	\$3,567,917	11.53%
7362	Caruso Pump Station Improvements	Waterline Industries Corp	1	DD	11/2/2016	\$4,097,097	\$0	\$4,097,097	\$10,881	0.27%	F&I wiring to (7) existing fire alarm tamper switches and flow switches and modify drawings to depict connections to fire alarm panel.	\$4,107,978	0.27%
			2	D	12/2/2016	\$4,097,097	\$0	\$4,097,097	\$221,417	5.40%	F&I a new Durolast roof membrane for the entire Caruso Pump Station facility. Extend the contract time by 10 calendar days.	\$4,329,395	5.67%
			3	DD	2/28/2017	\$4,097,097	\$0	\$4,097,097	\$2,000	0.05%	Increase the estimated quantities for Bid item 1D.	\$4,331,395	5.72%
			4	DD	3/22/2017	\$4,097,097	\$0	\$4,097,097	\$0	0.00%	Extend the Contract Time by 30 calendar days from April 3, 2017 to May 3, 2017.	\$4,331,395	5.72%
			5	DD	4/25/2017	\$4,097,097	\$0	\$4,097,097	\$0	0.00%	Extend the contract time by 45 calendar days from May 3, 2017 to June 17, 2017.	\$4,331,395	5.72%
			6	B	5/8/2017	\$4,097,097	\$0	\$4,097,097	(\$64,650)	-1.58%	F&I and insulate approximately 20 feet of existing HVAC ductwork on the Pump Station roof. Decrease the estimated quantities in Bid Item 1-B.	\$4,266,745	4.14%
7396	Replacement of Scum Skimmers	Walsh Construction	2	D	7/25/2016	\$20,163,462	\$61,070	\$20,224,532	\$83,268	0.41%	F&I "extender" on 12 new scum skimmers.	\$20,307,801	0.72%
			3	D	10/17/2016	\$20,163,462	\$61,070	\$20,224,532	\$85,696	0.43%	Remove, F&I one gear drive in Gravity Thickener No. 3.	\$20,393,497	1.14%
7398	Cryogenics Chillers Replacement	William M Collins Inc.	1	DD	12/22/2016	\$3,235,800	\$0	\$3,235,800	\$6,627	0.20%	F&I a pipe support on the 14-inch insulated air high pressure (AHP) line outlet pipes of the three chillers; six (6) pipe supports on the three 4-inch vertical chiller vent lines.	\$3,242,427	0.20%
			2	DD	1/5/2017	\$3,235,800	\$0	\$3,235,800	(\$23,172)	-0.72%	Delete F&I: type 4 pipe support on the 4-inch chilled water piping; type 5 pipe support on the three chiller vent lines; demolish the existing pipe support for Chiller #1.	\$3,219,255	-0.51%

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
7411	Clinton Wastewater Treatment Plant Phosphorus Reduction	Daniel O'Connells Sons Inc.	1	DD	12/22/2017	\$7,272,432	\$0	\$7,272,432	\$4,472	0.06%	F&I a project sign on High Street; and (6) new concrete pads under the new mixers	\$7,276,904	0.06%
			2	DD	3/22/2017	\$7,272,432	\$0	\$7,272,432	\$17,926	0.25%	Furnish a 3-inch natural gas poly line. F&I dowels to tie the new junction structure into the existing Chlorine Contact Distribution structure.	\$7,294,831	0.31%
7431	Upgrades to Chelsea Screen House	WES Construction	3	D	8/16/2016	\$4,885,180	\$25,473	\$4,910,653	\$148,542	3.04%	Remove (2) 480v outlets the in the Screen Room. Delete all gas monitoring inputs and outputs. F&I a new MSA controller panel adjacent to SCADA panel; and four new remote gas sensors.	\$5,059,195	3.56%
			4	DD	9/6/2016	\$4,885,180	\$25,473	\$4,910,653	\$13,410	0.27%	Remove the existing feeder breakers and thermal overload protective devices and F&I 15 amp HMCP feeder breakers and thermal overload devices for Wet	\$5,072,605	3.84%
			5	DD	9/29/2016	\$4,885,180	\$25,473	\$4,910,653	\$14,436	0.30%	Rotate the SCADA Main Control Panel (MCP) 90 degrees, relocate the gas monitoring panel; furnish a NEMA 12 stainless steel electrical enclosure.	\$5,087,041	4.13%
			6	DD	11/8/2016	\$4,885,180	\$25,473	\$4,910,653	\$9,960	0.20%	Drill an exploratory hole at Sluice Gate #2 (SG-2) and backfill hole with grout. Remove twelve (12) existing anchor bolts. F&I fifteen new anchor bolts with epoxy adhesive.	\$5,097,001	4.34%
			7	DD	1/23/2017	\$4,885,180	\$25,473	\$4,910,653	\$4,355	0.09%	New floor plank and support grating system over the Wet Side and Dry Side Screen Channels.	\$5,101,356	4.43%
			8	D	4/27/2017	\$4,885,180	\$25,473	\$4,910,653	(\$148,315)	-3.04%	Install an inflatable plug and bulkhead within the Dry Side Channel in lieu of the specified bypass pumping. Delete the requirement to install four (4) bar screen deflectors.	\$4,953,041	1.39%
7458	Beacon Street Line Repair	R Zoppo Corp	1	D	2/6/2017	\$1,566,178	\$0	\$1,566,178	(\$37,616)	-2.40%	Hire a certified arborist to protect two public shade trees and construct a riser manhole in lieu of removing the two trees.	\$1,528,562	-2.40%
			2	DD	2/28/2017	\$1,566,178	\$0	\$1,566,178	\$6,554	0.42%	Relocate three electrical conduits around the access pit at the intersection of Beacon Street and St. Paul Street.	\$1,535,116	-1.98%
7471	NIH Pipeline Section 110 Reading and Woburn	Albanese D&S Inc.	3	D	8/4/2016	\$9,888,000	\$0	\$9,888,000	\$11,211	0.11%	F&I proprietary Gridsmart 360 degree traffic video detection equipment in lieu of other MassDOT traffic detection equipment models.	\$9,899,211	0.11%
			4	DD	9/1/2016	\$9,888,000	\$0	\$9,888,000	\$7,369	0.07%	Furnish 289 linear feet of 10-inch cured in place pipe (CIPP) liner for installation on Summer Ave in lieu of the specified CIPP liner. Remove and transplant a 12-foot high elm tree.	\$9,906,580	0.19%
			5	DD	9/9/2016	\$9,888,000	\$0	\$9,888,000	\$9,500	0.10%	Remove existing water services encountered during excavation and replace with new copper water service.	\$9,916,080	0.28%
			6	D	11/10/2016	\$9,888,000	\$0	\$9,888,000	\$97,015	0.98%	Furnish twelve feet of ductile iron piping around gate valves and two welded outlets at five locations.	\$10,013,095	1.27%
			7	B	12/18/2017	\$9,888,000	\$0	\$9,888,000	\$564,239	5.71%	Testing, removal, handling, transport and disposal of Group IA (unlined landfill) excavated materials; group II (asphalt batch) excavated materials. F&I nitrile pipe gaskets in lieu of the specified pipe gaskets.	\$10,577,334	6.97%

Table 2 Construction Change Orders FY17

Contract	Contract Name	Firm	Change Order No.	Approved By	Date	Initial Contract Value	COs Prior to 7/1/2016	Contract Value 7/1/16	FY17 Change Orders	% COs in FY 17	Description	Revised Total	Total % COs
			8	DD	1/27/2017	\$9,888,000	\$0	\$9,888,000	\$24,000	0.24%	Remove existing catch basins and F&I (6) new concrete catch basins.	\$10,601,334	7.21%
			9	D	3/13/2017	\$9,888,000	\$0	\$9,888,000	\$170,463	1.72%	F&I restrained joint pipe in lieu of ductile iron pipe. Remove existing drain line, F&I 12-inch drain line and two drain manholes. Remove the existing cast iron water main, F&I 8-inch ductile iron water main on Washington Street.	\$10,771,797	8.94%
			10	B	4/12/2017	\$9,888,000	\$0	\$9,888,000	\$300,000	3.03%	Perform (2) test pits for drain manhole structures. Remove 175 linear feet of existing asphalt sidewalk. Remove and replace a 26-inch oak tree at 94 Oak Street. F&I 12-inch and 18-inch PVC drain line and concrete drain manhole structures.	\$11,071,797	11.97%
7472	Rosemary Brook Building Repair and Stabilization	Calhess	1	DD	8/3/2016	\$1,696,700	\$0	\$1,696,700	\$11,948	0.70%	Retool the existing sandstone blocks on the east and west buildings.	\$1,708,648	0.70%
			2	DD	8/29/2016	\$1,696,700	\$0	\$1,696,700	\$24,950	1.47%	Remove and reset the twenty three (23) stones on the west building chimney to tie them back into the structure.	\$1,733,598	2.17%
			3	DD	1/9/2017	\$1,696,700	\$0	\$1,696,700	\$8,606	0.51%	Relocate steel columns to support the west building roof. F&I a steel plate over the hatch on the west building; delead, re-install the broken hatch doorway; prep, prime, and paint all new steel; F&I bird proof netting. Extend the Contract Time by 60 calendar days.	\$1,742,204	2.68%
			4	DD	2/14/2017	\$1,696,700	\$0	\$1,696,700	\$12,590	0.74%	F&I a cricket ridge structure and overflow scuppers; and a new intermediate rail on the existing turret stairs in the west building.	\$1,754,794	3.42%
			5	D	3/22/2017	\$1,696,700	\$0	\$1,696,700	\$0	0.00%	Extend the Contract Time by 120 calendar days from January 18, 2017 to May 18, 2017.	\$1,754,794	3.42%
7477	Cathodic Protection Replacement Shaft 5A/5	Corr Tech Inc.	1	DD	3/30/2017	\$132,000	\$0	\$132,000	\$10,332	7.83%	Excavate and remove existing PVC conduits and replace with PVC conduits enclosed in a concrete duct bank. Excavate two (2) test pits.	\$142,332	7.83%
7478	NIH Sections 110 and 112 Stoneham and Wakefield	Albanese D&S Inc.	1	D	6/7/2017	\$17,817,999	\$0	\$17,817,999	\$48,394	0.27%	Remove the existing cast iron water main F&I 8-inch water main, hydrants and valves. Furnish new MWRA frames and covers on all structures on this project.	\$17,866,393	0.27%
7488	CVA Intake Screen Replacement	W.M. Schultz Const. Inc.	1	DD	1/12/2017	\$1,049,000	\$0	\$1,049,000	\$2,000	0.19%	Furnish Builder's Risk Insurance for the contract duration.	\$1,051,000	0.19%
7532	Section 80 Repair	P Caliacco Corp	1	B	4/12/2017	\$1,828,409	\$0	\$1,828,409	\$81,870	4.48%	Suspend contract work as of March 28, 2017 and recommence work in the Fall of 2017; extend the contract time by 335 calendar days.	\$1,910,279	4.48%

Average Change Order Rate: 1.57%

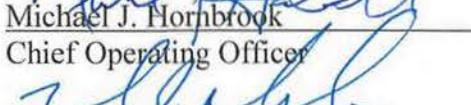
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Fiscal Year 2017 Year-End Capital Improvement Program Spending Report



COMMITTEE: Administration, Finance & Audit

 VOTE
X INFORMATION

Michael J. Hornbrook
Chief Operating Officer

Thomas J. Durkin
Director, Finance


Kathy Soni, Budget Director

Louise L. Miller, Budget Manager
Preparer/Title

At the end of each fiscal year, staff present the Board with a recap of the Capital Improvement Program (CIP).

FY17 was the fourth year of MWRA's five-year spending cap for FY14-18 established at \$791.7 million. The FY17 capital budget was \$155.3 million. The FY17 capital spending totaled \$133.2 million, \$22.1 million or 14.3% lower than budget.

In terms of overall spending, FY17 has improved from previous year's underspending trends.

In FY17, the Authority reached substantial completion on the Deer Island Scum Skimmer Replacement, Chelsea Screenhouse Upgrades, Section 36 Valve Replacement, Caruso Pump Station Improvements, Deer Island Fuel Oil System Upgrades, and Quabbin Power, Communication and Security contracts.

The Authority made significant progress on several major projects at the Deer Island, including the North Main Pump Station and Winthrop Terminal Butterfly Valve Replacement, and the Northern Intermediate High and Southern Extra High Redundancy water pipeline projects.

In FY17, MWRA managed 52 design and construction contracts and awarded 30 new contracts valued at \$158.7 million.

RECOMMENDATION:

For information only. The Fiscal Year 2017 Year-End Capital Program Spending Report highlights MWRA's major capital program accomplishments during FY17 and provides explanations for spending variances. *Please see Attachment A for the full Report.*

DISCUSSION:

Projects that were completed or reached substantial completion in FY17 included:

- Deer Island Scum Skimmer Replacement - \$20.4 million
- Section 36/W11/S 9-A11 Pipe and Valve Replacement - \$11.4 million
- Chelsea Screenhouse Upgrades - \$5.0 million
- Deer Island Fuel Oil System Upgrades - \$4.8 million
- Section 4 Webster Avenue Bridge Pipeline Replacement - \$3.8 million
- Quabbin Power, Communications & Security- \$3.6 million
- Southborough Water Quality Laboratory Upgrades - \$3.4 million
- Deer Island Cryogenics Chillers Replacement - \$3.2 million
- Rosemary Brook Siphon Building Repair - \$1.8 million
- Deer Island Secondary Reactors VFDs - \$3.2 million
- Thermal Power Plant Boiler Control Replacement - \$1.6 million
- Beacon Street Water Line Repair - \$1.5 million

MWRA made significant progress on a number of water and wastewater projects, including:

- North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacement – 90% complete
- Chelsea Headworks Upgrades – 9% complete
- Alewife Brook Pump Station Rehabilitation – 29% complete
- Clinton Phosphorus Reduction – 69% complete
- Deer Island Digester Sludge Pump Replacement Phase 2 – 100% complete
- Wachusett Aqueduct Pump Station Construction – 53% complete
- Hatchery Pipeline and Hydroturbine Construction – 97% complete
- Northern Intermediate High Redundancy Phase 1B Construction – 86% complete
- Information Security Protection Infrastructure Upgrades – 59% complete

MWRA pipeline rehabilitated or constructed in FY17 totaled 0.1 miles for wastewater projects and over 4.0 miles for water projects. *Please see Attachment D for a detailed breakdown of the linear footage of pipeline rehabilitated or constructed by project for FY17.*

Major contracts awarded by MWRA in FY17 with the following Notice to Proceed dates include:

- Southern Extra High Redundancy Pipeline Section 111 Phase 1 Construction – July 2016
- Prison Point Rehabilitation Design/Construction Administration/Resident Inspection – August 2016
- Chelsea Creek Headworks Upgrades Construction – November 2016
- Section 80 Water Main Replacement – December 2016

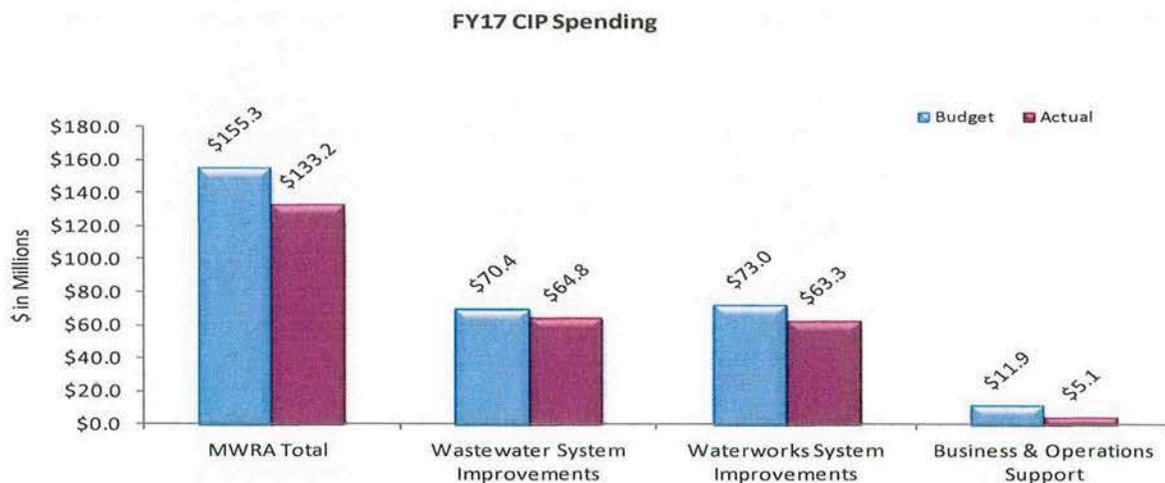
- Northern Intermediate High Section 89 & 29 Redundancy Phase 1C Construction – January 2017
- Commonwealth Avenue Pump Station Improvements Design/Construction Administration/Resident Inspection – January 2017
- Chicopee Valley Aqueduct Motorized Screens Replacement Construction – January 2017
- Deer Island Personnel Dock Rehabilitation – February 2017
- Nut Island Odor Control and HVAC Design/Construction Administration/Resident Inspection – March 2017
- Interceptor Renewal 1 Reading Extension Sewer Construction – May 2017
- Marlborough Maintenance Facility Construction – May 2017

Please see Attachment C FY17 Planned versus Actual/Revised CIP Notices to Proceed for a complete list of contracts awarded.

FY17 also included overall spending of \$51.0 million for the community financial assistance programs on both the water and wastewater side. Inflow and Infiltration (I/I) spending consisted of \$15.4 million in grants and \$6.9 million in loans offset by \$8.9 million in prior period loan repayments for net spending of \$13.4 million. The Local Water System Assistance Program spending was \$22.7 million in loans, including CVA communities, offset by \$21.8 million in prior period loan repayments for net spending of \$0.9 million, and Lead Service Line Replacement loans of \$6.0 million.

Major Variances to FY17 Budget

For FY17, total Capital Improvement Program spending was budgeted at \$155.3 million. Total spending was \$133.2 million, which was \$22.1 million or 14.3% below budget. Underspending was reported in Wastewater of \$5.6 million, Waterworks of \$9.7 million, and Business and Operations Support of \$6.9 million.



The table below reports the FY17 spending and variances by major program:

\$ in Millions	Budget	Actuals	\$ Var.	% Var.
Wastewater System Improvements				
Interception & Pumping	25.9	19.4	-6.5	-25.1%
Treatment	18.1	25.0	6.9	38.0%
Residuals	0.4	0.0	-0.4	N/A
CSO	7.1	7.0	-0.1	-1.6%
Other	18.8	13.4	-5.4	-28.9%
Total Wastewater System Improvements	\$70.4	\$64.8	-5.6	-7.9%
Waterworks System Improvements				
Drinking Water Quality Improvements	3.0	1.0	-2.0	-66.5%
Transmission	27.7	28.4	0.7	2.5%
Distribution & Pumping	34.9	22.6	-12.4	-35.4%
Other	7.4	11.3	4.0	N/A
Total Waterworks System Improvements	\$73.0	\$63.3	-9.7	-13.3%
Business & Operations Support	\$11.9	\$5.1	-6.9	-57.5%
Total MWRA	\$155.3	\$133.2	-22.1	-14.3%

The \$22.1 million variance is the net of \$39.8 million in less than budgeted spending on 42 projects offset by \$17.7 million in more than budgeted spending on 15 projects. The main reasons for the variances were:

Water Distribution and Pumping: Net underspending of \$12.4 million

- \$10.6 million for Section 89/29 Redundancy Phase 1C and 2 Construction and \$4.2 million for SEH Section 111 Construction Phase 2 and 3 for changes in schedules, and \$0.9 million for Phase 1 due to lower award than budget.
- \$1.0 million for Chestnut Hill Gatehouse No. 1 Repairs Construction due to schedule change.
- The underspending was partially offset by overspending of \$3.6 million for Section 89/29 Redundancy Phase 1B due to contractor progress and \$1.3 million for Spot Pond Supply Mains due to additional work for Webster Avenue Bridge Pipe Rehabilitation.

Wastewater Treatment: Net overspending of \$6.9 million

- \$1.8 million for Deer Island Primary/Secondary Clarifier Rehabilitation legal settlement.
- \$2.5 million for North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacements, \$1.7 million for Deer Island Power System Improvements, \$0.9 million for Clinton Phosphorus Reduction Construction, and \$0.9 million for Digester Sludge Pump Phase 2 due to contractor progress.
- \$0.7 million for Electrical Upgrades Construction 4 and \$0.2 million for Secondary Reactor VFDs due to timing of final work in FY17 that had been budgeted in FY16.
- The overspending was partially offset by underspending of \$1.1 million for Clinton Roof Rehabilitation due to updated schedule.

Interception & Pumping: Net underspending of \$6.5 million

- \$5.3 million for Chelsea Creek Headworks Upgrades Construction and Engineering Services During Construction due to a later than budgeted Notice-to-Proceed date, \$0.3 million on Caruso Pump Station Improvements Construction for timing of final work and a balancing change order and other smaller projects totaling \$0.9 million.

Other Wastewater: Net underspending of \$5.4 million

- \$5.4 million for Community Infiltration/Inflow (I/I) due to less than anticipated requests for grants and loans.

Other Waterworks: Net overspending of \$4.0 million

- \$4.4 million for Local Water Community Assistance due to greater than budgeted community requests for loans.
- This overspending was partially offset by \$0.3 million under spending for updated schedule for Carroll Water Treatment Plant SCADA/PLC Upgrades.

Drinking Water Quality Improvements: Net underspending of \$2.0 million

- \$1.4 million for updated schedule for Marlborough Maintenance Facility and final balancing change order for Southborough Water Quality Laboratory Upgrades, and Spot Pond Covered Storage Facility Design/Build of \$0.2 million due to construction delays, and other smaller projects totaling \$0.4 million

Waterworks Transmission: Net overspending of \$0.7 million

- \$2.4 million for Wachusett Aqueduct Pump Station Construction and Engineering Services During Construction and \$0.6 million for the Hatchery Pipeline Construction and Engineering Services During Construction due to contractor progress.
- The overspending was partially offset by 1.0 million for reduced scope of work for Sudbury Aqueduct MEPA review, \$0.8 million for timing of watershed land purchases, and \$0.4 million caused by less than anticipated progress for the Rosemary Brook Siphon Building Repairs due to delays in obtaining specialty items for work.

Residuals: Net underspending of \$0.4 million

- \$0.4 million for Residuals Upgrades construction due to updated schedules for sludge tank and silo coating, electrical and mechanical projects.

Combined Sewer Overflow: Net underspending of \$0.1 million

- \$0.6 million primarily for Cambridge Sewer Separation Project due to updated costs of final work, and final cost adjustments for completed projects for South Dorchester Bay Sewer Separation Commercial and Fox Point, Fort Point Channel, and Reserved Channel projects.

Please see Attachment B for detailed FY17 CIP variance explanations of all FY17 projects.

FY18 Outlook

Looking ahead to FY18, the projected capital spending is \$184.7 million including contingency of \$9.8 million. Projects with the largest budgeted spending in FY18 include Facility Asset Protection of \$25.1 million, Northern Intermediate High Redundancy and Storage of \$20.7 million, Infiltration/Inflow Local Financial Assistance of \$19.1 million, Cosgrove Tunnel Redundancy of \$18.5 million, Southern Extra High Redundancy and Storage of \$13.5 million, Local Water System Assistance Program of \$11.7 million, and Deer Island Treatment Plant Asset Protection of \$11.1 million.

Staff will be completing the design and progressing to the bid and award stage on several major projects such as Deer Island Treatment Plant Clarifier Rehabilitation Phase 2 Construction, HVAC Equipment Replacement Construction, Gravity Thickener Rehabilitation, Southern Extra High Redundancy Pipeline Section 111 Construction 2 (recently awarded) and Construction 3, Metropolitan Tunnel Redundancy Conceptual Design Engineering Impact Report, Section 57 Water & 21/20/19 Sewer Design/Engineering Services During Construction (recently awarded), Miscellaneous VFD Replacements Construction, Northern High Service Section 53 and 99 Connections Design Construction Administration/Resident Inspection, and Sodium Hypochlorite & Bisulfite Tanks Rehabilitation.

Please see Attachment E for FY18 Planned Contract Awards.

Staff will continue to provide oversight for the CSO Community Managed projects including Cambridge Sewer Separation contracts of \$1.5 million.

ATTACHMENTS:

- A. Fiscal Year 2017 Year-End Capital Program Spending Report
- B. FY17 CIP Year-End Variance Report
- C. FY17 Planned versus Actual/Revised CIP Notice to Proceeds
- D. Linear Footage of Rehabilitated or New Pipelines in FY17
- E. FY18 Planned Capital Contract Awards

MASSACHUSETTS WATER RESOURCES AUTHORITY

Capital Program Spending Report

for

Fiscal Year 2017



September 20, 2017

Fiscal Year 2017 Year-End Capital Program Spending Report

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Introduction

Since its inception in 1986, MWRA has expended \$8.2 billion on capital initiatives. Of this spending 72% has supported improvements to Wastewater treatment, interception, pumping and combined sewer overflow (CSO) systems, 26% has supported Waterworks treatment, transmission, distribution and water protection improvements, and 2% has supported Business and Operations Support initiatives. Through FY17, nearly 80% of the capital spending has been for court mandated projects. The long-term strategy for capital work is identified in the Authority's Master Plan which was first published in 2006, updated in 2013 and is currently being updated, and serves as a road map for inclusion of projects in the Capital Improvement Program (CIP) in every budget cycle. Going forward, MWRA expects to spend \$2.4 billion on system improvements between FY18-FY27 with main emphasis on Asset Protection and Water System Redundancy initiatives including the Metropolitan Tunnels Long-Term Redundancy Project.

MWRA Capital Spending FY1986 - FY2027				
(in millions)				
Program	Expenditures FY86 - FY17		Planned Expenditures FY18 - FY27	
	Amount	% of Total	Amount	% of Total
Wastewater	\$5,848	72%	\$1,127	47%
Waterworks	\$2,197	26%	\$1,255	52%
Business & Operations Support	\$130	2%	\$32	1%
Total MWRA	\$8,175	100%	\$2,414	100%

To date, MWRA has spent \$908.2 million on the Wastewater CSO program and plans to spend an additional \$8.5 million through FY21.

To date, MWRA has distributed \$150.9 million in grants and \$181.6 million in no-interest loans to fund 528 separate projects in 43 communities under the I/I Local Financial Assistance Program. Additionally, \$350.8 million in Local Water Pipeline Assistance Program loans has been distributed to member communities.

FY17 Spending

Total CIP spending in FY17 was \$133.2 million which was \$22.1 million or 14.3% less than the \$155.3 million budgeted.

Spending by program in FY17 was:

Program	FY17 Budget (in millions)	FY17 Actuals (in millions)	Variance	% Variance
Wastewater	\$70.4	\$64.8	(\$5.6)	-7.9%
Waterworks	\$73.0	\$63.3	(\$9.7)	-13.3%
Business & Operations Support	\$11.9	\$5.1	(\$6.9)	-57.5%
Total	\$155.3	\$133.2	(\$22.1)	-14.3%

FY17 included spending of \$27.1 million not directly under MWRA's control, most notably the Inflow and Infiltration (I/I) program, the Local Water Pipeline program, and the community managed Combined Sewer Overflow (CSOs) projects. These programs are either loan or grant programs to support the MWRA's member communities' local water and sewer infrastructure. In FY17, MWRA expended \$35.5 million in water and I/I loans and \$15.4 million in I/I grants offset by \$30.7 million in prior period loan repayments for net spending of \$20.2 million. After accounting for programs which are not directly under MWRA's control, the FY17 CIP underspending is \$20.9 million or 16.4%, as shown in the table below.

Program	FY17 Budget (in millions)	FY17 Actuals (in millions)	Variance	% Variance
Wastewater less I/I and Community CSO	\$44.5	\$44.6	\$0.1	0.3%
Waterworks less Water Loans	\$70.6	\$56.4	(\$14.1)	-20.0%
Business & Operations Support	\$11.9	\$5.1	(\$6.9)	-57.5%
Total	\$127.0	\$106.1	(\$20.9)	-16.4%

FY17 Capital Program Highlights

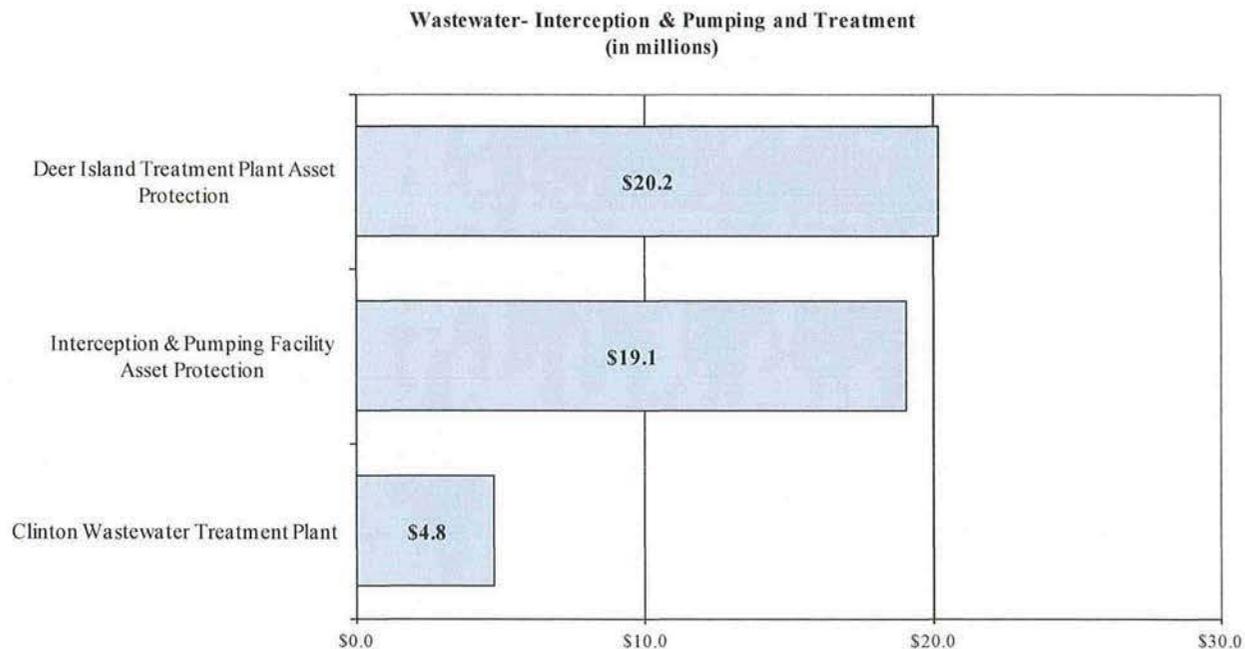
This section highlights the spending and key accomplishments by major program categories and projects.

Wastewater System

During FY17, the MWRA spent \$64.8 million on Wastewater system projects: \$19.4 million for Interception & Pumping projects, \$25.0 million for Treatment projects, \$7.0 million for CSO projects, and \$13.4 million for Other Wastewater projects.

Wastewater Interception & Pumping and Treatment Projects

Total FY17 spending for Interception & Pumping was \$19.4 million and Treatment was \$25.0 million. The largest spending occurred on the following:



Key Accomplishments in Wastewater - Interception and Pumping:

- Chelsea Creek Headworks Upgrades Construction
 - Notice to Proceed (NTP) for construction contract issued November 2016.
 - NTP for construction resident engineering services issued November 2016.
 - Project 9% completed in FY17.

- Prison Point Rehabilitation Design/Construction Administration/Resident Inspection
 - NTP issued August 2016.

- Chelsea Screenhouse Upgrades
 - Substantially complete in September 2016.

- Cambridge Branch 23,24,26,27 Study
 - NTP issued October 2016.
- Prison Point Piping Rehabilitation
 - NTP issued October 2016.
- Sections 4,5,6,186 Study
 - NTP issued in February 2017.
- Nut Island System-wide Odor Control Evaluation
 - Substantially complete in February 2017.
- Nut Island Headworks Odor Control and HVAC Improvements Design/Construction Administration/Resident Inspection
 - NTP issued March 2017.
- Interceptor Renewal 3 Dorchester Interceptor Sewer Design/Construction Administration/Resident Inspection
 - NTP issued in April 2017.
- Interceptor Renewal 3 Reading Extension Sewer
 - NTP issued in May 2017.
- Hingham/Quincy Pump Stations Fuel Storage Upgrades Construction
 - NTP issued in May 2017.
- Caruso Pump Station Improvements Construction
 - Substantially complete in June 2017.
- Wastewater Metering Planning/Study/Design
 - Contract awarded in June 2017.

Key Accomplishments in Wastewater – Treatment:

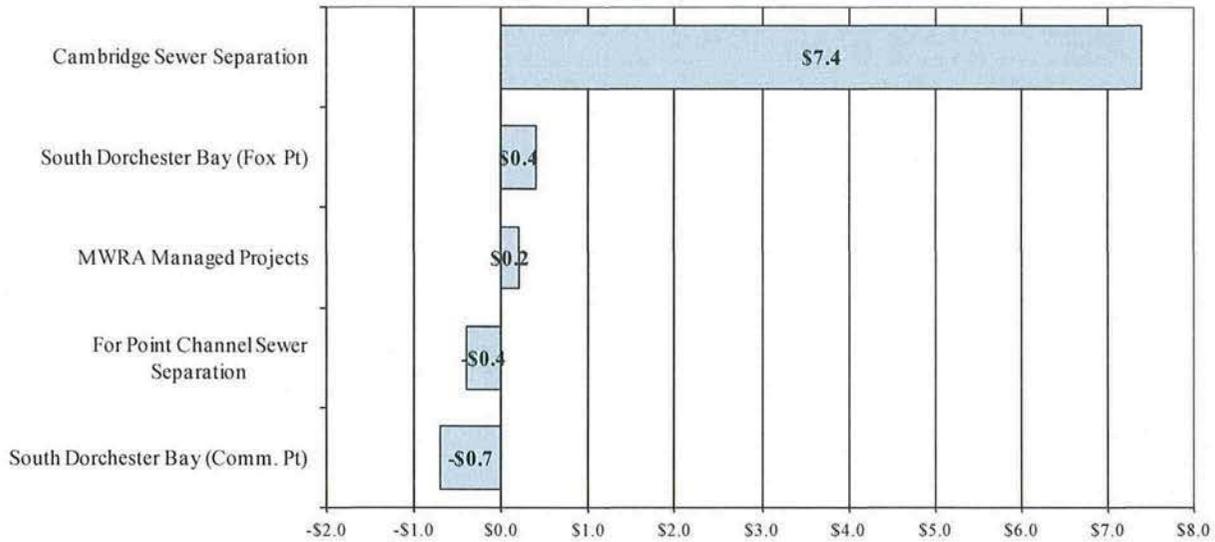
- Deer Island Treatment Plant (DITP) As-Needed Design contracts 8-1,8-2, and 8-3
 - NTP issued in July 2016.
- DITP Secondary Reactor Variable Frequency Drives
 - Substantially complete in August 2016.
- DITP Scum Skimmer Replacement
 - Substantially complete in October 2016.
- DITP Cryogenics Chillers Replacement
 - Substantially complete in October 2016.

- DITP Thermal Power Plant Boiler Controls Replacement
 - Substantially complete in November 2016.
- DITP North Main Pump Station Motor Control Center Phase 2 Design/Engineering Services During Construction/Resident Inspection
 - NTP issued in January 2017.
- DITP Personnel Dock Repair
 - NTP issued February 2017.
- DITP Rip Rap Material
 - NTP issued March 2017 and completed in June 2017.
- DITP Fuel System Modifications
 - Substantially complete in May 2017.
- Clinton National Grid Gas Line
 - Substantially complete in June 2017.
- DITP Sludge Pump Replacement Phase 2
 - Significant progress was made on project in FY17 – 100% complete.
- Clinton Wastewater Treatment Plant Phosphorus Reduction Construction
 - Significant progress was made on project in FY17 – contract 69% complete
- DITP North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacement
 - Significant progress was made on project in FY17 – contract 90% complete.
- DITP Winthrop Terminal Facility Variable Frequency Drives Replacement Construction
 - Significant progress was made on project in FY17 – contract 9% complete.

Wastewater System – Combined Sewer Overflow (CSO) Projects

Total FY17 spending for CSO projects was \$7.0 million. Of this amount, the community managed projects totaled \$6.8 million and MWRA managed projects totaled \$0.2 million. The largest spending relates to the Cambridge Sewer Separation contract. It should be noted that community managed CSO projects are included in the CIP based on estimates for the total project costs. Once a project is completed, there is a final cost adjustment. In FY17, final cost adjustments on two Boston Water and Sewer Commission CSO contracts resulted in lower costs than budgeted.

**Wastewater- Combined Sewer Overflows
(in millions)**



Key Accomplishments in CSO:

- All CSO sewer separation reached substantial completion in FY16 in compliance with Schedule Seven of the Federal Court’s Orders in the 1985 Clean Water Act enforcement action. Work remains in Cambridge for final restoration work through FY17 and FY18. MWRA is currently required to submit bi-annual compliance and progress reports through December 2020. In addition, staff are working to award CSO Performance Assessment in FY18.

Wastewater - Other

In FY17, this category includes spending only for the community managed Infiltration/Inflow (I/I) Local Financial Assistance Program.

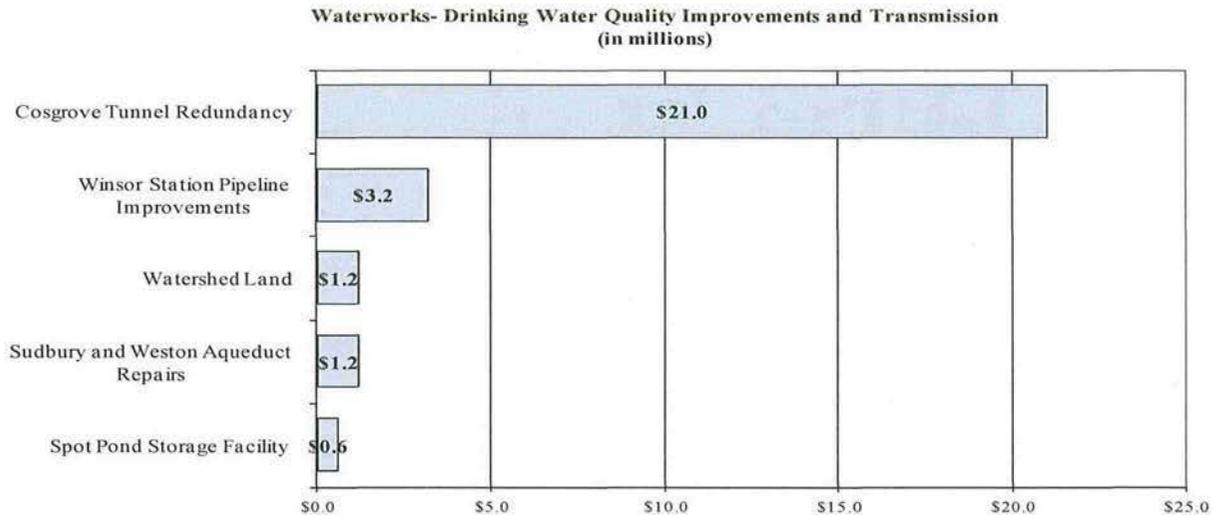
In FY17, MWRA distributed \$15.4 million in grants and \$6.9 million in no-interest loans which is offset by repayment of prior-period loans of \$8.9 million resulting in net spending of \$13.4 million.

Waterworks System

During FY17, the MWRA spent \$63.3 million on Waterworks system projects: \$1.0 million for Drinking Water Quality Improvement projects, \$28.4 million for Transmission projects, \$22.6 million for Distribution and Pumping projects, and \$11.3 million for Other Waterworks projects.

Waterworks System – Drinking Water Quality Improvements and Transmission

Total FY16 spending for Drinking Water Quality Improvements and Transmission projects was \$7.1 million and \$8.1 million, respectively. Projects with the largest spending are listed below:



Key Accomplishments in Drinking Water Quality Improvements:

- Southborough Water Quality Laboratory Upgrades
 - Substantially complete in November 2016.
- Marlborough Maintenance Facility
 - NTP issued May 2017.

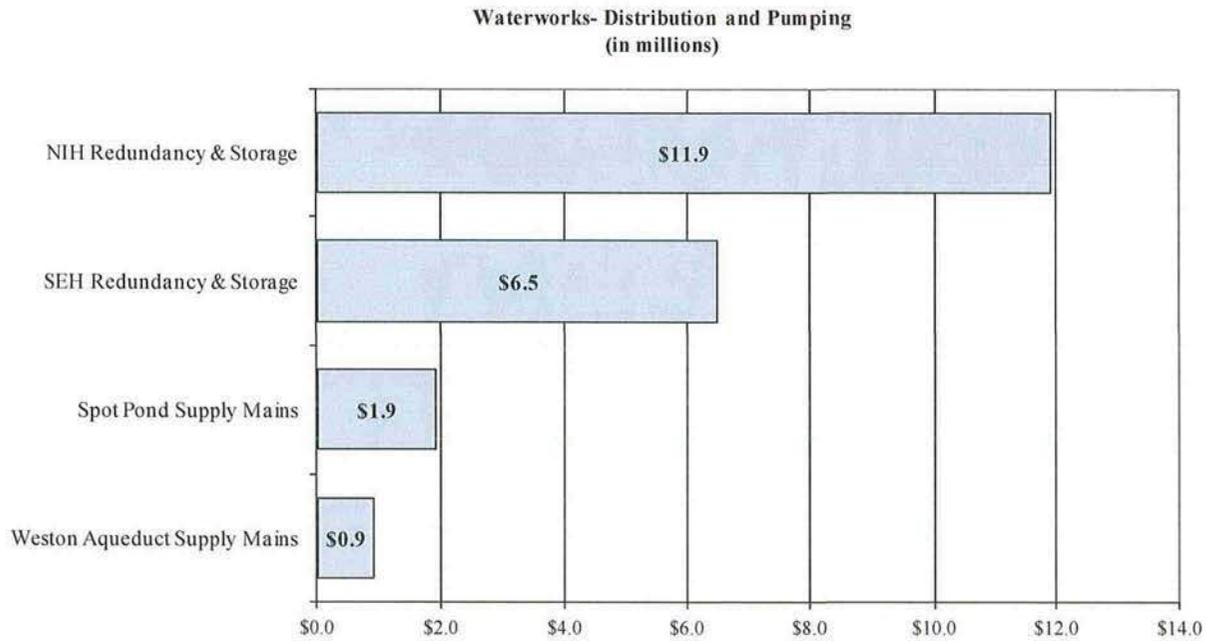
Key Accomplishments in Transmission:

- Evaluation of Farm Pond Buildings-Waban Arches
 - NTP issued July 2016.
- Shaft 5A/5 Surface Piping Cathodic Protection
 - NTP issued November 2016 and substantially complete in June 2017.
- Chicopee Valley Aqueduct Motorized Screens Replacement Construction
 - NTP issued January 2017.
- Commonwealth Avenue Pump Station Improvements Design/Construction Administration/Resident Inspection
 - NTP issued January 2017.
- Shaft 12 Isolation Gate Design/Construction Administration/Resident Inspection
 - NTP issued March 2017.

- Rosemary Brook Siphon Building Repair
 - Substantially complete in May 2017.
- Sudbury Aqueduct Massachusetts Environmental Policy Act Review
 - Substantially complete in June 2017.
- Wachusett Aqueduct Pump Station Construction
 - Significant progress was made on project in FY17 - contract 53% complete.
- Winsor Station Hatchery Pipeline Construction
 - Significant progress was made on project in FY17 – contract 97% complete.

Waterworks System - Distribution and Pumping

Total FY17 spending for Distribution and Pumping projects totaled \$22.6 million. Projects with the largest spending are listed below:



Key Accomplishments in Distribution and Pumping:

- Southern Extra High Redundancy Section 111 Construction 1
 - NTP issued in July 2016.
- New Connecting Mains Shaft 7 to WASM 3 - CP3 (sections 23,24,47) Final Design/Construction Administration/Resident Inspection
 - NTP issued July 2016.
- Section 80 Pipeline Replacement
 - NTP issued December 2016.

- Spot Pond Supply Mains Section 4 Webster Avenue Bridge Pipe Replacement Construction
 - Substantially complete in December 2016.
- Weston Aqueduct Supply Mains Section 36/W11/S 0-A11 Valve Construction
 - Substantially complete in December 2016.
- Northern Intermediate High Redundancy - Phase 1C Sections 110 and 112 Construction
 - NTP issued January 2017.
- Northern High Service Section 56 Feasibility Study
 - Substantially complete in June 2017.
- Peabody Pipeline Section 109 Extension Design/Construction Administration/Resident Inspection
 - NTP issued June 2017.
- Northern Intermediate High Redundancy - Phase 2 Section 110 Construction
 - Contract awarded June 2017.
- Northern Intermediate High Redundancy & Storage – Phase 1B Construction
 - Significant progress was made on project in FY17 – contract 86% complete.

Waterworks – Other

This category includes the community assistance program for the local water pipelines and other MWRA Waterworks projects.

In FY17, MWRA distributed \$28.7 million in Local Water Pipeline Assistance Program loans to member communities offset by repayment of prior-period loans of \$21.8 million which resulted in total net receipts of \$6.9 million.

Key Accomplishments in Other Waterworks:

- Quabbin Power Communication & Security Construction
 - Substantially complete in April 2017.
- Beacon Street Line Repair Construction
 - Substantially complete in April 2017.

Business & Operations Support

Total FY17 spending for Business and Operations Support totaled \$5.1 million.

Key Accomplishments in Business & Operations Support:

- As-Needed Design Contract 12

- Substantially complete in July 2016.
- As-Needed Design Contract 13
 - Substantially completed in August 2016.
- Information Security Protection Infrastructure Upgrades
 - Significant progress was made on contract in FY17 – 59% complete

Total New or Rehabilitated Pipeline

In addition to measuring spending on CIP projects, MWRA tracks the mileage of pipeline that is rehabilitated or added to its infrastructure. During FY17, the MWRA rehabilitated or constructed 0.1 mile of wastewater pipeline and over 4 miles of water pipeline. These numbers do not include the rehabilitated or replaced pipelines of our member communities which are funded through our Inflow/Infiltration (I/I) and Water Loan programs as referenced above. *Refer to Attachment D for the specific linear footage of rehabilitated or new pipelines by project in FY17.*

FY17 Spending Variances

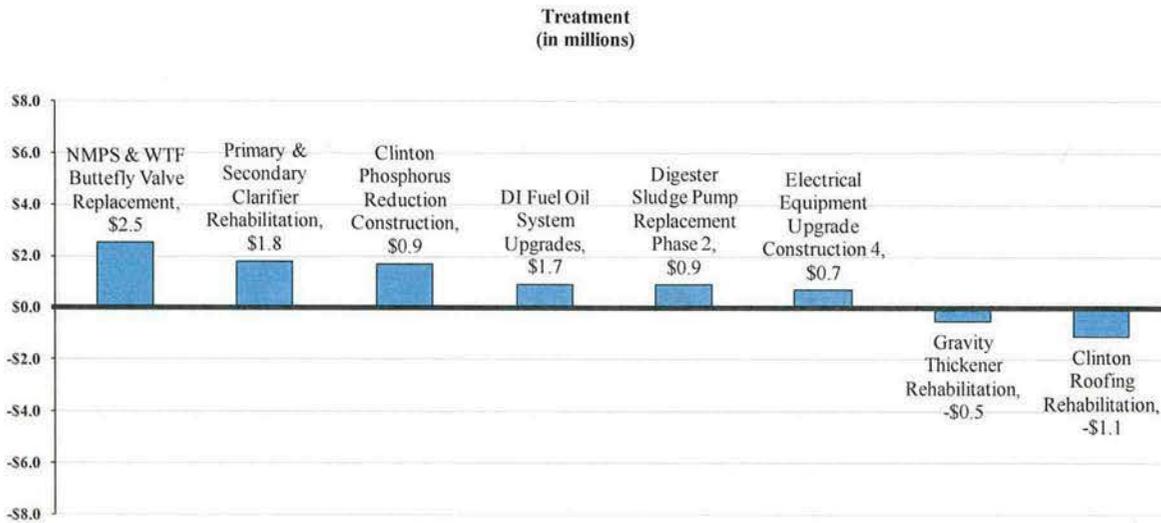
Total FY17 capital spending was \$133.2 million which was \$22.1 million or 14.3% less than the \$155.3 million budget. The variance is primarily due to underspending for the Interception & Pumping Facility Asset Protection, lower community requests for loans and grants for the Infiltration/Inflow (I/I) Local Financial Assistance Program, Northern Intermediate High and Southern Extra High Redundancy projects partially offset by progress on Deer Island Treatment Plant Asset Protection, Water Local Assistance Program, and Cosgrove Tunnel Redundancy projects.

Program	Budgeted Spending	Actual Spending	Variance to Budget		% Actual Spending to Total Spending
			\$	%	
Total Wastewater System	\$70,374	\$64,803	(\$5,571)	-7.9%	49%
Interception & Pumping	\$25,928	\$19,423	(\$6,505)	-25.1%	15%
Treatment	\$18,113	\$25,002	\$6,889	38.0%	19%
Residuals	\$400	\$0	(\$400)	0.0%	0%
Combined Sewer Overflow	\$7,116	\$7,001	(\$115)	-1.6%	5%
Other Wastewater Programs	\$18,817	\$13,377	(\$5,440)	-28.9%	10%
Total Waterworks System	\$73,009	\$63,311	(\$9,699)	-13.3%	48%
Drinking Water Quality Improvements	\$2,991	\$1,003	(\$1,988)	-66.5%	1%
Transmission	\$27,733	\$28,414	\$680	2.5%	21%
Distribution and Pumping	\$34,920	\$22,569	(\$12,351)	-35.4%	17%
Other Waterworks Programs	\$7,365	\$11,325	\$3,960	53.8%	9%
Business & Operations Support	\$11,943	\$5,075	(\$6,868)	-57.5%	4%
Total MWRA	\$155,327	\$133,189	(\$22,137)	-14.3%	100%

FY17 Variances for Major Projects

Please see Attachment B for the full FY17 CIP variance explanations by project.

Wastewater – Treatment



Deer Island Treatment Plant Asset Protection:

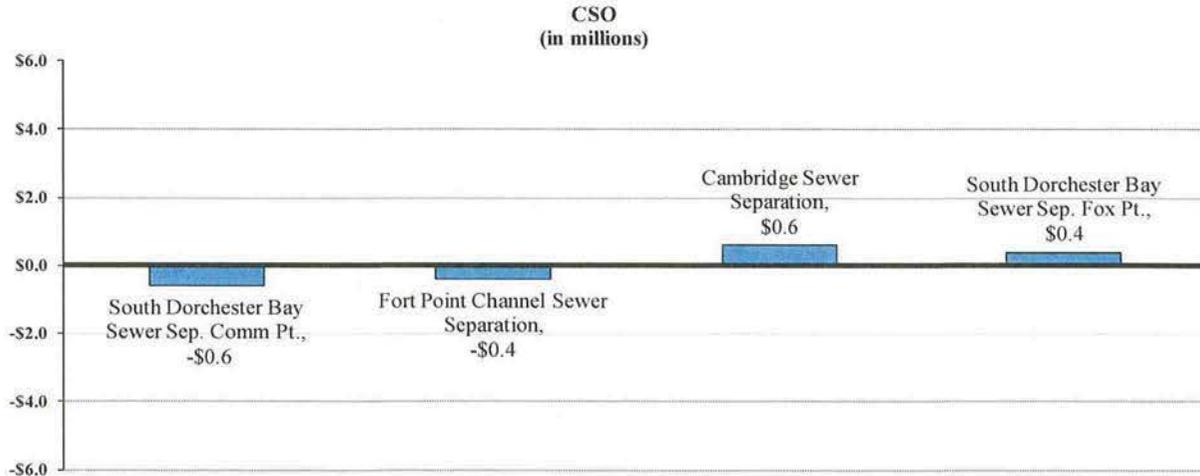
- Total FY17 Budget: \$13.3 million
- Total FY17 Expended: \$20.2 million
- \$6.9 million greater than budgeted spending
 - Overspending on projects totaling \$8.7 million, including
 - \$2.5 million for North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacement: greater than budgeted contractor progress
 - \$1.8 million for Primary & Secondary Clarifier Rehabilitation: legal settlement
 - \$1.7 million for DI Fuel Oil System Upgrades: greater than budgeted contractor progress
 - \$0.9 million for Digester Sludge Pump Replacement Phase 2: greater than budgeted contractor progress
 - \$0.7 million for Electrical Equipment Upgrade – Construction 4: timing of payment for final work
 - Offset by underspending totaling \$1.8 million, including:
 - \$0.5 million for Gravity Thickener Rehabilitation: updated schedule.

Clinton Wastewater Treatment Plant:

- Total FY17 Budget: \$4.8 million
- Total FY17 Expended: \$4.8 million

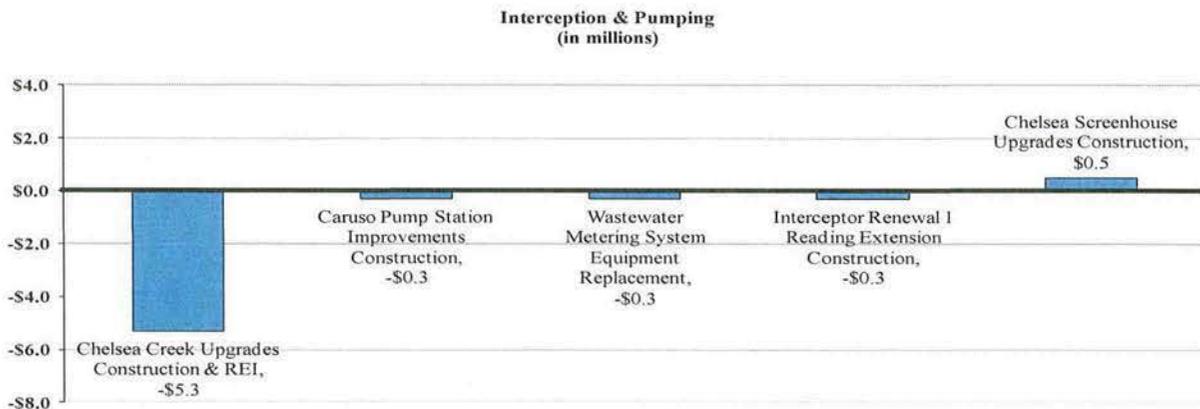
- Greater than budgeted spending due to contractor progress on the Phosphorus Reduction construction of \$0.9 million partially offset by updated schedule for the Clinton Roofing Rehabilitation contract of \$1.1 million.

Wastewater - Combined Sewer Overflows (CSO's)



- Total FY17 Budget: \$7.1 million
- Total FY17 Expended: \$7.0 million
- \$0.1 million less than budgeted spending
 - \$0.6 million in overspending at Cambridge Sewer Separation due to updated costs for restoration work offset by underspending of \$0.8 million for BWSC sewer separation final cost adjustments for several completed projects.

Wastewater - Interception & Pumping



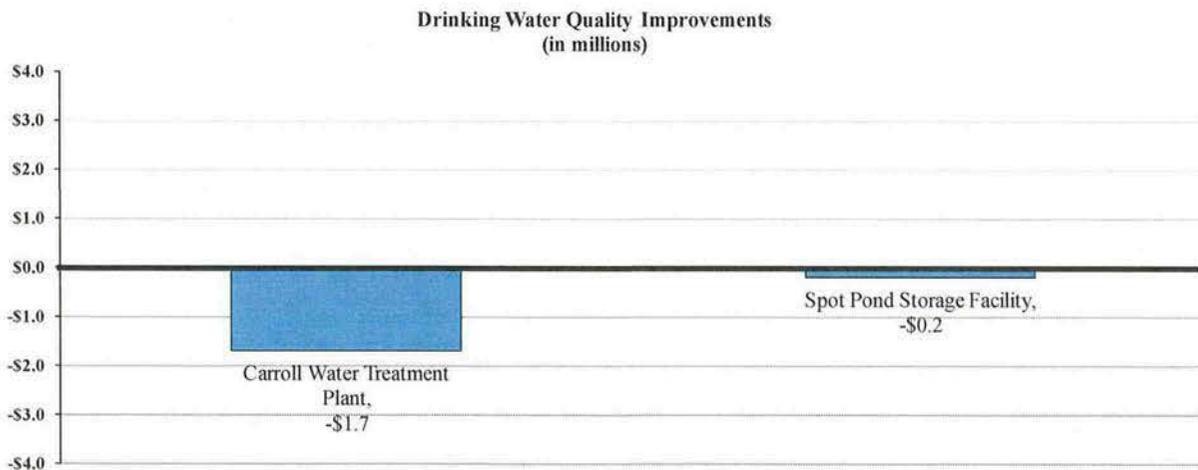
- Total FY17 Budget: \$25.9 million
- Total FY17 Expended: \$19.4 million

- \$6.5 million less than budgeted spending
 - Underspending in Interception & Pumping Facility Asset Protection totaling \$6.0 million, including
 - \$5.3 million for Chelsea Creek Upgrades – Construction and Resident Engineering/Inspection: contract notice to proceed was later than anticipated
 - \$0.3 million for Caruso Pump Station Improvements Construction: work anticipated in FY17 that was completed in FY16. Also, balancing credit change order.
 - \$0.3 million for Interceptor Renewal No. 1 Reading Extension Sewer Construction due to schedule change
 - Underspending in Wastewater Metering System Equipment Replacement totaling \$0.3 million due to updated schedule for Planning/Study/Design contract.
 - Offset by overspending of \$0.5 million for Chelsea Screenhouse Upgrades for work expected in FY16 that was completed in FY17.

Wastewater - Other

\$5.4 million less than budgeted spending for I/I Local Financial Assistance resulting from \$3.0 million in less than budgeted grant distributions and \$2.9 million in less than budgeted no-interest loans and \$0.5 for repayments for previous loan distributions.

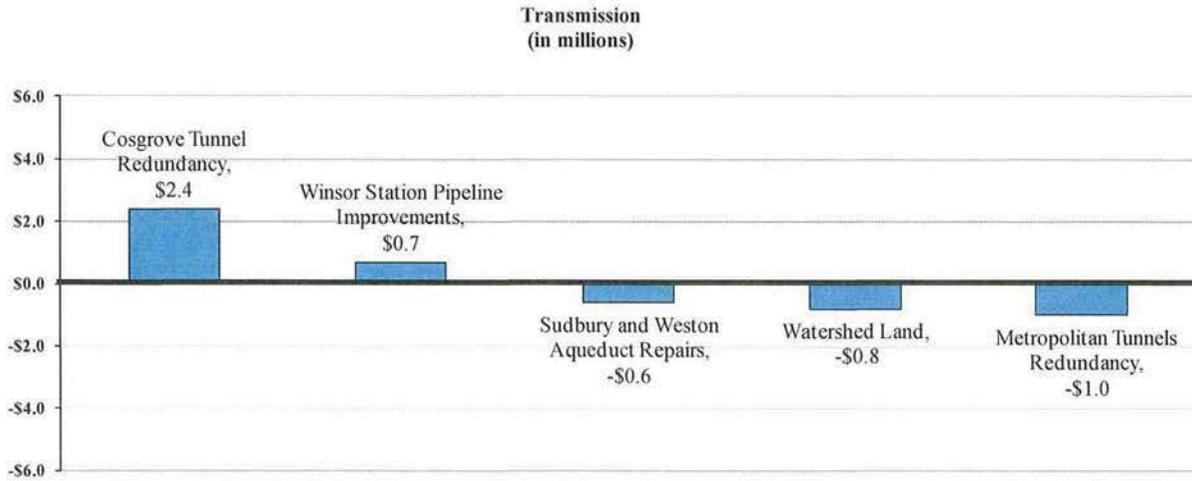
Waterworks - Drinking Water Quality Improvements



- Total FY17 Budget: \$3.0 million
- Total FY17 Expended: \$1.0 million
- \$1.0 million less than budgeted spending
 - Underspending primarily due to
 - \$1.4 million for Carroll Water Treatment Plant - Existing Facilities Upgrades CP-7 Marlborough Maintenance Facility due to updated schedule.

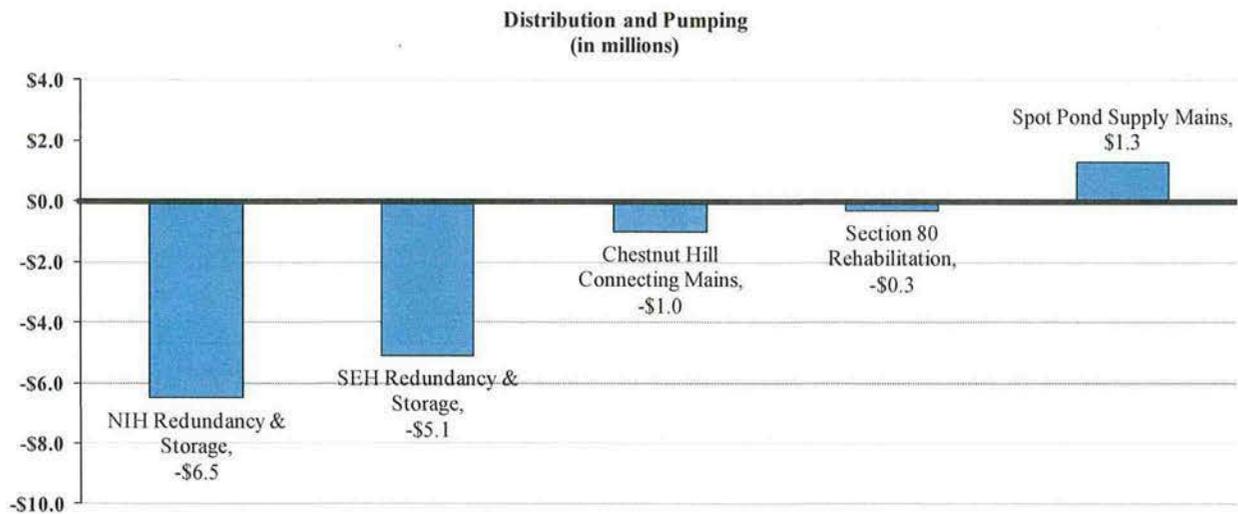
- \$0.2 million for Spot Pond Storage Facility due to timing of final restoration work.

Waterworks – Transmission



- Total FY17 Budget: \$27.7 million
- Total FY17 Expended: \$28.4 million
- \$0.7 million more than budgeted spending
 - Overspending on various projects, including
 - \$2.4 million for Cosgrove Tunnel Redundancy primarily due to greater than budgeted progress for the Wachusett Aqueduct Pump Station Construction
 - \$0.7 million primarily due to consultant and contractor progress on Hatchery Pipeline project
 - Offset by underspending of \$1.0 million for Metropolitan Tunnel Redundancy - Sudbury Aqueduct MEPA Review due to reduction of scope, \$0.8 million for timing of Watershed Land purchases, and \$0.4 million for construction delays for the Sudbury-Weston Aqueduct Repairs - Rosemary Brook Siphon Building Repair.

Waterworks - Distribution and Pumping



- Total FY17 Budget: \$34.9 million
- Total FY17 Expended: \$22.6 million
- \$12.4 million less than budgeted spending
 - Underspending on various projects, including
 - \$6.5 million for Northern Intermediate High (NIH) Redundancy & Storage - Section 89/29 Redundancy Construction Phase 1C and 2: later than budgeted contract award
 - \$5.1 million for Southern Extra High (SEH) Redundancy & Storage – Section 111 Pipeline Redundancy Construction 2 and 3: later than budgeted contract award, and Section 111 Construction 1 awarded less than budget
 - \$1.0 million for Chestnut Hill Connecting Mains- Gatehouse No. 1 Repairs: updated schedule
 - \$0.3 million for Section 80 Rehabilitation: time extension as a result of unforeseen conditions.
 - Offset by overspending on various projects, including:
 - NIH Construction Phase 1B of \$3.6 million due to greater than budgetd contractor progress
 - Spot Pond Supply Mains Webster Avenue Bridge Pipeline Replacement of \$1.3 million due to additional work based on re-design
 - Southern Extra High Redundancy Design of \$0.5 million due to consultant progress.

Waterworks - Other

Local Water Pipeline Improvement Loan Program: \$4.4 million more than budgeted spending which resulted from \$3.6 million in higher than projected loan distributions and \$0.8 million in less than projected repayment due to less than projected loans in FY16.

Business & Operations Support

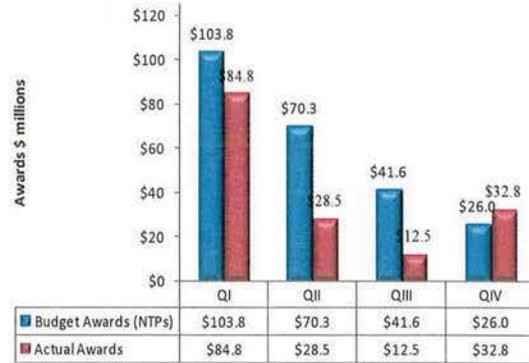
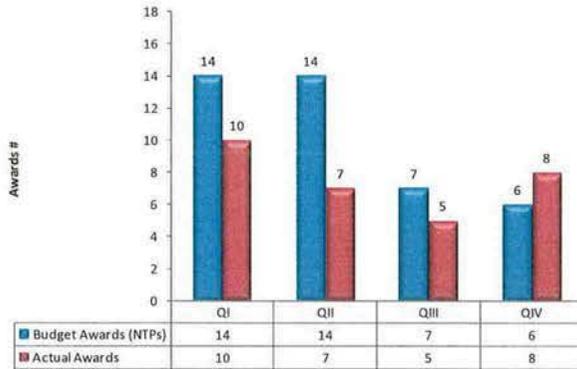
- Total FY17 Budget: \$11.9 million
- Total FY17 Expended: \$5.1 million
- \$6.8 million less than budgeted spending
 - Management Information Systems (combined): \$3.4 million less than budgeted spending primarily due to timing of Information Technology initiatives.
 - Centralized Equipment Purchase: \$2.2 million less than budgeted spending primarily due to timing of vehicle purchases and award of security equipment contracts.
 - Capital Maintenance Planning/Development: \$1.2 million less than budgeted spending primarily due to lower than projected task order work for As-Needed Design contracts 12-15.

FY17 CIP Contract Awards

The FY17 CIP planned the award of 41 contracts with a value of \$241.6 million. During FY17, the MWRA awarded 30 contracts valued at \$158.7 million, representing 73.2% of contracts and 65.7% of contract funding. Of the 41 planned awards, 19 contracts were awarded, 17 are expected to be awarded in FY18, 4 have been rescheduled beyond FY18, and 1 is being done in-house. Of the 17 contracts that moved to FY18: 3 were due to permitting issues, 3 due to changes in priorities, 2 due to scope changes, and 9 due to bidder issues/outside consultant/contractor delays. In addition to FY17 budgeted awards, 11 contracts were awarded: 4 projects originally planned in FY16, 5 contracts for work that was broken out from an existing phase of a project, 1 unplanned contract, and 1 for new project, bringing the total number of contracts awarded in FY17 to 30.

A comparison of the FY17 budgeted contracts and the FY17 actual contract awards are detailed below:

FY17 Contracts (\$ in Millions)				
Program	Budget		Actual	
	#	\$	#	\$
Total MWRA	41	241.6	30	158.7
Wastewater	24	172.9	14	99.4
Waterworks	16	68.3	13	59.1
Business Operations & Support	1	0.4	3	0.2



Please refer to Attachment C for a full listing of contracts planned to be awarded in FY17 and actual awards.

Change Orders Review

Management of change orders remains a top priority. Total change orders for MWRA-managed capital projects were 8.3% of award value through June 2017. Change orders as a percent of award value for completed and ongoing work in the FY17 CIP are 8.8% and 2.0%, respectively. These percentages remain within the target of 10% for change orders as a percentage of awards.

Master Plan and the FY18 CIP Process

To arrive at the FY18 Final CIP, the Authority identified the needs of the programs taking into account the recommendations of the Master Plan. The long-term strategy for capital work is identified in the Authority's Master Plan which was published in 2006, updated in 2013, and is currently being updated. The Master Plan serves as a road map for inclusion of projects in the CIP in every budget cycle. In FY17, no new projects were added from the Master Plans.

The updated Master Plans will be focused on capital needs over the next 40-years and are intended to be the principal framework for annual capital planning. The Plans will focus on projects that require capital spending during the next two 5-year CIP cap cycles: FY19-23 and FY24-28. Potential capital needs during the next 10-year (FY29-38) and 20-year (FY39-53) planning periods will also be identified.

FY18 CIP and FY14-18 Cap Budget

The FY14 CIP established the FY14-18 Base-Line Cap budget at \$791.7 million. The following is a breakdown of the FY14-18 Cap components:

FY14-18 Base-Line Cap		FY14	FY15	FY16	FY17	FY18	Total FY14-18
	Projected Expenditures	\$142.5	\$147.6	\$149.3	\$141.8	\$136.8	\$718.0
Contingency	7.6	9.5	10.1	9.8	9.3	46.1	
Inflation on Unawarded Construction	0.8	4.2	8.4	11.1	13.5	37.9	
Less: Chicopee Valley Aqueduct Projects	(5.0)	(2.2)	(1.4)	(1.3)	(0.4)	(10.3)	
FY14-18 Base-Line Cap	\$145.8	\$159.1	\$166.4	\$161.3	\$159.1	\$791.7	

The cap is updated every year based on the actual expenditures for the prior fiscal year. The FY18 Final CIP budget includes in addition to FY14-18 capital expenditures of \$617.0 million, contingency of \$17.1million offset by \$82.3 million in Community Loan Program Support and \$7.9 million in Chicopee Valley Aqueduct adjustments. The total Final FY18 projected FY 14-18 Cap spending of \$543.9 million is \$174.1.0 million or 22% less than the Base-Line Cap. \$82.3 million of the underspending is due to redefining the Cap in FY15 at the recommendation of the Advisory Board by excluding the Community Financial Assistance programs.

FY18 Final		FY14	FY15	FY16	FY17	FY18	Total FY14-18
		Projected Expenditures	\$102.2	\$103.6	\$95.1	\$141.2	\$174.9
Contingency	0.0	0.0	0.0	7.3	9.8	17.1	
Inflation on Unawarded Construction	0.0	0.0	0.0	0.0	0.0	0.0	
Less: I/I Program	0.0	(17.5)	(13.6)	(18.4)	(19.1)	(68.6)	
Less: Water Loan Program	0.0	1.4	5.3	(8.7)	(11.7)	(13.7)	
Less: Chicopee Valley Aqueduct Projects	(5.6)	(1.2)	(0.4)	(0.1)	(0.6)	(7.9)	
FY18 Proposed FY14-18 Spending		\$96.6	\$86.3	\$86.4	\$121.3	\$153.4	\$543.9

The FY18 Final CIP budget complies with the overall Base-Line Cap requirement.

FY18 Outlook Based on FY18 CIP

Looking ahead to FY18, the projected capital spending is \$184.7 million including contingency of \$9.8 million. Projects with the largest budgeted spending in FY18 include Facility Asset Protection of \$25.1 million, Northern Intermediate High Redundancy and Storage of \$20.7 million, Infiltration/Inflow Local Financial Assistance of \$19.1 million, Cosgrove Tunnel Redundancy of \$18.5 million, Southern Extra High Redundancy and Storage of \$13.5 million, Local Water System Assistance Program of \$11.7 million, and Deer Island Treatment Plant Asset Protection of \$11.1 million.

In FY18, 54 contracts or phases of projects with a total budget of \$287.5 million are expected to be awarded. Staff will be completing the design and progressing to the bid and award stage on several major projects such as Deer Island Treatment Plant (DITP) Clarifier Rehabilitation Phase 2 Construction, DITP HVAC Equipment Replacement Construction, DITP Gravity Thickener Rehabilitation, Southern Extra High Redundancy Pipeline Section 111 Construction 2 (recently awarded) and Construction 3, Metropolitan Tunnels Long-Term Redundancy Conceptual Design/Environmental Impact Report, Section 57 Water & 21/20/19 Sewer Design/Engineering Services During Construction (recently awarded), DITP Miscellaneous VFD Replacements Construction, Northern High Service Section 53 and 99 Connections Design Construction Administration/Resident Inspection, and DITP Sodium Hypochlorite & Bisulfite Tanks Rehabilitation. *Please see Attachment E for FY18 Planned Contract Awards.*

ATTACHMENT B
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Wastewater					
Interception & Pumping (I&P)	\$25,928	\$19,423	(\$6,505)	-25.1%	<u>Underspending</u> Chelsea Creek Headworks Upgrades Construction and REI: \$5.3M (NTP shifted 4 months; delayed start to resolve permitting issues) Caruso Pump Station Improvements Construction: \$0.3M (delayed installation of HVAC equipment due to unforeseen roof replacement) Wastewater Meter System - Equipment Replacement Planning/Study/Design: \$0.3M, Interceptor Renewal 1, Reading Extension Sewer - Construction: \$0.3M and Quincy/Hingham Pump Station Fuel Storage Upgrades - Construction: \$0.3M (schedule changes) Other smaller projects totaling \$0.6M. <u>Offset Overspending</u> Chelsea Screenhouse Upgrades Construction and ESDC/REI: \$0.6M (work scheduled for FY16 performed in FY17)
Treatment	\$18,113	\$25,002	\$6,889	38.0%	<u>Overspending</u> NMPS & WTF Butterfly Valve Replacement: \$2.5M (project progress) Primary & Secondary Clarifier Rehab - Construction: \$1.8M (Portion of \$2.65M settlement with contractor. Remainder was retainage payment.) Power System Improvements - Construction: \$1.7M (project progress) Clinton Wastewater Treatment Plant Phosphorus Reduction - Construction and ESDC: \$1.2M (project progress) Digested Sludge Pump Replacement - Phase 2: \$0.9M (project progress) Electrical Equipment Upgrades Construction 4: \$0.7M (work scheduled and budgeted for FY16 performed in FY17) Gravity Thickener Rehab: \$0.5M (schedule change) Scum Skimmer Replacement: \$0.3M (payment of punch list items) WTF VFD Replacement - Construction: \$0.2M <u>Offset Underspending</u> Clinton Roofing Rehabilitation: \$1.1M and Gravity Thickener Rehab: \$0.5M (schedule changes) NMPS & WTF Butterfly Valve Replacement ESDC/REI: \$0.2M (less than anticipated need for services) Other smaller projects totaling \$1.1M.

ATTACHMENT B
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Residuals	\$400	\$0	(\$400)	-	Residuals Facility Upgrades - Construction: \$0.4M (schedule change)
CSO	\$7,116	\$7,001	(\$115)	-1.6%	<u>Overspending</u> Cambridge Sewer Separation: \$0.6M (updated final costs and rescheduling of work by City of Cambridge) Dorchester Bay Sewer Separation (Fox Point): \$0.4M: (final cost adjustments) <u>Offset Underspending</u> Dorchester Bay Sewer Separation (Commercial Point): \$0.6M, Fort Point Channel Sewer Separation: \$0.4M and Reserved Channel Sewer Separation Design and Construction: \$0.2M (final cost adjustments)
Other Wastewater	\$18,817	\$13,377	(\$5,440)	-28.9%	<u>Underspending</u> I/I Local Financial Assistance: \$5.4M (less than anticipated requests for grants and loans). The annual CIP budget is based on prior average annual disbursements. Communities' requests for grants and loans are based on their own individual planned schedule of infiltration and inflow work and can vary greatly beyond the Authority's control.
Total Wastewater	\$70,374	\$64,803	(\$5,571)	-7.9%	

ATTACHMENT B
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Waterworks					
Drinking Water Quality Improvements	\$2,991	\$1,003	(\$1,988)	-66.5%	<u>Underspending</u> CP7 Existing Facilities: \$1.4M (updated schedule for Marlborough Maintenance Facility and balancing credit change order for Southborough Water Quality Laboratory Upgrades) Spot Pond Covered Storage Facility: \$0.2M (Microwave tower installed. Installation of communication shelter ongoing.) Other smaller projects totaling \$0.4M.
Transmission	\$27,733	\$28,414	\$680	2.5%	<u>Overspending</u> Wachusett Aqueduct Pump Station Construction and ESDC/REI: \$2.4M (project progress) Hatchery Pipeline Construction and ESDC/REI: \$0.6M (project progress) Other smaller projects totaling \$0.2M. <u>Offset Underspending</u> Sudbury Aqueduct - MEPA Review: \$1.0M (reduced scope of work) Watershed Land Acquisition: \$0.8M (timing of land purchases) Rosemary Brook Siphon Building Repair: \$0.4M (anticipated time extension due to additional restoration work) Weston Aqueduct Flow Control Valve: \$0.3M (work transferred to CEB)

ATTACHMENT B
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Distribution & Pumping	\$34,920	\$22,569	(\$12,351)	-35.4%	<u>Underspending</u> NIH Section 89/29 Redundancy Phase 1C and Phase 2 Construction: \$10.6M SEH Redundancy Pipeline Section 111 Phase 2 and Phase 3 - Construction: \$4.2M (schedule changes) and Phase 1 - Construction: \$0.9M (award under budget) Chestnut Hill Gatehouse No. 1 Repairs - Construction: \$1.0M (schedule change) Section 80 Replacement - Construction: \$0.3M (construction timed with water shutoff of partially served communities) Weston Aqueduct Supply Mains Section 36/C/S9 - A11 Valve: \$0.2M (anticipated credit change order for less than estimated quantities of rock and contaminated soil, and timing of valve installation work) Valve Replacement Equipment Purchase: \$0.2M (purchases to made from CEB if needed) Other smaller projects totaling \$0.3M. <u>Offset Overspending</u> NIH Section 89/29 Redundancy Phase 1B Construction and Design/ESDC: \$4.1M (project progress) Section 4 Webster Ave Bridge Pipe Rehab - Construction: \$1.3M (additional change order work based on redesign)
Other Waterworks	\$7,365	\$11,325	\$3,960	53.8%	<u>Overspending</u> Local Water System Assistance Program: \$4.4M (more than anticipated community requests for loans. The annual CIP budget is based on prior average annual disbursements. Communities' requests for loans are based on their own individual planned pipeline lining and/or replacement work and can vary greatly beyond the Authority's control.) <u>Offset Underspending</u> Waterworks SCADA/PLC Upgrades: \$0.3M (schedule change)
Total Waterworks	\$73,009	\$63,311	(\$9,699)	-13.3%	

ATTACHMENT B
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Business & Operations Support					
Total Business & Operations Support	\$11,943	\$5,075	(\$6,868)	-57.5%	<u>Underspending</u> MIS Projects: \$3.3M (timing of IT Strategic Plan implementation) As-Needed Design: \$1.2M (less than budgeted use of these contracts) Vehicle Purchases: \$1.0M and Major Lab Instrumentation: \$0.3M (timing of purchases) Security Equipment: \$.9M (schedule change)
Total MWRA	\$155,327	\$133,189	(\$22,137)	-14.3%	

**ATTACHMENT C
FY17 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)**

Project	Subphase	NTP	FY18 Final	FY17 Budget	Award Amount	Vendor	Schedule Change Reason Code*
Facility Asset Protection	Prison Point Rehabilitation - Design/Construction Administration/Resident Inspection	Jul-16	Aug-16	\$ 2.5	\$ 2.8	Arcadis U.S., Inc.	1
Facility Asset Protection	Chelsea Creek Upgrades - Construction	Jul-16	Nov-16	62.0	72.9	Barletta Heavy Division/Barletta Engineering Corporation, A Joint Venture	1
New Connect Mains-Shaft 7 to WASM 3	CP3 (Sect 23,24,47) - Final Design/Construction Administration/Resident Inspection	Jul-16	Jul-16	3.0	3.5	Green International Affiliates, Inc.	1
Chestnut Hill Connecting Mains	Chestnut Hill Gatehouse # 1 Repairs Construction	Jul-16	Sep-17	1.0			3 & 6
NIH Redundancy & Storage	Section 89 & 29 Redundancy Construction Phase 2	Jul-16	Jun-17	18.2	22.7	Albanese D&S, Inc.	1
Winsor Station Pipeline Improvements	Shaft 12 Isolation Gate Design CA/RI	Jul-16	Mar-17	2.2	1.7	Arcadis, U.S., Inc.	1
Sudbury/Weston Aqueduct Repairs	Weston Aqueduct Flow Control Valve	Jul-16	Project done in the CEB.	0.4			2
Sudbury/Weston Aqueduct Repairs	Evaluation of Farm Pond Buildings-Waban Arches	Jul-16	Jul-16	0.1	0.3	Green International Affiliates, Inc.	1
Application Improvements Program	Pre-Treatment Information Management Systems (PIMS) Enhancements	Sep-16	Jan-19	0.4			6
Facility Asset Protection	Cambridge Branch 23, 24, 26, 27 - Study	Sep-16	Oct-16	1.0	0.7	Hazen and Sawyer, P.C.	1
NHS - Revere & Malden Pipeline Improvements	Section 53 and 99 Improvements Study (Design CA/RI now)	Sep-16	Nov-17	0.4			3 & 7
Metropolitan Redundancy Interim Improvements	Commonwealth Ave Pump Station Redundancy-Design/Construction Administration/Resident Inspection	Sep-16	Jan-17	0.8	2.8	Black & Veatch Corporation	1
SEH Redundancy & Storage	Redundancy Pipeline Sect III - Construction 2	Sep-16	Jul-17	10.8			3 & 4
Quabbin Transmission System	Chicopee Valley Aqueduct Motorized Screens Replacement-Construction	Sep-16	Jan-17	1.0	1.0	W.M. Schultz Construction	1
Wastewater Meter System-Equipment Replacement	Planning / Study / Design	Oct-16	Jun-17	2.7	3.9	RJN Group, Inc.	1
Residuals Asset Protection	Residuals Facility Upgrades - Construction	Oct-16	Jul-17	10.0			3 & 7
Central Monitoring System	Waterworks Supervisory Control and Data Acquisition System (SCADA)/Program Logic Controller (PLC) Upgrades (Comm. Ave PS Programming and Configuration initial phase awarded)	Oct-16	Oct-16	18.5	0.1	McInnis Consulting Services, Inc.	1

**ATTACHMENT C
FY17 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)**

Project	Subphase	NTP	FY18 Final	FY17 Budget	Award Amount	Vendor	Schedule Change Reason Code*
Section 80 Rehabilitation	Section 80 Replacement	Oct-16	Dec-16	0.7	1.8	P. Caliacco Corporation	1
Corrosion & Odor Control	Nut Island Headworks Odor Control and HVAC Improvements Design/Construction Administration/Resident Engineer Inspection	Nov-16	Mar-17	2.8	5.7	Hazen and Sawyer, P.C.	1
Facility Asset Protection	Sections 4, 5, 6, 186 - Study	Nov-16	Feb-17	1.5	1.2	Hazen and Sawyer, P.C.	1
Facility Asset Protection	Hingham/Quincy PS Fuel Storage Upgr. Constuction	Nov-16	May-17	0.5	0.5	MECO Environmental Services, Inc.	1
DI Treatment Plant Asset Protection	Cathodic Protection - Design/ESDC	Nov-16	Oct-17	1.0			3 & 7
DI Treatment Plant Asset Protection	Barge Berth and Facility Replacement (Personel Dock Repair)	Nov-16	Feb-17	2.3	1.3	Coastal Marine Construction LLC	1
DI Treatment Plant Asset Protection	North Main Pump Station Motor Control Center Phase 2 Design/Engineering Services During Construction/Resident Inspection	Nov-16	Jan-17	2.5	2.5	AECOM	1
DI Treatment Plant Asset Protection	Gravity Thickener Rehabilitation	Nov-16	Apr-18	14.1			3 & 7
DI Treatment Plant Asset Protection	Combined Heat & Power Alternatives Study (originally Design)	Dec-16	Oct-17	6.0			3 & 7
Clinton Wastewater Treatment Plant	Clinton Roofing Rehabilitation	Dec-16	Sep-17	1.2			3 & 7
SEH Redundancy & Storage	Redundancy Pipepline Section III - Construction 3	Dec-16	Oct-17	7.4			3 & 4

July 2016 - December 2016

28 Contracts Planned (17 contracts awarded)

\$ 174.9 \$ 125.5

Facility Asset Protection	Interceptor Renewal 3 Dorchester Interceptor Sewer Design Construction Administration/Resident Inspection	Jan-17	Apr-17	1.0	1.5	CDM Smith Inc.	1
DI Treatment Plant Asset Protection	Eastern Seawall Design - 1	Jan-17	Apr-18	0.6			3 & 6
DI Treatment Plant Asset Protection	HVAC Equipment Replacement - Construction	Jan-17	Jan-18	29.5			3 & 7
NIH Redundancy & Storage	Section 89 & 29 Rehabilitation - Design	Jan-17	Oct-17	1.5			3 & 4
Winsor Station Pipeline Improvements	Winsor Power Station Final Design/Construction Administration/Resident Inspection	Jan-17	Jan-18	1.9			3 & 5
Facility Asset Protection	Interceptor Renewal 1, Reading Extension Sewer - Construction	Mar-17	May-17	4.3	2.0	Green Mountain Pipeline Services, Inc.	1
DI Treatment Plant Asset Protection	HVAC Equipment Replacement Resident Engineer Inspection	Mar-17	Jan-18	2.0			3 & 7
DI Treatment Plant Asset Protection	Switchgear Replacement - Construction	Apr-17	Sep-18	8.0			7
Distribution Systems Facilities Mapping	Update of Record Drawings	Apr-17	Apr-19	0.5			5
DI Treatment Plant Asset Protection	Expansion Joint Repair - Construction 3	May-17	Mar-18	1.9			3 & 7
DI Treatment Plant Asset Protection	Future Miscellaneous Variable Frequency Drives Replacements - Construction	May-17	Jul-17	5.3			3 & 5

**ATTACHMENT C
FY17 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)**

Project	Subphase	NTP	FY18 Final	FY17 Budget	Award Amount	Vendor	Schedule Change Reason Code*
DI Treatment Plant Asset Protection	Odor Control Rehabilitation - Design/Engineering Services During Construction	Jun-17	Mar-21	5.2			6
DI Treatment Plant Asset Protection	Sodium Hypochlorite and Bisulfite Tanks Rehabilitation	Jun-17	Oct-17	5.0			3 & 6

January 2017 - June 2017 **13 Contracts Planned (2 contracts awarded)** \$ 66.8 \$ 3.5

41 FY17 Contract Awards Planned \$ 241.6 \$ 129.1

Unplanned Awards

Facility Asset Protection	Prison Point Piping Rehabilitation	Jun-16	Oct-16	\$ 0.4	\$ 0.5	John Danforth, Inc.	1
Facility Asset Protection	Chelsea Headworks Resident Engineering/ Inspection	Jun-16	Nov-16	3.7	3.6	CDM Smith, Inc.	1
Central Monitoring	Utility Fees and Permits	Jul-16	Jul-16	0.7	0.2	Verizon Business Network Services	1
MetroWest Tunnel	Shaft 5A/5 Surface Piping Cathodic Protection	May-16	Nov-16	0.2	0.1	CorrTech Inc.	1
NIH Redundancy & Storage	Section 89 & 29 Redundancy Construction Phase 1C	Jun-16	Jan-17	17.2	17.8	Albanese D&S, Inc.	1
DI Treatment Plant Asset Protection	DI Rip Rap Material		Mar-17	0.0	0.2	Lorusso Corp	1
Carroll Water Treatment Plant	CP-7 Existing Facilities Modifications (Marlborough Maintenance facility)	Sep-16	May-17	2.6	3.4	E.A Colangeli Co., Inc	1
Technical Assistance	Technical Assistance Consulting Services - Surveying		May-17	0.1	0.1	Bryant Associates	1
Peabody Pipeline Project	Peabody Pipeline Section 109 Extension Design ESDC/REI		Jun-17	0.0	3.5	CDM Smith, Inc.	1
Technical Assistance	Appraisal Services		Jun-17		0.1	Colliers Internation Holdings, Inc.	1
Technical Assistance	Appraisal Services		Jun-17		0.1	Foster Appraisal & Consulting Co.	1

Total Unplanned (11 contracts) \$ 25.0 \$ 29.6

Total of 30 contracts awarded through June 2017 \$ 158.7

Note: Of the unplanned 11 contracts, 5 were planned to be awarded in FY16

*** Reason Codes:**

1. NTP issued in FY17.
2. Project/Phase eliminated or being performed in-house; or phase completed but on hold.
3. NTP expected in FY18
4. Schedule change due to permitting.
5. Scope changes.
6. Changes in priorities.
7. Bidder Issue/Outside Design Delay/Contractor issue

ATTACHMENT D

**Linear Footage Of Rehabilitated Or New Pipelines
FY17 (July 2016-June 2017)**

	<u>Contract #</u>	<u>Type</u>	<u>Linear Feet</u>
<u>WASTEWATER PROJECTS</u>			
Clinton Phosphorus Reduction Construction	7411	New	560
<u>WATERWORKS PROJECTS</u>			
NIH Section 110 Reading CP2	7471	New	5,790
NIH Section Stoneham CP-3	7478	New	3,133
Hatchery Pipeline and Hydroelectric Construction	7235	New	4,760
SEH Section 111 CP-1	6454	New	4,677
Wachusett Aqueduct Pump Station	7157	New	2,180
Section 4 Webster Avenue Pipe Replacement Construction	7335	New	1,034
Beacon Street Line Repair	7532	New	20
	7532	Rehab	72
Weston Aqueduct Supply Mains Section 36/W11/S9-A11 Valve	7448	New	20
<u>TOTAL PIPELINE REHABILITATED OR CONSTRUCTED IN FY17</u>			
	<u>Linear Feet</u>		<u>Miles</u>
Wastewater Projects	560		0.1
Water Projects	<u>21,686</u>		<u>4.1</u>
Total	22,246		4.2

ATTACHMENT E
FY18 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)

Project	Contract No.	Subphase	Notice to Proceed	Total Contract Amount
Residuals Asset Protection	7153	Mechanical Improvements	Jul-17	\$ 2.0
DI Treatment Plant Asset Protection	7131	Misc. VFD Replacement Construction	Jul-17	5.3
NHS - Revere & Malden Pipeline Improvements	6957	Sect 14 Water Pipeline Relocate (Malden)	Jul-17	1.3
Northern Low Service Rehabilitation Section 8	7540	Sec 57 Water & 21/20/19 Sewer Design/Engineering Services During Construction/Resident Engineer Inspection	Jul-17	5.8
SEH Redundancy & Storage	7504	Redundancy Pipeline Section 111 - Construction 2	Jul-17	15.2
Residuals Asset Protection	7151	Sludge Tank & Silo Coating	Aug-17	0.8
Applications Improvements Program	7438	Enterprise Content Mgmt	Sep-17	4.0
Information Security Program ISP	7440	Electronic Security Plan Implementation	Sep-17	0.5
Facility Asset Protection	7237	Headworks Effluent Shaft - Study	Sep-17	0.5
Facility Asset Protection	7551	Wiggins Term Pump Station Design	Sep-17	0.5
Facility Asset Protection	7553	Fuel Oil Tank Replacement Design	Sep-17	1.5
Residuals Asset Protection	7152	Electrical Improvements	Sep-17	2.2
Clinton Wastewater Treatment Plant	7450	Clinton Roofing Rehabilitation	Sep-17	1.2
Chestnut Hill Connecting Mains	7382	Chestnut Hill Gatehouse # 1 Repair Construction	Sep-17	1.0
Waterworks Facility Asset Protection	7022	Cosgrove/Gillis Pump Station/Cottage Farm CSO Flat Roof Replacement	Sep-17	0.9
CSO Support	7572	CSO Performance Assessment	Oct-17	3.0
Braintree-Weymouth Relief Facilities	7326	Mill Cove Siphon Sluice Gates - Design	Oct-17	0.8
Corrosion & Odor Control	7365	NI Mechanical & Electrical Upgrades Design/Construction Administration/Resident Engineering Inspection	Oct-17	1.6
Facility Asset Protection	7361	DeLauri Pump Station Screens Gates Valves & Security	Oct-17	1.1

ATTACHMENT E
FY18 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)

Project	Contract No.	Subphase	Notice to Proceed	Total Contract Amount
206 DI Treatment Plant Asset Protection	6880	Cathodic Protection - Design/Engineering Services During Construction	Oct-17	1.4
DI Treatment Plant Asset Protection	6963	Combined Heat and Power Alternatives Study	Oct-17	0.8
DI Treatment Plant Asset Protection	7449	Sodium Hypochlorite&Bisulfite Tanks Rehabilitation	Oct-17	5.0
NIH Redundancy & Storage	7116	Section 89 & 29 Rehabilitation - Design	Oct-17	3.2
SEH Redundancy & Storage	7505	Redundancy Pipeline Section 111 - Construction 3	Oct-17	10.0
Watershed Division Capital Improvements	7569	Quabbin Administration Building Conceptual Design Report	Oct-17	0.2
DI Treatment Plant Asset Protection	7167	Gas Protection System Replacement	Nov-17	2.0
NHS - Revere & Malden Pipeline Improvements	7485	Sect 53 and 99 Connections-Design Construction Administration/Resident Inspection	Nov-17	5.2
Central Monitoring System	7581	CWTP SCADA Upgrades Design Programing Resident Engineering	Nov-17	2.2
Facility Asset Protection	7162	Pump Stations & CSOs Condition Assessment	Dec-17	3.3
Residuals Asset Protection	7173	Pellet Piping - Relocate	Dec-17	3.0
Clinton Wastewater Treatment Plant	7372	Valves & Screw Pumps Replacement	Dec-17	1.5
July 2017 - December 2017		31 Contracts Planned		\$ 87.0
Braintree-Weymouth Relief	9586	B/W Improvements - Design/Construction Services/Resident Inspection	Jan-18	0.8
Wastewater Central Monitoring	7578	Design & Programming Services	Jan-18	3.5
Facility Asset Protection	7515	Interceptor Renewal 5 Milton - Design Construction Administration/Resident Inspection	Jan-18	2.0
DI Treatment Plant Asset Protection	7094	HVAC Equipment Replacement Resident Engineering Inspection	Jan-18	2.0
DI Treatment Plant Asset Protection	7110	HVAC Equipment Replacement - Construction	Jan-18	38.8

ATTACHMENT E
FY18 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)

Project	Contract No.	Subphase	Notice to Proceed	Total Contract Amount
DI Treatment Plant Asset Protection	7126	South System Pump Station VFD Replacement Design/Engineering Services During Construction	Jan-18	4.8
South Spine Distribution Mains	7155	Section 22 North - Facility Plan/Environmental Impact Report	Jan-18	1.0
Carroll Water Treatment Plant	7543	Technical Assistance 9	Jan-18	0.6
Carroll Water Treatment Plant	7544	Technical Assistance 10	Jan-18	0.6
Waterworks Facility Asset Protection	6832	Steel Tank/Impr Des CA/RI	Jan-18	3.0
Winsor Station Pipeline Improvements	7460	Winsor Power Station Final Design/Construction Administration/Resident Inspection	Jan-18	4.4
Watershed Division Capital Improvements	7577	Maintenance Garage/Wash Bay/Storage Building Construction	Jan-18	2.3
DI Treatment Plant Asset Protection	6705	Expansion Joint Repair - Construction 3	Mar-18	2.0
NHS - Revere & Malden Pipeline Improvements	7536	Sec 56 Pipe Demolition Construction	Mar-18	0.6
Metro Tunnel Redundancy	7159	Conceptual Design Engineering Impact Report	Mar-18	7.5
DI Treatment Plant Asset Protection	6723	Eastern Seawall Design/Engineering Services During Construction/Resident Engineering Inspection	Apr-18	0.7
DI Treatment Plant Asset Protection	7428	Gravity Thickener Rehab	Apr-18	16.9
NHS - Revere & Malden Pipeline Improvements	7454	Section 56 Replacement/Saugus Design Construction Administration/Resident Inspection	Apr-18	2.0
New Connect Mains-Shaft 7 to WASM 3	6955	Replacement Section 25, 75, 59 & 60 Design Construction Administration/Resident Inspection	Apr-18	3.0
Wastewater Central Monitoring	7580	Equipment/Hardware	Apr-18	2.1
Metropolitan Redundancy Interim Improvements	7560	Tops of Shafts Design/Construction Administration/Resident Inspection	Apr-18	1.6

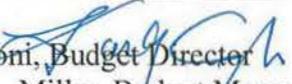
ATTACHMENT E
FY18 PLANNED CAPITAL CONTRACT AWARDS (\$ in Millions)

Project	Contract No.	Subphase	Notice to Proceed	Total Contract Amount
DI Treatment Plant Asset Protection	7395	Clarifier Rehabilitation Phase 2 - Construction	Jun-18	100.0
Sudbury/Weston Aqueduct Repairs	7491	Ash Street Sluice Gates - Design	Jun-18	0.4
January 2018 - June 2018		23 Contracts Planned		\$ 200.4
Total FY18		54 Contract Awards Planned		\$ 287.5

STAFF SUMMARY

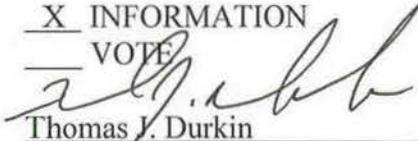
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: FY17 Year-End Financial Update and Summary

COMMITTEE: Administration, Finance & Audit


Kathy Soni, Budget Director
Louise L. Miller, Budget Manager
Preparer/Title

X INFORMATION

VOTE


Thomas J. Durkin
Director, Finance

RECOMMENDATION:

For information only. This staff summary provides the financial results and variance highlights for Fiscal Year 2017, based on the audited fiscal year-end financial close.

DISCUSSION:

The total FY17 year-end variance is \$15.1 million due to lower direct expenses of \$5.8 million, lower debt service of \$1.8 million (after \$25.0 million defeasance), lower indirect expenses of \$0.6 million, and higher revenues of \$6.9 million.

\$4.8 million of the surplus was due to unbudgeted revenue for additional water sales related to the drought. Per the Advisory Board's recommendation, these funds will be used to partially fund the lead services line removal loan program, thus benefiting the water customers. Also, \$391,580 in state Debt Service Assistance received in May was applied against the FY18 budget.

Staff are recommending that the remaining approximately \$10 million of the FY17 surplus be used to defease debt to provide targeted rate relief for communities in future challenging years. This rate management strategy has proven to be very effective in the past few years in managing assessment increases over time. The proposed defeasance scenario is being presented to the Board at this meeting in a separate staff summary.

FY17 Current Expense Budget

The expense variances for the fiscal year 2017 by major budget category were:

- Net Lower Direct Expenses of \$5.8 million, or 2.6%. Spending was lower primarily for Wages and Salaries, Utilities, Other Services, Fringe Benefits, Other Materials, Maintenance, and Training & Meetings. This was offset by higher spending for Overtime, Worker's Compensation, Professional Services, and Chemicals.

- Lower Debt Service of \$1.8 million, or 0.4%, for favorable short-term interest rates, less than budgeted State Revolving Fund, later than anticipated new borrowing, the favorable impact of the August 2016 refunding, and receipt of unbudgeted Debt Service Assistance of \$391,580.
- Lower Indirect Expenses of \$0.6 million, or 0.5%, for lower Watershed reimbursements and Insurance costs.

FY17 Budget and FY17 Actual Year to Date Variance by Expenditure Category

	FY17 Budget YTD	FY17 Actual YTD	\$ Variance	% Variance
Direct Expenses	\$226.5	\$220.7	-\$5.8	-2.6%
Indirect Expenses	\$38.0	\$37.3	-\$0.6	-1.7%
Debt Service	\$455.1	\$453.4	-\$1.8	-0.4%
Total	\$719.6	\$711.4	-\$8.2	-1.1%

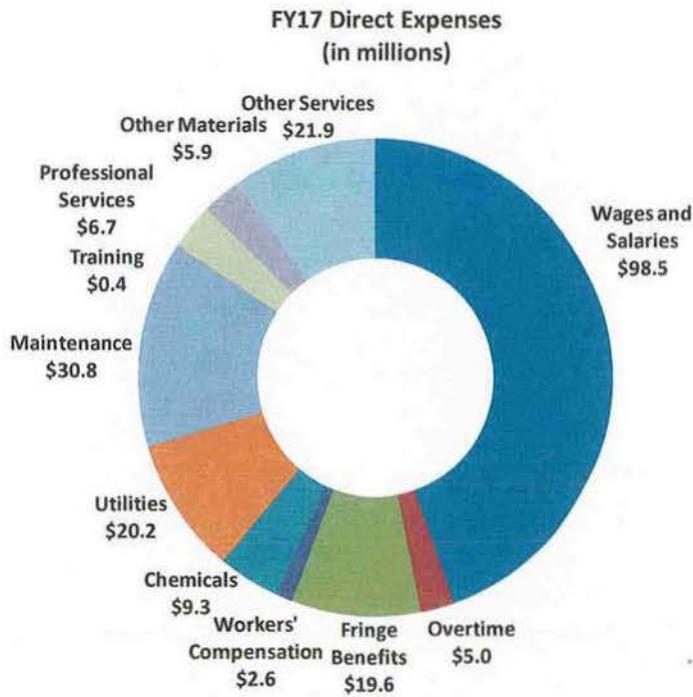
Totals may not add due to rounding

Total Revenues of \$726.5 million were \$6.9 million over budget reflecting \$4.8 million receipt for water usage related to the drought; \$1.1 million for an insurance payment received for the Nut Island fire incident; \$528,000 for disposal of surplus material; \$299,000 for a class action lawsuit settlement for derivative agreements; \$285,000 of investment income; and \$248,000 for energy efficiency incentives from the utility companies. This is offset by lower RPS credits at Deer Island of \$294,000.

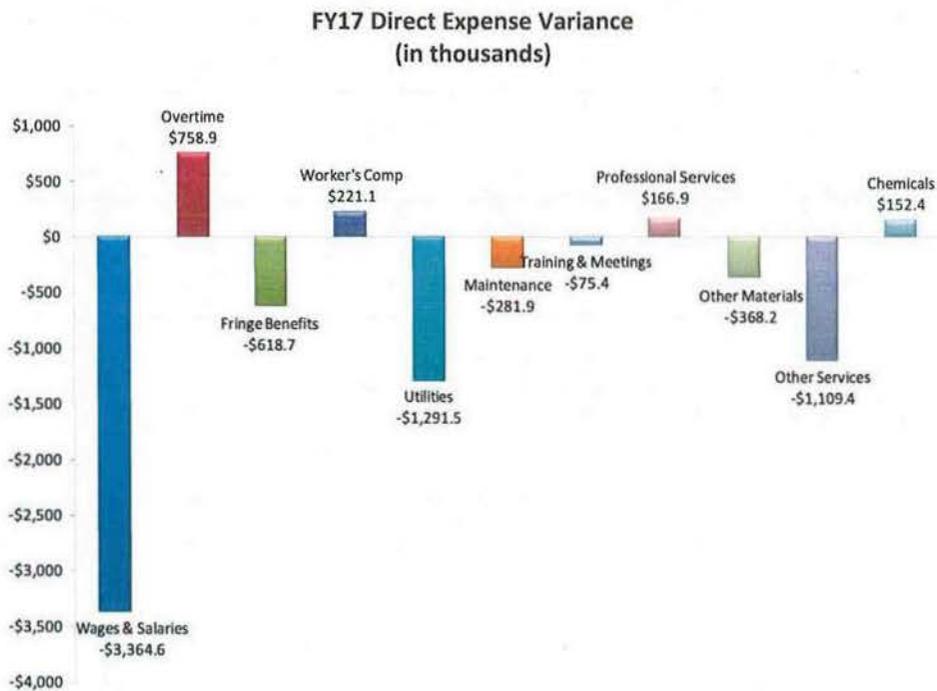
Please refer to Attachment 1 for a more detailed comparison by line item of the budget variances for the year to date.

Direct Expenses

Year-to-date direct expenses totaled \$220.8 million, \$5.8 million, or 2.6%, less than budgeted.



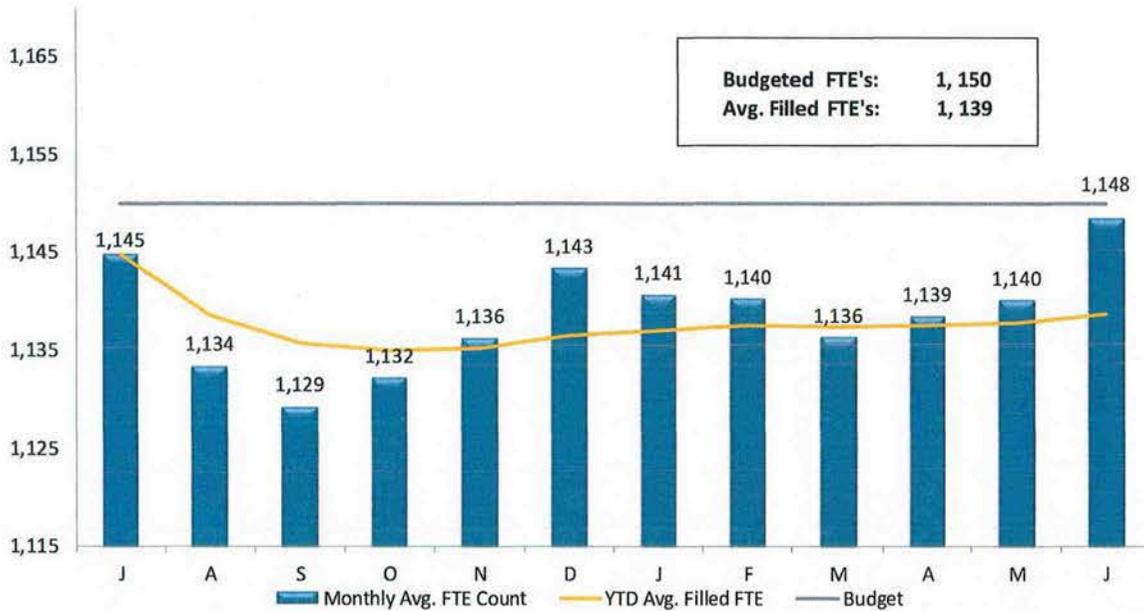
Lower than budgeted spending in Wages and Salaries, Utilities, Other Services, Fringe Benefits, Other Materials, Maintenance, and Training & Meetings, was offset by higher spending for Overtime, Worker's Compensation, Professional Services, and Chemicals.



Wages and Salaries

Wages and Salaries were under budget by \$3.4 million, or 3.3%, mainly as a result of lower average Full Time Equivalent positions (FTEs) than budgeted, the timing of backfilling vacant positions, the salary mix differential between staff retiring and new hires, and lower than budgeted leave balance accruals. The average FTEs for FY17 were 1,139, which was 11 positions lower than the 1,150 FTEs budgeted.

FY17 MWRA Full Time Equivalent (FTE) Position Trend



Utilities

Utilities were under budget by \$1.3 million or 6.0%. The major driver of the underspending was \$1.6 million in electricity cost due to self-generation of power during the HEEC cable location work and lower than budgeted pricing. As of year-end, the lower volume variance at Deer Island was approximately \$748,000, and the lower unit pricing from Direct Energy and Eversource have yielded a favorable price variance of \$715,000. Diesel Fuel was overspent by \$381,000 primarily due to an additional delivery of diesel fuel at Deer Island totaling \$817,000 for self-generation of power at Deer Island for HEEC cable work, offset by lower pricing and lower usage than budgeted of \$436,000 primarily in Wastewater Operations.

Other Services

Other Services spending was lower than budget by \$1.1 million, or 4.8%, due to lower spending of \$418,000 for sludge pelletization services because of lower quantities, and \$98,000 for Grit and Screenings disposal services also primarily due to lower quantities; \$219,000 for Space/Lease Rentals due to lower escrow payments at the Chelsea Facility for taxes and

insurance, and lower than budgeted pass-through maintenance costs at the Charlestown Navy Yard Facility; \$207,000 for Other Services primarily for timing of community lead service assistance; and \$198,000 for lower telephone costs than budgeted associated with the slower than anticipated activation of new high speed data lines due to Verizon staffing issues.

Fringe Benefits

Fringe Benefit spending was lower than budgeted by \$619,000, or 3.1%, primarily for lower Health Insurance costs of \$631,000 due to fewer employees and retirees than budgeted participating in health insurance plans, and the shift from family to individual plans.

Other Materials

Other Materials was lower than budgeted by \$368,000, or 5.9%, mainly due to Vehicle Expenses of \$268,000 due to lower than budgeted fuel prices; Computer Hardware of \$255,000 due to timing of purchases; and Computer Software of \$43,000. This is offset by higher spending for Lab and Testing Supplies of \$120,000; Work Clothes of \$38,000; and Health and Safety of \$31,000.

Training & Meetings

Training & Meetings was underspent by \$75,000 or 17.3%, primarily in Fleet Services due to timing of training (scheduled third-party trainer was not available as expected).

Overtime

Overtime expenses were higher than budgeted by \$759,000 or 18.1%, mainly at Deer Island related to the HEEC cable relocation project, and more wet weather events than anticipated, Metro Maintenance related to off-hour maintenance work and wet weather events, Metro Water Operations for coverage, Water Valve maintenance for off hour work, and Wastewater Operations for wet weather events. Some examples of off-hour maintenance work were replacing electric cable trays and wiring for pumps at the Chestnut Hill Underground Pump Station, Reservoir Road electrical switchgear replacement, carpet replacement at the Chelsea Administration building, and rollout of the MAXIMO upgrade.

Professional Services

Professional Services was overspent by \$166,000, or 2.6%. Within Professional Services, Legal Services was overspent primarily in the Law Division for the third-party opinion associated with the negotiations pertaining to the new cross-harbor electric cable. This was offset by underspending in Other Services mainly in Finance for finance/investment services; and Engineering primarily in Emergency Preparedness.

Worker's Compensation

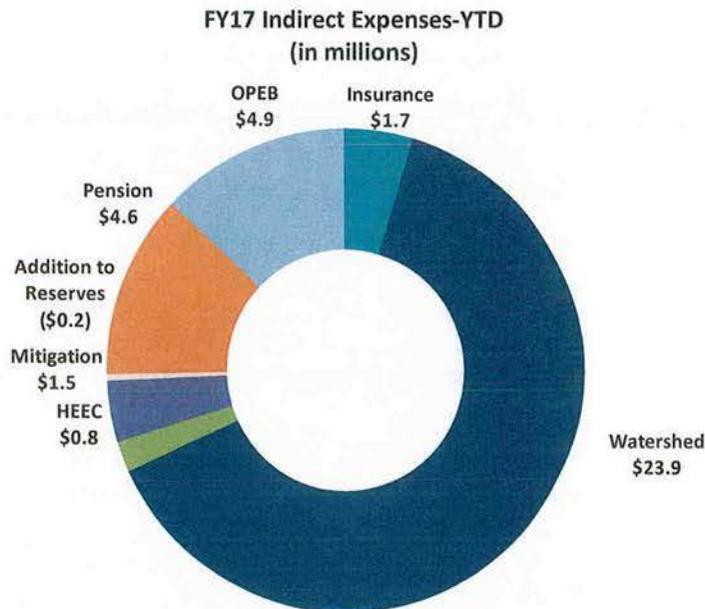
Year-to-Date Worker's Compensation expenses were higher than budget by \$221,000, or 9.4%. For the year, compensation payments were higher than budgeted by \$537,000, offset by lower medical payments of \$452,000. For the month of June, actual costs were \$156,000 higher than budgeted due to increasing the reserve for third-party costs by \$136,000.

Maintenance

Maintenance was underspent by \$282,000, or 0.9%. Within maintenance, the Nut Island fire incident which was not budgeted this year, accounted for \$178,000 in overspending. Excluding the Nut Island fire incident, maintenance was underspent by approximately \$460,000, or 1.5%. Some of the underspending is attributed to timing of the door replacement project at Deer Island, painting and coating contract at Clinton, the timing of purchase of various materials, contracts for electrical services and timing of instrumentation services.

Indirect Expenses

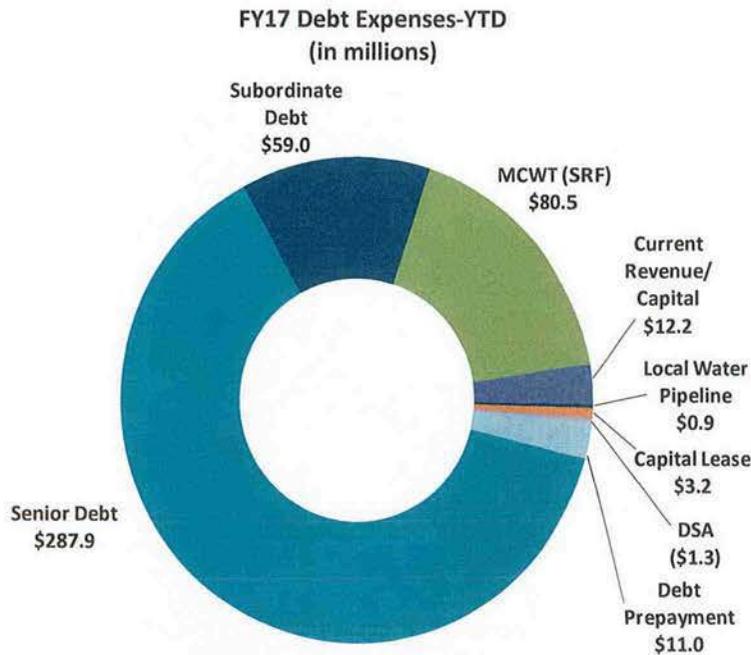
For the fiscal year, Indirect Expenses totaled \$37.3 million, \$638,000 or 1.7% lower than budgeted, due to lower Watershed costs of \$380,000 partly resulting from an over-accrual in FY16 of \$55,000 for lower Watershed management operating expenses; lower than budgeted insurance costs of \$258,000; and lower PILOT payments of \$181,000.



Debt Service

Debt Service expenses include the principal and interest payment for fixed debt, the variable subordinate debt, the Massachusetts Clean Water Trust (SRF) obligation, the commercial paper

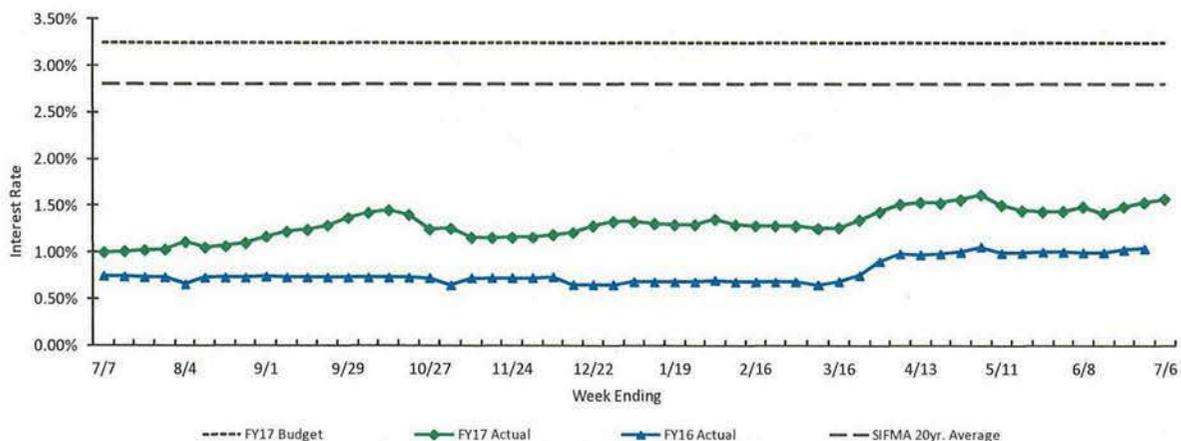
program for the local water pipeline projects, current revenue for capital, and the Chelsea facility lease payment.



Debt Service expenses for the fiscal year totaled \$453.4 million, which was \$1.8 million less than budgeted after a \$25.0 million defeasance executed in June. The short-term rates related variance was \$14.3 million. Additionally, the Authority recognized \$12.0 million in underspending that is the result of the favorable impact of the August 2016 refunding, lower SRF funding than planned, and delaying the senior debt borrowing to May versus January. The Authority also received \$391,580 in unbudgeted Debt Service Assistance.

The graph below reflects the FY17 actual variable rate trend by week over the past year against the FY17 Budget.

**Weekly Average Interest Rate on MWRA Variable Rate Debt
(Includes liquidity support and remarketing fees)**



Revenue & Income

Total Revenue for the fiscal year was \$726.5 million, \$6.9 million or 1.0% higher than budget.

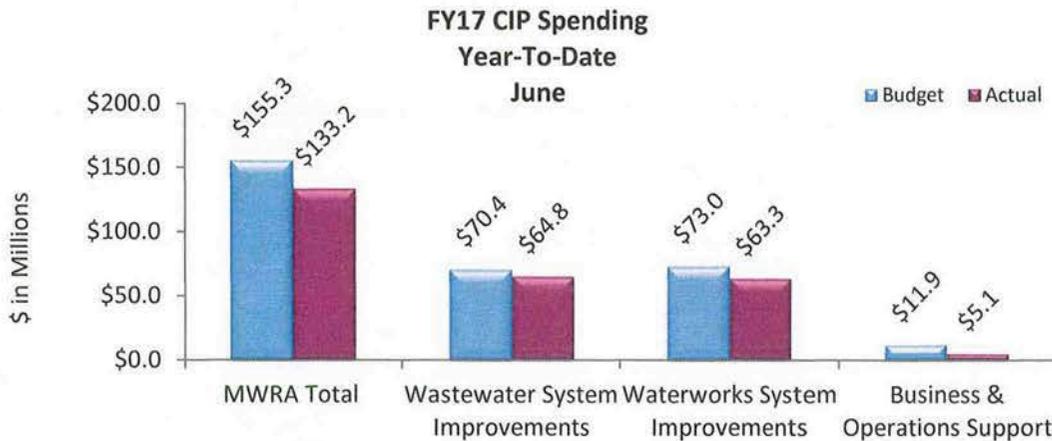
The higher than budgeted non-rate Revenue was driven by the receipt \$4.8 million for water usage related to the drought; \$1.1 million for an insurance payment received for the Nut Island fire incident; \$528,000 for the disposal of surplus materials; \$299,000 for a class action lawsuit settlement for derivative agreements; and \$248,000 for energy efficiency incentives from the utility companies. Investment Income is over budget by \$285,000 as result of higher short-term rates offset by losses on unanticipated bond calls.

Please refer to Attachment 2 for a more detailed variance explanation by line item.

FY17 Capital Improvement Program

Capital expenditures in FY17 total \$133.2 million through the end of June, \$22.1 million, or 14.3%, under budget.

After accounting for programs which are not directly under MWRA's control, most notably the Inflow and Infiltration (I/I) program, the Local Water Pipeline program, and the community managed Combined Sewer Overflow (CSOs) projects, capital spending totaled \$106.1 million, \$20.9 million, or 16.4%, under budget.



Overall underspending reflects the underspending of \$5.6 million in Wastewater Improvements, \$9.7 million in Waterworks Improvements, and \$6.9 million in Business and Operations Support.

FY17 Year-to-date spending By Program:

\$ in Millions	Budget	Actuals	\$ Var.	% Var.
Wastewater System Improvements				
Interception & Pumping	25.9	19.4	-6.5	-25.1%
Treatment	18.1	25.0	6.9	38.0%
Residuals	0.4	0.0	-0.4	N/A
CSO	7.1	7.0	-0.1	-1.6%
Other	18.8	13.4	-5.4	-28.9%
Total Wastewater System Improvements	\$70.4	\$64.8	-5.6	-7.9%
Waterworks System Improvements				
Drinking Water Quality Improvements	3.0	1.0	-2.0	-66.5%
Transmission	27.7	28.4	0.7	2.5%
Distribution & Pumping	34.9	22.6	-12.4	-35.4%
Other	7.4	11.3	4.0	N/A
Total Waterworks System Improvements	\$73.0	\$63.3	-9.7	-13.3%
Business & Operations Support	\$11.9	\$5.1	-6.9	-57.5%
Total MWRA	\$155.3	\$133.2	-22.1	-14.3%

Totals may not add due to rounding

The main reasons for the project spending variances in order of magnitude are:

Water Distribution and Pumping: Net underspending of \$12.4 million

- \$10.6 million for Section 89/29 Redundancy Phase 1C and 2 Construction and \$4.2 million for SEH Section 111 Construction Phase 2 and 3 for changes in schedules, and \$0.9 million for Phase 1 due to lower award than budgeted.
- \$1.0 million for Chestnut Hill Gatehouse No. 1 Repairs Construction due to schedule change.
- The underspending was partially offset by overspending of \$3.6 million for Section 89/29 Redundancy Phase 1B due to contractor progress and \$1.3 million for Spot Pond Supply Mains due to additional work for Webster Avenue Bridge Pipe Rehabilitation.

Wastewater Treatment: Net overspending of \$6.9 million

- \$1.8 million for Deer Island Primary/Secondary Clarifier Rehabilitation legal settlement.
- \$2.5 million for North Main Pump Station and Winthrop Terminal Facility Butterfly Valve Replacements, \$1.7 million for Deer Island Power System Improvements, \$0.9 million for Clinton Phosphorus Reduction Construction, and \$0.9 million for Digester Sludge Pump Phase 2 due to contractor progress.
- \$0.7 million for Electrical Upgrades Construction 4 and \$0.2 million for Secondary Reactor VFDs due to timing of final work in FY17 that had been budgeted in FY16.
- The overspending was partially offset by underspending of \$1.1 million for Clinton Roof Rehabilitation due to updated schedule.

Interception & Pumping: Net underspending of \$6.5 million

- \$5.3 million for Chelsea Creek Headworks Upgrades Construction and Engineering Services During Construction due to a later than budgeted Notice-to-Proceed date, \$0.3 million on Caruso Pump Station Improvements Construction for timing of final work and a balancing change order and other smaller projects totaling \$0.9 million.

Other Wastewater: Net underspending of \$5.4 million

- \$5.4 million for Community Infiltration/Inflow (I/I) due to less than anticipated requests for grants and loans.

Other Waterworks: Net overspending of \$4.0 million

- \$4.4 million for Local Water Community Assistance due to greater than budgeted community requests for loans.
- This overspending was partially offset by \$0.3 million underspending for updated schedule for Carroll Water Treatment Plant SCADA/PLC Upgrades.

Drinking Water Quality Improvements: Net underspending of \$2.0 million

- \$1.4 million for updated schedule for Marlborough Maintenance Facility and final balancing change order for Southborough Water Quality Laboratory Upgrades, and Spot Pond Covered Storage Facility Design/Build of \$0.2 million due to construction delays, and other smaller projects totaling \$0.4 million.

Waterworks Transmission: Net overspending of \$0.7 million

- \$2.4 million for Wachusett Aqueduct Pump Station Construction and Engineering Services During Construction and \$0.6 million for the Hatchery Pipeline Construction and Engineering Services During Construction due to contractor progress.
- The overspending was partially offset by 1.0 million for reduced scope of work for Sudbury Aqueduct MEPA review, \$0.8 million for timing of watershed land purchases, and \$0.4 million caused by less than anticipated progress for the Rosemary Brook Siphon Building Repairs due to delays in obtaining specialty items for work.

Residuals: Net underspending of \$0.4 million

- \$0.4 million for Residuals Upgrades construction due to updated schedules for sludge tank and silo coating, electrical and mechanical projects.

Combined Sewer Overflow: Net underspending of \$0.1 million

- Overspending of \$0.6 million primarily for Cambridge Sewer Separation Project due to updated costs of final work, offset by final cost adjustments for completed projects for South Dorchester Bay Sewer Separation Commercial and Fox Point, Fort Point Channel, and Reserved Channel projects totaling \$0.8 million.

Construction Fund Balance

The construction fund balance was at \$117.3 million as of the end of June. Commercial Paper availability was at \$222.0 million to fund construction projects.

Attachment 1 – Variance Summary June 2017

Attachment 2 – Current Expense Variance Explanations

Attachment 3 – Capital Improvement Program Variance Explanations

Attachment 4 – FY17 Budget vs. FY17 Projections

ATTACHMENT 1
FY17 Actuals vs. FY17 Budget

	June 2017 Year-to-Date					
	Period 12 YTD Budget	Period 12 YTD Actual	Period 12 YTD Variance	%	FY17 Approved	% Expended
EXPENSES						
WAGES AND SALARIES	\$ 101,858,897	\$ 98,494,291	\$ (3,364,606)	-3.3%	\$ 101,858,897	96.7%
OVERTIME	4,192,676	4,951,621	758,945	18.1%	4,192,676	118.1%
FRINGE BENEFITS	20,242,323	19,623,635	(618,688)	-3.1%	20,242,323	96.9%
WORKERS' COMPENSATION	2,344,190	2,565,336	221,146	9.4%	2,344,190	109.4%
CHEMICALS	9,110,407	9,262,849	152,442	1.7%	9,110,407	101.7%
ENERGY AND UTILITIES	21,541,077	20,249,594	(1,291,483)	-6.0%	21,541,077	94.0%
MAINTENANCE	31,080,642	30,798,709	(281,933)	-0.9%	31,080,642	99.1%
TRAINING AND MEETINGS	435,481	360,115	(75,366)	-17.3%	435,481	82.7%
PROFESSIONAL SERVICES	6,531,939	6,698,861	166,922	2.6%	6,531,939	102.6%
OTHER MATERIALS	6,219,630	5,851,449	(368,181)	-5.9%	6,219,630	94.1%
OTHER SERVICES	22,974,855	21,865,445	(1,109,410)	-4.8%	22,974,855	95.2%
TOTAL DIRECT EXPENSES	\$ 226,532,117	\$ 220,721,905	\$ (5,810,211)	-2.6%	\$ 226,532,117	97.4%
INSURANCE	\$ 1,997,898	\$ 1,739,542	\$ (258,356)	-12.9%	\$ 1,997,898	87.1%
WATERSHED/PILOT	24,291,268	23,911,694	(379,574)	-1.6%	24,291,268	98.4%
BEC _o PAYMENT	773,859	789,258	15,399	2.0%	773,859	102.0%
MITIGATION	1,558,000	1,542,800	(15,200)	-1.0%	1,558,000	99.0%
ADDITIONS TO RESERVES	(167,742)	(167,742)	-	0.0%	(167,742)	100.0%
RETIREMENT FUND	4,632,624	4,632,624	-	0.0%	4,632,624	100.0%
POST EMPLOYEE BENEFITS	4,876,050	4,876,050	-	0.0%	4,876,050	100.0%
TOTAL INDIRECT EXPENSES	\$ 37,961,957	\$ 37,324,226	\$ (637,731)	-1.7%	\$ 37,961,957	98.3%
STATE REVOLVING FUND	\$ 86,971,915	\$ 80,459,851	\$ (6,512,064)	-7.5%	\$ 86,971,915	92.5%
SENIOR DEBT	268,472,556	287,931,637	19,459,081	7.2%	268,472,556	107.2%
CORD FUND	-	-	-	---	-	---
DEBT SERVICE ASSISTANCE	(873,804)	(1,265,384)	(391,580)	44.8%	(873,804)	69.1%
CURRENT REVENUE/CAPITAL	12,200,000	12,200,000	-	0.0%	12,200,000	100.0%
SUBORDINATE MWRA DEBT	69,997,992	69,997,992	-	0.0%	69,997,992	100.0%
LOCAL WATER PIPELINE CP	4,149,242	858,685	(3,290,557)	-79.3%	4,149,242	20.7%
CAPITAL LEASE	3,217,060	3,217,060	-	0.0%	3,217,060	100.0%
DEBT PREPAYMENT	10,994,960	10,994,960	-	0.0%	10,994,960	100.0%
VARIABLE DEBT	-	(11,027,773)	(11,027,773)	---	-	0.0%
DEFEASANCE ACCOUNT	-	-	-	---	-	---
TOTAL DEBT SERVICE	\$ 455,129,921	\$ 453,367,027	\$ (1,762,894)	-0.4%	\$ 455,129,921	99.6%
TOTAL EXPENSES	\$ 719,623,995	\$ 711,413,158	\$ (8,210,836)	-1.1%	\$ 719,623,995	98.9%
REVENUE & INCOME						
RATE REVENUE	\$ 694,878,500	\$ 694,878,500	\$ -	0.0%	\$ 694,878,500	100.0%
OTHER USER CHARGES	8,752,834	8,809,434	56,600	0.6%	8,752,834	100.6%
OTHER REVENUE	6,519,171	13,087,910	6,568,739	100.8%	6,519,171	200.8%
RATE STABILIZATION	-	-	-	---	-	---
INVESTMENT INCOME	9,473,490	9,758,480	284,990	3.0%	9,473,490	103.0%
TOTAL REVENUE & INCOME	\$ 719,623,995	\$ 726,534,324	\$ 6,910,329	1.0%	\$ 719,623,995	101.0%

ATTACHMENT 2
Current Expense Variance Explanations

Total MWRA	FY17 Budget YTD June	FY17 Actuals YTD June	FY17 YTD Actual vs. FY17 Budget		Explanations
			\$	%	
Direct Expenses					
Wages & Salaries	101,858,897	98,494,291	(3,364,606)	-3.3%	Underspending is mainly the result of lower average Full Time Equivalent positions (FTEs) than budgeted, the timing of backfilling vacant positions and the salary mix differential between staff retiring and new hires. The average FTEs for the fiscal year was 1,139, which was 11 positions lower than the 1,150 FTEs budgeted.
Overtime	4,192,676	4,951,621	758,945	18.1%	Higher spending at DITP related to the HEEC cable relocation project, wet weather and the Sail Boston event; Metro Maintenance due to off-hour maintenance work and wet weather; Wastewater Ops for wet weather, offset by lower spending for NMPS work at DITP; Metro Water Ops for coverage; Water Valve Maintenance and Water Inspection for off-hour work.
Fringe Benefits	20,242,323	19,623,635	(618,688)	-3.1%	Lower than budget mainly in Health Insurance of \$631,000, due to fewer than budgeted participation and the changes between family and individual plans.
Worker's Compensation	2,344,190	2,565,336	221,146	9.4%	Overspending due to higher compensation payments of \$537,000 and management costs of \$136,000. This is offset by lower medical payments of \$452,000. In June actual spending was \$156,000 over budget. It is important to note that spending on this line item can change significantly depending on future claims and severity of cases.
Chemicals	9,110,407	9,262,849	152,442	1.7%	Overspending on Sodium Hypochlorite of \$108,000 due to higher contract prices; Polymer of \$79,000; Carbon Dioxide of \$49,000; Activated Carbon of \$47,000; Hydrogen Peroxide of \$36,000; Other Oxidizers of \$32,000; and Ferric Chloride of \$28,000. This is offset by underspending in Soda Ash of \$74,000; Liquid Oxygen of \$57,000; Aqua Ammonia of \$31,000; Hydrofluosilic Acid of \$30,000; and Sodium Hydroxide of \$26,000.
Utilities	21,541,077	20,249,594	(1,291,483)	-6.0%	Underspending in Electricity of \$1.6 million primarily at DITP due to lower prices and being off grid during the HEEC cable location work. This is offset by higher spending at waterworks facilities attributed to higher than anticipated demand charges at the new Spot Pond Pump Station. Natural Gas is underspent \$114,000 primarily at the Carroll Plant and the Chelsea Facility, offset by overspending at B/W IPS. Diesel Fuel is overspent by \$381,000 primarily related to DITP for costs associated with running the backup generators during the HEEC cable location work. This is offset by underspending in Wastewater Operations due to lower pricing and timing of deliveries and Water Operations due to one tank being offline at Gillis PS.

ATTACHMENT 2
Current Expense Variance Explanations

Total MWRA	FY17 Budget YTD June	FY17 Actuals YTD June	FY17 YTD Actual vs. FY17 Budget		Explanations
			\$	%	
Maintenance	31,080,642	30,798,709	(281,933)	-0.9%	<p>Materials were underspent by \$287,000 and Services were overspent by \$3,000.</p> <p>Nut Island fire remediation costs that were not eligible for insurance reimbursement total \$178,000 in FY17 for both materials and services; primarily in Building & Grounds Services, Pipeline Services and Plant & Machinery Materials.</p> <p>Underspending in Building & Grounds Services of \$469,000 at DITP for the door replacement contract and Clinton for timing of the coating contract, offset by overspending in FOD; HVAC Materials of \$349,000 at DITP for timing on the purchase of HVAC material like heat exchanger, chiller & condensing unit, heating coils, etc.; Electrical Services of \$281,000 at FOD Metro Maint for timing of new testing contract; Plant & Machinery Materials of \$263,000 at DITP offset by overspending in FOD due to timing of a spare rotating assembly at DeLauri, carbon replacement at Hough's Neck, and unbudgeted parts for the South Boston CSO pumps and Clinton; Specialized Equipment Services of \$230,000 in FOD Metro Maint; and Pipeline Materials of \$168,000 in Water Pipeline Maint for the timing of purchases of valves, pipe and fittings.</p> <p>Overspending in Plant & Machinery Services of \$835,000 at DITP for CTG and Boiler/STG/Hydroplant Service Contracts, offset by underspending in FOD Metro Maint; HVAC Services of \$183,000 primarily at the Carroll Plant; and Building & Ground Materials of \$127,000 primarily at DITP for tractor.</p>
Training & Meetings	435,481	360,115	(75,366)	-17.3%	Underspending primarily in Fleet Services due to timing.
Professional Services	6,531,939	6,698,861	166,922	2.6%	Higher spending for Legal Services of \$407,000 in the Law Division mostly for the HEEC cable negotiations. This is offset by lower spending on Engineering of \$103,000 primarily in Emergency Preparedness Dept; and Other Services of \$99,000 primarily in Treasury and Operations.
Other Materials	6,219,630	5,851,449	(368,181)	-5.9%	Lower than budgeted spending for Vehicle Expenses of \$268,000 primarily due to lower fuel prices; Computer Hardware of \$255,000 in MIS due to timing; Postage of \$58,000 due to timing of replenishing the postage meters; and Computer Software of \$43,000 in Operations - SCADA Maintenance group. This is offset by overspending in Lab & Testing of \$120,000 in Laboratory Services; Vehicle Purchases of \$51,000; Work Clothes of \$38,000; and Health/Safety of \$31,000.

**ATTACHMENT 2
Current Expense Variance Explanations**

Total MWRA	FY17 Budget YTD June	FY17 Actuals YTD June	FY17 YTD Actual vs. FY17 Budget		Explanations
			\$	%	
Other Services	22,974,855	21,865,445	(1,109,410)	-4.8%	Lower than budgeted Sludge Pelletization of \$418,000 due to lower year to date quantities; Space Lease/Rentals of \$219,000 due to lower escrow for Chelsea taxes and insurance, and pass through maintenance cost at CNY; Other Services of \$207,000 primarily for timing of community lead testing assistance; Telephone of \$198,000 in Operations associated with the increases in costs for the SCADA data lines to occur later than anticipated; and Grit and Screenings of \$98,000 due to lower quantities.
Total Direct Expenses	226,532,117	220,721,905	(5,810,212)	-2.6%	

ATTACHMENT 2
Current Expense Variance Explanations

Total MWRA	FY17 Budget YTD June	FY17 Actuals YTD June	FY17 YTD Actual vs. FY17 Budget		Explanations
			\$	%	
Indirect Expenses					
Insurance	1,997,898	1,739,542	(258,356)	-12.9%	Lower Claims than budgeted of \$254,000 and lower premiums of \$5,000.
Watershed/PILOT	24,291,268	23,911,694	(379,574)	-1.6%	Lower Watershed Reimbursement of \$199,000 due to over accrual at the end of FY16 as compared to actual invoiced paid and a lower PILOT payment of \$181,000.
HEEC Payment	773,859	789,258	15,399	2.0%	
Mitigation	1,558,000	1,542,800	(15,200)	-1.0%	Actual inflation rate was 1.5% vs. 2.5% used for the budget.
Addition to Reserves	(167,742)	(167,742)	-	0.0%	
Pension Expense	4,632,624	4,632,624	-	0.0%	
Post Employee Benefits	4,876,050	4,876,050	-	0.0%	
Total Indirect Expenses	37,961,957	37,324,226	(637,731)	-1.7%	
Debt Service					
Debt Service	456,003,725	454,632,412	(1,371,313)	-0.3%	The total debt service expenses includes a \$25.0 million defeasance executed in June. The short-term rates related variance was \$14.3 million. Additionally, the Authority recognized \$12.0 million in underspending that is the result of the favorable impact of the August 2016 refunding, lower SRF funding than planned, and delaying the borrowing senior debt to May versus January.
Debt Service Assistance	(873,804)	(1,265,384)	(391,580)	44.8%	
Total Debt Service Expenses	455,129,921	453,367,028	(1,762,893)	-0.4%	
Total Expenses					
Total Expenses	719,623,995	711,413,159	(8,210,836)	-1.1%	
Revenue & Income					
Rate Revenue	694,878,500	694,878,500	-	0.0%	
Other User Charges	8,752,834	8,809,434	56,600	0.6%	
Other Revenue	6,519,171	13,087,910	6,568,739	100.8%	\$4.8 M for sale of water due to the drought; \$1.1million for insurance payment received for the NI fire incident; \$528,000 from sale of surplus equipment; \$299,000 for settlement of class action lawsuit for derivative agreements; and \$248,000 for energy efficiency incentives from the utility companies. Offset by lower RPS credits at DITP of \$294,000.
Rate Stabilization	-	-	-		
Investment Income	9,473,490	9,758,480	284,990	3.0%	Investment Income is over budget as result of higher short term rates offset by for unanticipated calls re-invested at lower rates.
Total Revenue	719,623,995	726,534,324	6,910,329	1.0%	
Net Revenue in Excess of Expenses	-	15,121,165	15,121,165		

**ATTACHMENT 3
FY17 CIP Year-End Variance Report (000's)**

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Wastewater					
Interception & Pumping (I&P)	\$25,928	\$19,423	(\$6,505)	-25.1%	<u>Underspending</u> Chelsea Creek Headworks Upgrades Construction and REI: \$5.3M (NTP shifted 4 months; delayed start to resolve permitting issues) Caruso Pump Station Improvements Construction: \$0.3M (delayed installation of HVAC equipment due to unforeseen roof replacement) Wastewater Meter System - Equipment Replacement Planning/Study/Design: \$0.3M, Interceptor Renewal 1, Reading Extension Sewer - Construction: \$0.3M and Quincy/Hingham Pump Station Fuel Storage Upgrades - Construction: \$0.3M (schedule changes) Other smaller projects totaling \$0.6M. <u>Offset Overspending</u> Chelsea Screenhouse Upgrades Construction and ESDC/REI: \$0.6M (work scheduled for FY16 performed in FY17)
Treatment	\$18,113	\$25,002	\$6,889	38.0%	<u>Overspending</u> NMPS & WTF Butterfly Valve Replacement: \$2.5M (project progress) Primary & Secondary Clarifier Rehab - Construction: \$1.8M (Portion of \$2.65M settlement with contractor. Remainder was retainage payment.) Power System Improvements - Construction: \$1.7M (project progress) Clinton Wastewater Treatment Plant Phosphorus Reduction - Construction and ESDC: \$1.2M (project progress) Digested Sludge Pump Replacement - Phase 2: \$0.9M (project progress) Electrical Equipment Upgrades Construction 4: \$0.7M (work scheduled and budgeted for FY16 performed in FY17) Gravity Thickener Rehab: \$0.5M (schedule change) Scum Skimmer Replacement: \$0.3M (payment of punch list items) WTF VFD Replacement - Construction: \$0.2M <u>Offset Underspending</u> Clinton Roofing Rehabilitation: \$1.1M and Gravity Thickener Rehab: \$0.5M (schedule changes) NMPS & WTF Butterfly Valve Replacement ESDC/REI: \$0.2M (less than anticipated need for services) Other smaller projects totaling \$1.1M.

ATTACHMENT 3
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Residuals	\$400	\$0	(\$400)	-	Residuals Facility Upgrades - Construction: \$0.4M (schedule change)
CSO	\$7,116	\$7,001	(\$115)	-1.6%	<u>Overspending</u> Cambridge Sewer Separation: \$0.6M (updated final costs and rescheduling of work by City of Cambridge) Dorchester Bay Sewer Separation (Fox Point): \$0.4M: (final cost adjustments) <u>Offset Underspending</u> Dorchester Bay Sewer Separation (Commercial Point): \$0.6M, Fort Point Channel Sewer Separation: \$0.4M and Reserved Channel Sewer Separation Design and Construction: \$0.2M (final cost adjustments)
Other Wastewater	\$18,817	\$13,377	(\$5,440)	-28.9%	<u>Underspending</u> I/I Local Financial Assistance: \$5.4M (less than anticipated requests for grants and loans). The annual CIP budget is based on prior average annual disbursements. Communities' requests for grants and loans are based on their own individual planned schedule of infiltration and inflow work and can vary greatly beyond the Authority's control.
Total Wastewater	\$70,374	\$64,803	(\$5,571)	-7.9%	

**ATTACHMENT 3
FY17 CIP Year-End Variance Report (000's)**

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Waterworks					
Drinking Water Quality Improvements	\$2,991	\$1,003	(\$1,988)	-66.5%	<u>Underspending</u> CP7 Existing Facilities: \$1.4M (updated schedule for Marlborough Maintenance Facility and balancing credit change order for Southborough Water Quality Laboratory Upgrades) Spot Pond Covered Storage Facility: \$0.2M (Microwave tower installed. Installation of communication shelter ongoing.) Other smaller projects totaling \$0.4M.
Transmission	\$27,733	\$28,414	\$680	2.5%	<u>Overspending</u> Wachusett Aqueduct Pump Station Construction and ESDC/REI: \$2.4M (project progress) Hatchery Pipeline Construction and ESDC/REI: \$0.6M (project progress) Other smaller projects totaling \$0.2M. <u>Offset Underspending</u> Sudbury Aqueduct - MEPA Review: \$1.0M (reduced scope of work) Watershed Land Acquisition: \$0.8M (timing of land purchases) Rosemary Brook Siphon Building Repair: \$0.4M (anticipated time extension due to additional restoration work) Weston Aqueduct Flow Control Valve: \$0.3M (work transferred to CEB)
Distribution & Pumping	\$34,920	\$22,569	(\$12,351)	-35.4%	<u>Underspending</u> NIH Section 89/29 Redundancy Phase 1C and Phase 2 Construction: \$10.6M SEH Redundancy Pipeline Section 111 Phase 2 and Phase 3 - Construction: \$4.2M (schedule changes) and Phase 1 - Construction: \$0.9M (award under budget) Chestnut Hill Gatehouse No. 1 Repairs - Construction: \$1.0M (schedule change) Section 80 Replacement - Construction: \$0.3M (construction timed with water shutoff of partially served communities) Weston Aqueduct Supply Mains Section 36/C/S9 - A11 Valve: \$0.2M (anticipated credit change order for less than estimated quantities of rock and contaminated soil, and timing of valve installation work) Valve Replacement Equipment Purchase: \$0.2M (purchases to made from CEB if needed) Other smaller projects totaling \$0.3M. <u>Offset Overspending</u> NIH Section 89/29 Redundancy Phase 1B Construction and Design/ESDC: \$4.1M (project progress) Section 4 Webster Ave Bridge Pipe Rehab - Construction: \$1.3M (additional change order work based on redesign)

ATTACHMENT 3
FY17 CIP Year-End Variance Report (000's)

	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Other Waterworks	\$7,365	\$11,325	\$3,960	53.8%	<u>Overspending</u> Local Water System Assistance Program: \$4.4M (more than anticipated community requests for loans. The annual CIP budget is based on prior average annual disbursements. Communities' requests for loans are based on their own individual planned pipeline lining and/or replacement work and can vary greatly beyond the Authority's control.) <u>Offset Underspending</u> Waterworks SCADA/PLC Upgrades: \$0.3M (schedule change)
Total Waterworks	\$73,009	\$63,311	(\$9,699)	-13.3%	

ATTACHMENT 3
FY17 CIP Year-End Variance Report (000's)

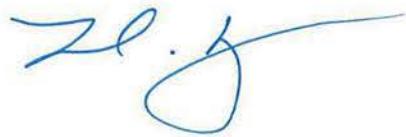
	FY17 Budget YTD June	FY17 Actuals YTD June	YTD Actuals vs. Budget		Explanations
			\$	%	
Business & Operations Support					
Total Business & Operations Support	\$11,943	\$5,075	(\$6,868)	-57.5%	Underspending MIS Projects: \$3.3M (timing of IT Strategic Plan implementation) As-Needed Design: \$1.2M (less than budgeted use of these contracts) Vehicle Purchases: \$1.0M and Major Lab Instrumentation: \$0.3M (timing of purchases) Security Equipment: \$0.9M (schedule change)
Total MWRA	\$155,327	\$133,189	(\$22,137)	-14.3%	

Attachment 4
FY17 Actual versus FY17 Year-End Projection

TOTAL MWRA	FY17 Projection	FY17 Actual	Change FY17 Actual vs. FY17 Projection	
			\$	%
EXPENSES				
WAGES AND SALARIES	\$ 98,876,200	\$ 98,494,291	\$ (381,909)	-0.4%
OVERTIME	4,693,199	4,951,621	258,422	5.5%
FRINGE BENEFITS	19,588,233	19,623,635	35,402	0.2%
WORKERS' COMPENSATION	2,643,780	2,565,336	(78,444)	-3.0%
CHEMICALS	9,259,739	9,262,849	3,110	0.0%
ENERGY AND UTILITIES	20,652,675	20,249,594	(403,081)	-2.0%
MAINTENANCE	31,237,369	30,798,709	(438,660)	-1.4%
TRAINING AND MEETINGS	409,086	360,115	(48,971)	-12.0%
PROFESSIONAL SERVICES	6,784,941	6,698,861	(86,080)	-1.3%
OTHER MATERIALS	6,204,993	5,851,449	(353,544)	-5.7%
OTHER SERVICES	21,954,208	21,865,445	(88,763)	-0.4%
TOTAL DIRECT EXPENSES	\$ 222,304,423	\$ 220,721,905	\$ (1,582,518)	-0.7%
INSURANCE	\$ 1,803,072	\$ 1,739,542	\$ (63,530)	-3.5%
WATERSHED/PILOT	24,000,159	23,911,694	(88,465)	-0.4%
HEEC PAYMENT	773,859	789,258	15,399	2.0%
MITIGATION	1,542,800	1,542,800	-	0.0%
ADDITIONS TO RESERVES	(167,742)	(167,742)	-	0.0%
RETIREMENT FUND	4,632,624	4,632,624	-	0.0%
POSTEMPLOYMENT BENEFITS	4,876,050	4,876,050	-	
TOTAL INDIRECT EXPENSES	\$ 37,460,822	\$ 37,324,226	\$ (136,596)	-0.4%
DEBT SERVICE				
State Revolving Funds (SRF)	\$ 80,459,851	80,459,851	\$ -	0.0%
Senior Debt	262,966,712	287,931,637	24,964,925	9.5%
Subordinate Debt	69,997,992	69,997,992	-	0.0%
Local Water Pipeline CP	858,685	858,685	-	0.0%
Capital Lease	3,217,060	3,217,060	-	0.0%
Current Revenue for Capital	12,200,000	12,200,000	-	0.0%
Debt Prepayment	10,994,960	10,994,960	-	0.0%
Variable Rate Debt	(10,729,069)	(11,027,773)	(298,704)	2.8%
Debt Service Assistance	(1,265,384)	(1,265,384)	-	
Defeasance Account			-	N/A
Projected/Actual Defeasance	24,964,925		(24,964,925)	-100.0%
TOTAL DEBT SERVICE	\$ 453,665,732	\$ 453,367,028	(298,704)	-0.1%
TOTAL EXPENSES	\$ 713,430,977	\$ 711,413,158	\$ (2,017,818)	-0.3%
REVENUE & INCOME				
RATE REVENUE	\$ 694,878,500	\$ 694,878,500	\$ -	0.0%
OTHER USER CHARGES	8,752,834	8,809,434	56,600	0.6%
OTHER REVENUE	12,819,171	13,087,910	268,739	2.1%
RATE STABILIZATION	-	-	-	
INVESTMENT INCOME	9,309,490	9,758,480	448,990	4.8%
TOTAL REVENUE & INCOME	\$ 725,759,995	\$ 726,534,324	\$ 774,329	0.1%

STAFF SUMMARY

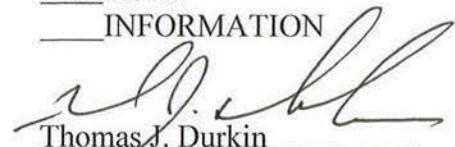
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Bond Defeasance of Future Debt Service



COMMITTEE: Administration, Finance & Audit

VOTE
 INFORMATION

Matthew R. Horan, Treasurer 
Sean R. Cordy, Sr. Financial Analyst 
Preparer/Title


Thomas J. Durkin
Director of Finance

Consistent with MWRA's multi-year rates management strategy, MWRA staff are recommending the execution of an approximately \$10.3 million defeasance in September 2017 to reduce future year rate increases. The \$10.3 million in available funds is derived from the FY17 surplus and will be used to prepay debt service coming due in FY19 through FY21 (\$9.6 million in principal and \$716,400 in interest). The defeasance of debt, coupled with diligent management of operational expenses, have been the keys to MWRA's ability to keep assessment increases sustainable and predictable.

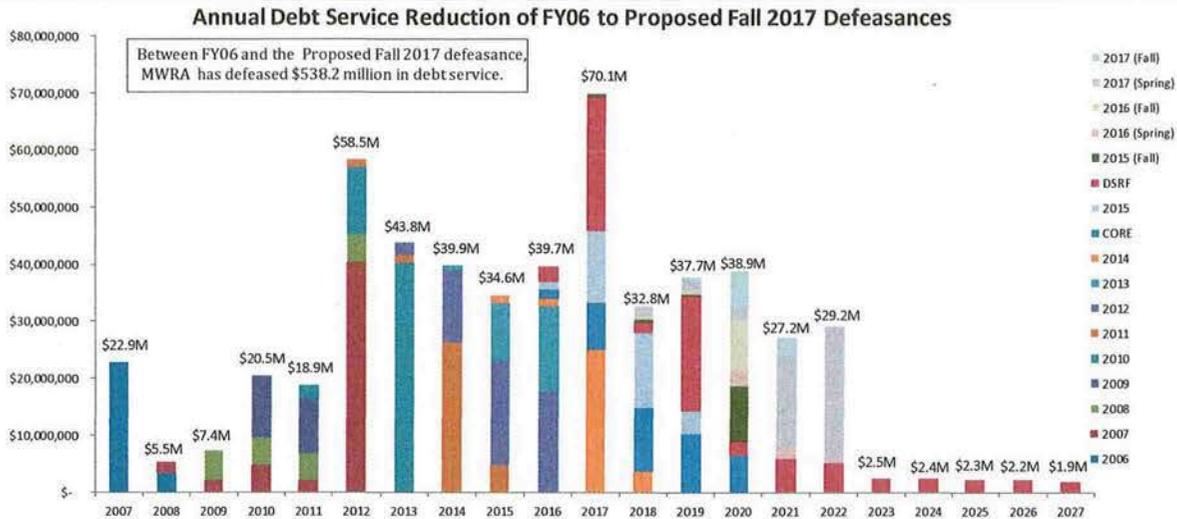
RECOMMENDATION:

To authorize the Executive Director or his designee, on behalf of the Authority, to enter into, execute and deliver all necessary agreements and other instruments and to take such other actions necessary to effectuate the redemption and defeasance of an aggregate principal amount of \$9,570,000 of outstanding MWRA senior bonds including to cause the escrow of cash and/or securities in an amount necessary to fund such redemption and defeasance, in order to reduce the debt service requirement by \$10,601,900 in the FY19 through FY21 timeframe.

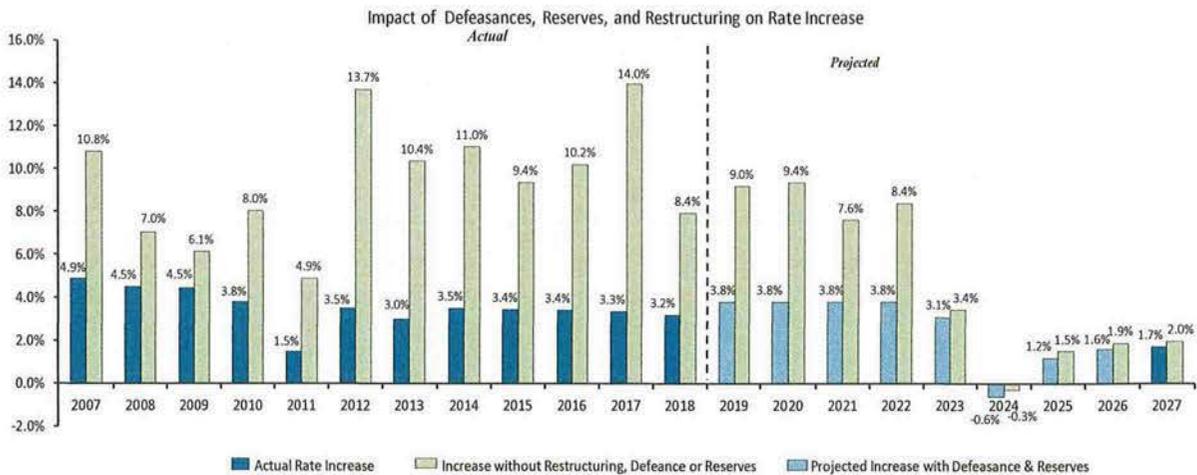
DISCUSSION:

As described in more detail in the FY17 Year-end Financial Update and Summary Staff Summary, MWRA has approximately \$10.3 million available from the FY17 budget to execute a defeasance of outstanding debt. These funds are available after the use of approximately \$11.0 million from the budgeted FY17 Optional Debt Payment and approximately \$25.0 million from the FY17 surplus to defease \$36.3 million in outstanding principal executed in June 2017.

MWRA's ongoing use of defeasances has had a significant impact lowering future debt service payments and limiting annual rate revenue increases. Including this transaction, MWRA has defeased \$538.2 million in debt service since 2006. The following chart details the multi-year impact of those defeasances.



The application of these defeasances has had a significant impact on rate increases. The chart below shows the estimated rate increase without the application of the defeasances.



Staff reviewed all bonds available to be defeased, and have identified the maturities of the bonds in the table below as the most advantageous defeasance candidates.

Series	Maturity	Call Date	Principal	Defeasance Cost ¹
2009B	August 1, 2020	August 1, 2019	\$ 3,610,000	\$ 3,790,500
2010A	August 1, 2020	August 1, 2020	\$ 1,390,000	\$ 1,501,200
2010B	August 1, 2021	August 1, 2020	\$ 2,700,000	\$ 2,970,000
2011B	August 1, 2021	August 1, 2021	\$ 510,000	\$ 555,900
2016B	August 1, 2020	August 1, 2020	\$ 1,360,000	\$ 1,468,800
Total			\$ 9,570,000	\$ 10,286,400

(1) Defeasance cost is only anticipated funds from surplus and does not include current year deposits. Assumes no interest earned on the escrow.

The proposed defeasance reduces debt service by a total of \$10.6 million between FY19 and FY21. The total debt service reduction attributable to the defeasance is approximately \$315,500 higher than the defeasance cost because the 2009 Series B and 2010 Series B bonds are callable prior to their maturity date. The payment of these bonds on the call date will yield interest savings, as a result of paying off the bonds prior to maturity without interest accruing.

	Budget Reduction by Fiscal Year			Total CEB Savings
	2019	2020	2021	
Defeasance CEB Savings	\$ 440,800	\$ 6,800,800	\$ 3,360,300	\$ 10,601,900

The funds will be utilized to purchase governmental securities in an amount sufficient to make all future interest and principal payments on the bonds to be defeased, offset by the interest earned on the securities.

The governmental securities purchased are deposited with an escrow agent (bond trustee). Once established, an escrow is irrevocable, replacing any future debt service payments due for the bonds being escrowed, and therefore reducing the rate revenue requirement. Establishing an escrow reduces debt service requirements for each fiscal year from the time it is executed until the defeased bonds mature.

Establishing an escrow to defease debt requires that MWRA's bond counsel draft an agreement to this effect and an independent verification agent must certify that the funds in the escrow are sufficient to pay the remaining debt service. Bonds that are escrowed to maturity are not included in the MWRA's debt cap or debt service coverage calculations. Staff will continue to monitor market conditions and the maturities available to be defeased to ensure that the bonds selected provide MWRA with the highest available debt service savings.

BUDGET/FISCAL IMPACT:

The defeasance of these bonds will decrease the FY19 through FY21 debt service requirement by \$10.6 million. The cost associated with bond counsel and financial advisory services will be paid out of the Treasury Department's professional services budget.



MASSACHUSETTS WATER RESOURCES AUTHORITY

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

Frederick A. Laskey
Executive Director

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TTY: (617) 788-4971

WASTEWATER POLICY & OVERSIGHT COMMITTEE MEETING

Chair: P. Flanagan
Vice-Chair: J. Walsh
Committee Members:
A. Blackmon
J. Carroll
J. Foti
A. Pappastergion
B. Peña
H. Vitale

to be held on

Wednesday, September 20, 2017

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

Time: Immediately following AF&A Comm.

AGENDA

A. Information

1. Hydrogen Cyanide Incident Chelsea Creek Headworks

B. Contract Awards

1. Supply and Delivery of Sodium Hypochlorite to the Deer Island Treatment Plant: Borden & Remington Corporation, Bid WRA-4413

C. Contract Amendments/Change Orders

1. Alewife Brook Pump Station Rehabilitation: Barletta Engineering Corporation, Contract 6797, Change Order 2

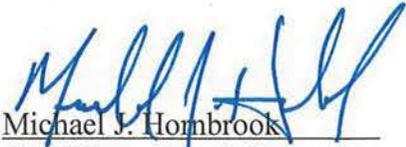
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Hydrogen Cyanide Incident at Chelsea Creek Headworks

COMMITTEE: Wastewater Policy & Oversight

X INFORMATION
 VOTE

John Vetere, Deputy Chief Operating Officer
Carolyn Fiore, Deputy Chief Operating Officer
Preparer/Title


Michael J. Hombrook
Chief Operating Officer

RECOMMENDATION:

For information only. On August 8, 2017, the Chelsea and Boston Fire Departments responded to a report of a hydrogen cyanide detection at the Chelsea Creek Headworks at 340 Marginal Street in Chelsea. After a thorough investigation of the incident, staff are confident that the detection of hydrogen cyanide was, in fact, detection of hydrogen sulfide, a biologically produced byproduct of contaminants routinely found in wastewater. The incident garnered significant publicity and was covered by major news outlets in the Boston area. What follows is a summary of the incident and recommendations for the future.

DISCUSSION:

The Chelsea Creek Headworks receives wastewater from twenty northern service area communities. The facility provides grit and screenings removal and flow control to an average dry weather wastewater flow of 135 million gallons per day (mgd) and wet weather flow of up to 350 mgd. The purpose of the facility is to prevent grit from depositing in the North Metropolitan Relief Tunnel, to protect the Deer Island pumps from damage from debris and to control the flow to Deer Island. The facility was originally built in the 1960s and is in the process of being completely upgraded. Because of its critical role, however, it remains fully operational. During the active construction, period of each workday, the Chelsea Fire Department maintains a Fire Watch for the Construction Contractor, BHD/BED JV 2015, a joint venture with Barletta Heavy Division and Barletta Engineering Corporation when "hot work" such as welding, grinding or cutting is scheduled.

Incident Description

During the overnight shift of August 7th to 8th, at approximately 4:07 am, a Lower Explosive Limit (LEL) trouble alarm was triggered by the facility's stationary gas monitoring system setting off the system's visual indicator strobe light (a trouble alarm indicates a communication issue with a sensor in alarm). MWRA staff performed a walk-through of the facility with a portable gas meter and there were no alarm level readings within the operating floor. Because there was no immediate safety issues, staff planned to have the MWRA's gas monitoring system

maintenance contractor come to the site during normal business hours on the day shift and address the communication/sensor issue and clear the alarm. The strobe light continued to flash.

When the personnel on the Fire Watch reported to the site at approximately 7 am on Tuesday, August 8, 2017, the Fire Watch saw the strobe light signal and called in the Chelsea Fire Department (without conferring with MWRA staff) assuming that a fire was occurring at the facility. The Fire Department responded and completed a walk-through of the facility wearing handheld air monitoring equipment (gas meters). The Fire Department handheld gas meters alarmed for the presence of hydrogen cyanide in the lower levels of the facility. Chelsea back-up units were called and confirmed the initial hydrogen cyanide readings. The Boston Fire Department was called to assist, and conducted an additional walk-through of the facility. Boston Fire, using similar meters, also confirmed the Chelsea meter readings detecting hydrogen cyanide in the lower levels. Boston Fire brought another type of meter to the site that was specifically calibrated for hydrogen cyanide. This meter showed no hydrogen cyanide, Boston Fire concluded that the building was safe, and left the site at approximately noon. Chelsea Fire made the decision to monitor for 24 hours.

When the Fire Department identified its initial hydrogen cyanide readings, MWRA staff and contractor staff from the Headworks Rehabilitation construction contract were initially evacuated from the facility. The facility continued to operate and was monitored from MWRA's Operation Control Center.

It should be noted that hydrogen sulfide is typically found in wastewater facilities, and gaseous levels vary depending upon the flow, ambient air and wastewater temperatures, strength of wastewater passing through a facility as well as the physical facility layout. MWRA's facilities have stationary meters that continuously measure oxygen, lower explosive limit (LEL) and hydrogen sulfide levels to protect staff. Fire personnel carry meters that can identify and measure a broad range of potentially toxic pollutants, including hydrogen cyanide, which can be a combustion product of various materials, but do not routinely enter areas with hydrogen sulfide. Hydrogen sulfide causes a known interference with meters measuring hydrogen cyanide, and meter operational manuals indicate that atmospheres with hydrogen sulfide will incorrectly trigger hydrogen cyanide detection at levels 4 to 6 times higher than hydrogen sulfide levels present.

MWRA's Emergency Operations Center was opened and staff initiated a multi-pronged response. At Deer Island, staff were restricted access to those areas of the plant where flow from the Chelsea Creek Headworks is received and only allowed staff to enter the area with appropriate personal protective equipment (in this case, self-contained breathing apparatus). The Toxic Reduction and Control Department (TRAC) was tasked with identifying potential industrial/commercial sources of cyanide, and mobilized to collect influent samples from the trunk sewers contributing flow to the facility. Engineering and Construction staff reviewed materials being used at site by the construction contractor and obtained copies of Safety Data Sheets to verify potential sources of cyanide. Safety and Process Control staff reviewed available information regarding the metering equipment on-site and used by the Chelsea and Boston Fire Departments. They also reached out to the gas meter service contractor and were able to obtain gas meters with filters that would measure hydrogen cyanide without interference from hydrogen sulfide. Executive Office staff coordinated with the large contingent of local media that responded to the report of a hazardous materials incident. Human Resources staff kept the unions informed of issues as they developed throughout the course of the day. Operations staff developed and implemented a plan to maintain operations at the facility.

Influent wastewater samples were collected by TRAC staff from three separate trunk lines entering the Headworks and were analyzed for cyanide by Laboratory Services staff that provided rapid turnaround. Wastewater samples were also collected in the influent chamber of the Headworks, and at the grit chamber of the isolated flow at Deer Island. Levels of hydrogen cyanide were detected between 20-63 parts per billion, consistent with wastewater samples collected throughout the system in the past.

Air monitoring was conducted on the lower level of the Chelsea Creek Headworks using meters left in place overnight by the Boston Fire Department. Hourly readings of the stationary meters were performed by MWRA staff accompanied by Fire Department staff, and the meters continued to detect relatively high levels of hydrogen cyanide (in the range of 0-27 parts per million) but handheld meters with filters to eliminate hydrogen sulfide interference showed levels near 0 ppm. By noon the next day, August 9, 2017, levels for all meters were showing results near 0 ppm. Chelsea Fire concluded the hazardous materials incident and departed the site. MWRA continued to monitor the lower levels of the facility with meters having the proper hydrogen sulfide interference filters.

Conclusions and Next Steps

Based on the information reviewed during and after the incident, including construction materials used at the site, influent and facility wastewater sampling, and air sampling with appropriate meters, staff have concluded that event was triggered by the detection of hydrogen sulfide that was misidentified as hydrogen cyanide.

Literature on the various meters used by Chelsea and Boston indicate that without a special filter on the air meters, hydrogen sulfide levels will result in hydrogen cyanide readings from 4 to 6 times the level of hydrogen sulfide detected. Hydrogen sulfide is an odiferous byproduct produced by contaminants typically found in wastewater that forms from the breakdown of organic material by bacteria in wastewater. When meters that correct for the interference of hydrogen sulfide are used, hydrogen cyanide is rarely detected in the Headworks and at very low levels.

To demonstrate this to staff satisfaction, MWRA has been collecting hourly meter readings from the influent channels at the Chelsea Creek Headworks using meters that appropriately correct for interference by hydrogen sulfide. Hydrogen sulfide levels have gone up and down, consistent with wastewater flow through the facility, while hydrogen cyanide results have hovered close to the instrument detection level, near 0 ppm.

Staff held tool box talks with wastewater staff to describe the incident and the plan for continued monitoring. The unions were also briefed about the incident and next steps.

Staff have procured three additional hand-held meters that have the appropriate filters and will use these and purchase additional appropriate filtered meters for use in and around wastewater operations.

BUDGET/FISCAL IMPACTS:

Chelsea Fire has submitted a bill for the hazardous materials response activities totaling approximately \$12,000. Overtime and other costs were approximately \$13,000, for a total cost of \$25,000. These costs will be absorbed in the FY18 current expense budget.

STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Supply and Delivery of Sodium Hypochlorite to the Deer Island Treatment Plant
Borden & Remington Corporation
Bid WRA-4413

COMMITTEE: Wastewater Policy & Oversight

 INFORMATION

 X VOTE



Michele S. Gillen

Chief Operating Officer

David Duest, Director, DIWWTP
Carolyn Francisco Murphy, Director of Procurement
Preparer/Title



Michael J. Hornbrook

Chief Operating Officer

RECOMMENDATION:

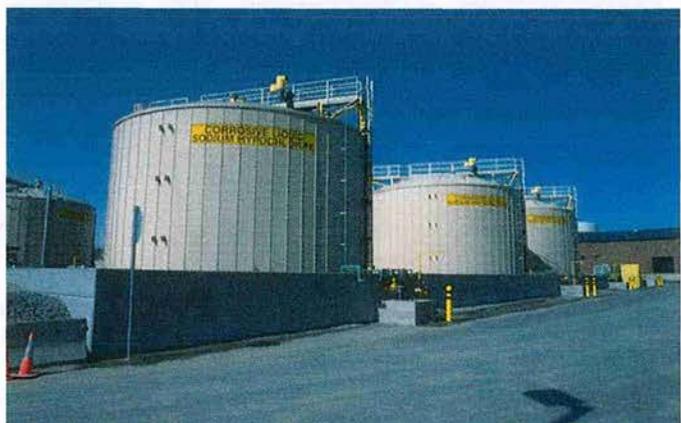
To approve the award of Purchase Order Contract WRA-4413, a one-year contract for the supply and delivery of sodium hypochlorite to the Deer Island Treatment Plant, to the lowest responsive bidder, Borden & Remington Corporation, and to authorize the Executive Director, on behalf of the Authority, to execute said purchase order contract in an amount not to exceed \$1,285,696.19 for a period of one year, from November 17, 2017 through November 16, 2018.

DISCUSSION:

MWRA uses sodium hypochlorite, which is a combination of chlorine and caustic soda, at the Deer Island Treatment Plant primarily to disinfect the plant's effluent. It is also used in the plant's odor control systems.

Sodium hypochlorite is stored in three above ground tanks, each 30 feet high and 40 feet in diameter, with a capacity to hold 250,000 gallons per tank.

Sodium hypochlorite is generally manufactured in different strengths: 15%, 19%, and 20% solution. The differing strengths do not affect the DITP treatment processes in any way; the only differences between them are unit cost, availability



and the amount of material delivered to Deer Island. The most common and widely available strength is the 15% grade solution, but this requires the largest delivered volume. In previous contracts, MWRA has purchased both 15% and 19% solution. Under the existing contract, also with Borden & Remington Corporation, MWRA is purchasing solely a 19% grade solution. Although the unit cost for 19% is slightly higher, the net result is that less volume is delivered to the treatment plant. Upon delivery and no matter the delivered strength, staff dilute the delivered product to an end use strength of 10-12%. The 19% has proven to be slightly more cost-effective when comparing actual total chlorine purchased.

Procurement Process

Bid WRA-4413 was advertised in the following publications: Boston Herald, Goods and Services Bulletin, El Mundo, and Banner Publications. In addition, bids were made available for public downloading on MWRA's e-procurement system (Event 3065), and six potential bidders were solicited through the e-Portal.

On August 8, 2017, Event 3065 closed, with the following results:

Borden & Remington Corporation	Estimated Gallons	Percentage Solution	Unit Price Per Gallon	Extended Bid Price
	2,200,000	15% Solution	\$0.60870	\$1,339,140.00
	1,750,199	19% Solution	\$0.73460	\$1,285,696.19
	1,650,000	20% Solution	No Bid	No Bid
Univar USA, Inc.	Estimated Gallons	Percentage Solution	Unit Price Per Gallon	Extended Bid Price
	2,200,000	15% Solution	\$0.75100	\$1,652,200.00
	1,750,199	19% Solution	No Bid	No Bid
	1,650,000	20% Solution	No Bid	No Bid
Kuehne Chemical Corporation	Estimated Gallons	Percentage Solution	Unit Price Per Gallon	Extended Bid Price
	2,200,000	15% Solution	\$1.50	\$3,300,000.00
	1,750,199	19% Solution	\$1.57	\$2,747,812.43
	1,650,000	20% Solution	\$1.60	\$2,640,000.00

Vendors were given the option to provide a unit bid price for any number of the three available grades of sodium hypochlorite. Under the current contract with Borden & Remington Corporation, which expires on November 16, 2017, MWRA is paying a fixed price of \$0.6904 per gallon for 19% solution for an annual cost of \$1,208,337.39. Compared to the existing contract, the cost per gallon price is increased by 6.4% or \$0.0442 per gallon. The not to exceed amount of the contract is not a firm commitment of cost or a guarantee of purchase to the vendor; MWRA will only pay for product delivered and received.

Although during recent years the caustic soda market has been moderate and stable, the market has historically been one of extreme volatility. The Purchasing Unit contacted Borden & Remington Corporation and they attributed this year's cost increase to an overall market

tightening, with the United States, Europe, and South America all cutting back on production. In addition, they stated a return to higher caustic prices and volatility is likely to continue for the next few years. In addition, the large discrepancy in bid prices can be attributed to a more aggressive bidding approach taken by Borden & Remington compared to Univar and Kuchne. On June 7, 2017 the Board of Directors approved a one year, \$1,141,896.00 contract with Univar to supply a 15% grade of sodium hypochlorite to the John J. Carroll Water Treatment Plant at a cost of \$0.588 per gallon.

Staff have reviewed Borden & Remington Corporation's bid and have determined that it meets all of the requirements of the bid specifications. Therefore, staff recommend the award of this one-year purchase order contract to Borden & Remington Corporation, as the lowest responsive bidder.

BUDGET/FISCAL IMPACT:

There are sufficient funds available for the first portion of this contract in the approved FY18 Current Expense Budget. Appropriate funding will be included in the Proposed FY19 Current Expense Budget request for the remaining term of the contract.

MBE/WBE/PARTICIPATION:

Borden & Remington Corporation is not a certified Minority- or Women-owned business.

STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Alewife Brook Pump Station Rehabilitation
Barletta Engineering Corporation
Contract 6797, Change Order 2



COMMITTEE: Wastewater Policy & Oversight

INFORMATION
 VOTE

John P. Vetere, Deputy Chief Operating Officer
A. Navanandan, P.E., Chief Engineer
Corinne M. Barrett, Director, Construction
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To authorize the Executive Director, on behalf of the Authority, to approve Change Order 2 to Contract 6797, Alewife Brook Pump Station Rehabilitation, with Barletta Engineering Corporation, for a lump sum amount of \$690,000, increasing the contract amount from \$12,568,878 to \$13,258,878, and extending the contract term by 180 calendar days from May 31, 2018 to November 27, 2018.

Further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 6797 in amounts not to exceed the aggregate of \$250,000, and 180 days in accordance with the Management Policies and Procedures of the Board of Directors.

DISCUSSION:

The Alewife Brook Pump Station in Somerville (shown on the right), constructed in 1951, receives wastewater from portions of Arlington, Belmont, Cambridge, Medford, and Somerville. All flow is pumped to the North Metropolitan and North Metropolitan Relief Sewers, and ultimately conveyed to Deer Island for treatment.



The project includes: replacement of wet-weather pumps, motors, gear drives, variable frequency drives, motor control center, influent screens, sluice gates, standby generator, roof, programmable logic controller, air handling and air conditioning units; remediation of PCB-

containing paints; remediation of asbestos-containing roofing and insulation materials; installation of a flow meter on the 66-inch downstream Alewife Brook Conduit; flood control measures; and energy efficiency improvements.

On February 15, 2012, the Board approved the award of Contract 7034 to Fay, Spofford & Thorndike, LLC, (FS&T¹) in an amount not to exceed \$1,558,446.39, for a term of 1,703 calendar days for final design, and construction administration and resident engineering services for the Alewife Brook Pump Station Rehabilitation project.

On November 18, 2015, the Board approved the award of Contract 6797 to Barletta Engineering Corporation for construction of the improvements with a contract term of 853 days. The Notice to Proceed for construction was issued on January 29, 2016 with contract completion to be achieved by May 31, 2018.

To date, the construction work is approximately 30% complete. The work performed to date includes installation of flood protection measures, commencement of PCB remediation, electrical, and initial installation of bypass system piping and sound barriers.

This Change Order

A critical aspect of the project is to bypass the Alewife Brook Pump Station dry and wet weather flow using a temporary bypass pump system. This approach was chosen because it reduced risk by shortening the construction period and avoiding the need to replace portions of the station during full station operation and losing hydraulic pumping capacity. This older pump station does not have existing pumping redundancy or the ability to isolate individual pumps for removal and replacement. By temporarily bypassing the entire pump station, all components (electrical switchgear, pumps, and screens) can be removed and reinstalled.

Stantec's approach for this temporary bypass pumping included a conceptual level design utilizing a performance specification with a required flowrate, operating level band, suction lift and testing parameters, and required the contractor to submit a Massachusetts Professional Engineer stamped design for the bypass system. Stantec also prepared conceptual plans showing the locations of the pumping inlet and discharge chambers (both existing chambers adjacent to the station), and an overland temporary pipe routing.

This design approach is Stantec's standard practice for temporary bypass pumping systems, and it has been utilized by MWRA for previous contracts. In the design phase, Stantec contacted three local bypass pumping suppliers and provided them with the performance specification requirements. The suppliers furnished Stantec preliminary site layouts and order of magnitude pricing, and raised no questions or reservations concerning the ability to provide a workable temporary bypass system. The bypass performance specifications and conceptual plans were included in the contract documents. No pre-bid comments or questions regarding the viability of the bypass system design were submitted by any of the seven general contractors bidding on the

¹ On October 31, 2015 all assets and liabilities of Fay, Spofford & Thorndike, LLC were transferred to Stantec Consulting Services, Inc. Contract 7034 was assigned from Fay, Spofford & Thorndike, LLC to Stantec Consulting Services, Inc. by vote of the MWRA Board of Directors on February 10, 2016.

project.

After award of the contract, Barletta submitted a PE stamped design for the bypass system (see Attachment 1) and the temporary system was then installed. Trial tests of the bypass system on April 25 and May 5, 2017 failed to meet the required bypass test of 35 million gallons per day (mgd) for four hours. Barletta asserted after the failed tests that the existing inlet chamber was too small and a bypass system capable of pumping 35 mgd for four hours, and overall 90 mgd could not be achieved. In support of its position, Barletta furnished correspondence and calculations from the design engineering firm Simpson, Gumpertz and Heger (SGH). SGH contends that the size of the existing inlet chamber did not meet Hydraulic Institute Standards, and water level restrictions and elevations required in the contract documents, among other things, would not allow for adequate bypass pumping flow. Barletta asserted that it could not make the temporary bypass system work and that modifications were required to meet the prescribed conveyance capacity.

Staff requested that Stantec revisit its initial conceptual bypass design and the Barletta-installed bypass system. Stantec disputed SGH's position and its basis, and confirmed that the performance specification with the existing inlet chamber sizing could achieve the contract required bypass flow rates. Stantec furnished a technical memorandum supporting its conclusion and conceptual bypass design and identifying several flaws in the Barletta-installed system including pump selection. Stantec further noted that the contract documents do not require that the Hydraulic Institute Standards be followed and it is not customarily followed for temporary bypass systems.

Correspondence was exchanged between MWRA and Barletta, each disputing the other's position. MWRA made demand upon Barletta to make additional attempts to achieve the performance of its designed bypass system, or submit a workable bypass design utilizing all existing site conditions and in compliance with the contract restraints and requirements. Barletta remained steadfast in its position that further efforts would not result in a contract compliant bypass system without modifications to the existing inlet chamber.

With no clear path to move forward to complete the work at this critical pumping station, staff requested Stantec to provide a Massachusetts PE stamped bypass design either developed in-house or through a subconsultant. Stantec retained an outside bypass pumping supplier with experience in designing and installing bypass pumping. Stantec, after several weeks of effort, was unsuccessful in providing a supplier and engineer to stamp a bypass pump design that meets the original contract requirements.

At this juncture it is clear that there will be no definitive consensus reached as to whether the bypass pumping capacity required can be met given the physical constraints in which that system must operate. MWRA can no longer bear the delays in progress caused by the stalemate between Barletta and Stantec as to the constructability or feasibility of the current bypass system design. It is staff's opinion that it is in the best interest of the MWRA to move forward with the Barletta-proposed modifications to the conceptual plan outlined in the contract documents.

Barletta has submitted a PE stamped bypass plan that modifies the contract documents to convey test requirements of 35 mgd for 4 hours (see Attachment 2). These modifications include

additional pump suction locations, lower pump elevations and a larger operating band. This modification will utilize, to the maximum extent practical, as much of the initial bypass installation as feasible, including reuse of portions of the suction and discharge piping, electrical power supply to pumps, sound barrier, flow meters and wiring to master control system, and inlet and outlet structure modifications.

The additional costs to install the new components for the revised configuration, including engineering design, is approximately \$462,000. The remaining \$228,000 for this change order is associated with the project schedule delay and bypass system rework.

The installation of the modified bypass system includes moving six of the suction pipes for the bypass pumps outside the existing inlet chamber; excavating the bypass pumps 2.5 feet below grade; revising the discharge piping at the discharge location, trench box rentals; excavating and installing concrete collars and covers; revising the temporary pump control system; and repairing pipe at penetrations.

Subject to the Board's approval, MWRA staff and Barletta agreed to extending the contract term by 180 calendar days from May 31, 2018 to November 27, 2018 and a lump sum amount of \$690,000.

MWRA has notified Stantec and Barletta that MWRA fully reserves its rights to recoup all damages arising out of this change order work.

CONTRACT SUMMARY:

	<u>Amount</u>	<u>Time</u>	<u>Dated</u>
Original Contract:	\$12,560,000.00	853 Days	01/29/16
Change Orders:			
Change Order 1*	\$8,878.00	0 Days	07/27/17
Change Order 2	<u>\$690,000.00</u>	<u>180 Days</u>	Pending
Total of Change Orders:	\$698,878.00	180 Days	
Adjusted Contract:	\$13,258,878.00	1,033 Days	

*Approved under delegated authority

If Change Order 2 is approved, the cumulative total value of all change orders to this contract will be \$698,878 or 5.6% of the original contract amount. Work on this contract is 30% complete.

BUDGET/FISCAL IMPACT:

The FY18 CIP includes a budget of \$12,624,000 for Contract 6797. Including this change order for \$690,000.00 the adjusted contract total will be \$13,258,878 or \$634,878 over budget. This amount will be covered within the five-year CIP spending cap.

DMBE/DWBE PARTICIPATION:

The D/MBE and D/WBE participation requirements for this project were established at 3.4% and 3.8%, respectively. The Contractor has been notified that these requirements are still expected to be met.

ATTACHMENTS:

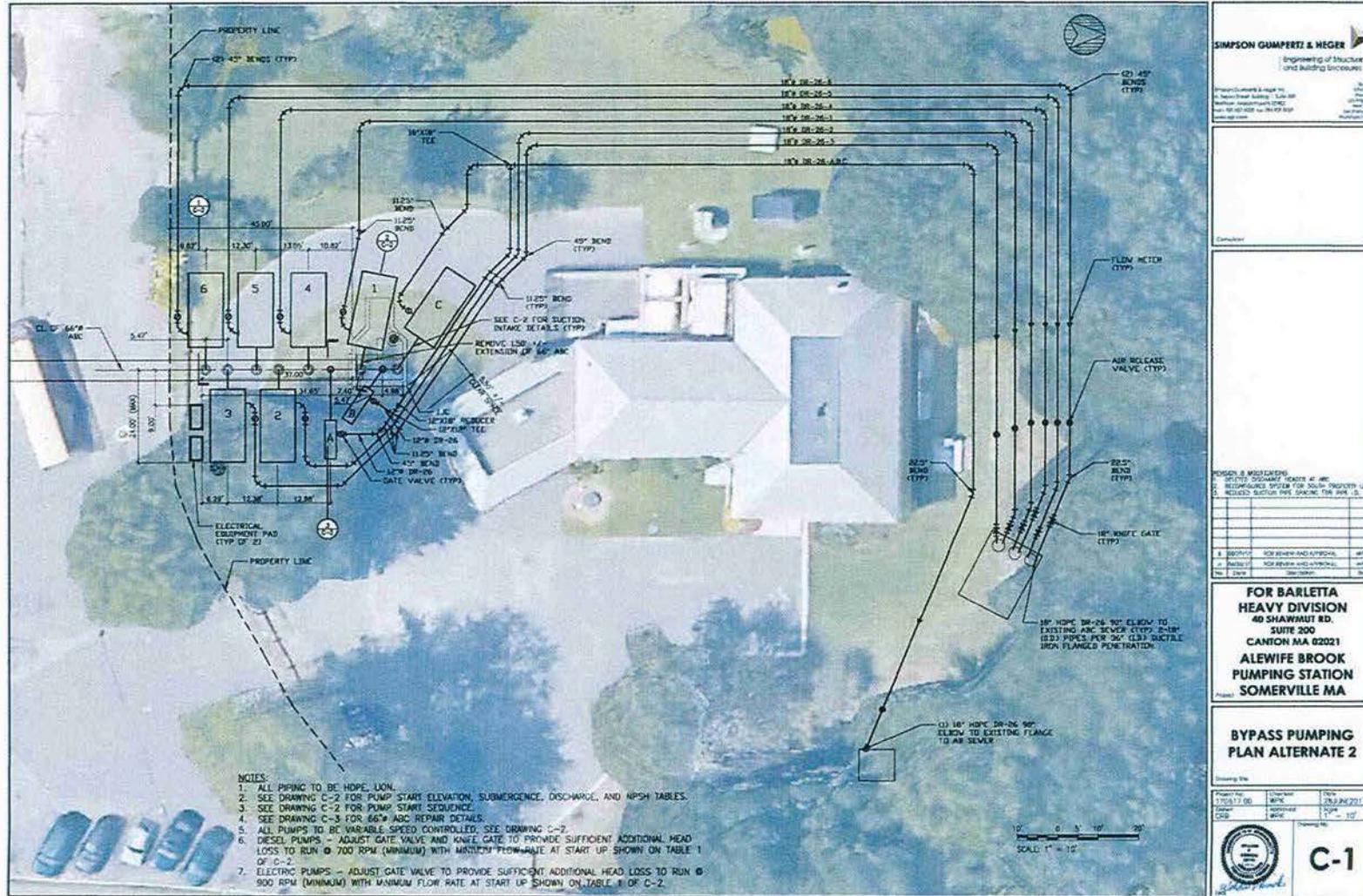
Attachment 1 – Originally Installed Bypass System Design

Attachment 2 – Revised Bypass System Design

Attachment 1
Alewife Pump Station Original Bypass Pumping Arrangement



Attachment 2 Barletta Proposed Bypass Pumping Arrangement





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

WATER POLICY AND OVERSIGHT COMMITTEE MEETING

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

to be held on

Wednesday, September 20, 2017

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

Time: Immediately following Wastewater Comm.

AGENDA

A. Information

1. Report on Corrosion Control in the Water and Sewer Systems
2. Status Update of North Reading and the MWRA

B. Contract Amendments/Change Orders

1. Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services: Stantec Consulting Services, Inc., Contract 7156, Amendment 4
2. Wachusett Aqueduct Pumping Station, BHD/BEC JV 2015, A Joint Venture: Contract 7157, Change Order 21

STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Report on Corrosion Control in the Water and Sewer Systems



COMMITTEE: Water Policy & Oversight

X INFORMATION
 VOTE

John P. Vetere, Deputy Chief Operating Officer
A. Navanandan, P.E., Chief Engineer
Ester N. Lwebuga, P.E., Program Manager
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

The majority of MWRA's existing cathodic protection systems providing corrosion control for MWRA pipelines and structures have reached the end of their useful lives and are no longer providing protection. The existing systems are in need of replacement. Staff have developed a Cathodic Protection Replacement Program to assess, make repairs, replace and maintain the existing cathodic protection systems. This staff summary provides information on the Corrosion Control Cathodic Protection Replacement program.

RECOMMENDATION:

For information only.

BACKGROUND:

As with all metallic surfaces exposed to corrosive environments, MWRA's water and sewer facilities are subject to corrosion. Corrosion is the destruction of a substance, or its properties as a result of a reaction with its environment. In the water and sewer systems, the facilities may experience corrosion due to one or more of the



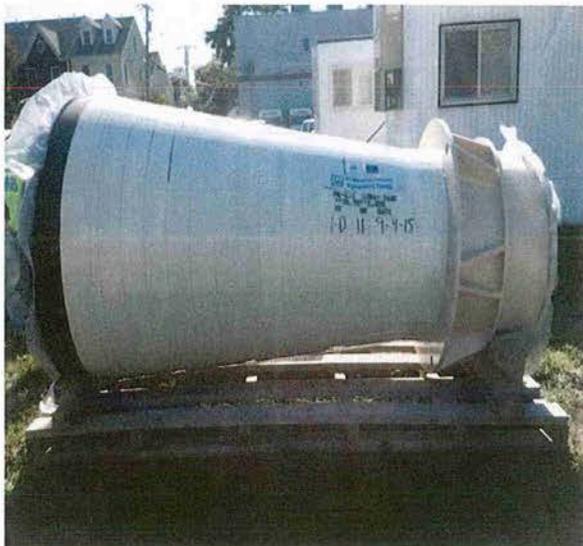
Waltham Bridge Pipeline before replacement



Waltham Bridge Pipeline Replaced 2004

following factors: soil properties; electrochemical reactions with other nearby dissimilar metals; effects of stray currents from other structures in the vicinity, high levels of hydrogen sulfide, and in the case of storage tanks, reaction at the interface between the internal tank wall and the water.

MWRA has implemented corrosion control measures for the different water and sewer facilities including specifying coatings for pipelines and storage tanks, encasing of piping in polyethylene



bags, tape wrapping of pipelines, controlling hydrogen sulfide levels and installation of cathodic protection.

Within the MWRA water system, there are approximately 300 miles of distribution pipe, 10 active pumping stations, and 14 distribution storage facilities six of which are steel. Most of the pipes are made of steel, cast iron and ductile iron and as a result are subject to corrosion due to the environmental conditions in which they reside. The remaining pipes are prestressed concrete cylinder pipe, or reinforced concrete pipe.

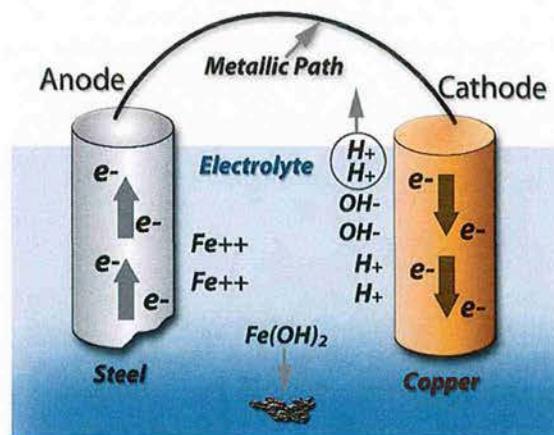
The MWRA sewer collection system includes four remote headworks facilities, a network of nearly 300 miles of sewer pipelines and tunnels, 13 pump stations, one screening facility, and six combined sewer overflow treatment/storage facilities.

The Deer Island Treatment Plant receives an average daily flow of 360 mgd and has a peak wet weather capacity of 1,300 mgd, with additional system capacity available at combined sewer overflow outfalls. Corrosion in the sewer system is mostly attributed to high hydrogen sulfide levels which cause deterioration of concrete and brick pipe and structure systems. MWRA continues to monitor hydrogen sulfide corrosion and odor issues in the collection system to prioritize inspections for affected sewers. Internal inspection information (physical, television, and sonar) is used to develop maintenance schedules, identify structural problems, and help define rehabilitation projects.

Cathodic Protection

In order to maintain pipe integrity, cathodic protection is utilized within the water and sewer systems. Cathodic protection is a technique used to reduce the corrosion of a metal surface by making that surface the cathode of an electrochemical cell. Proper cathodic protection decreases the number of pipeline leaks and failures, and metal loss in storage tanks; and ensures the integrity of the water distribution system and helps to ensure sewer mains are maintained. Without proper cathodic protection, pipeline leaks and premature pipeline and storage tank failures increase, causing potentially costly property damage and possible loss of service to customers.

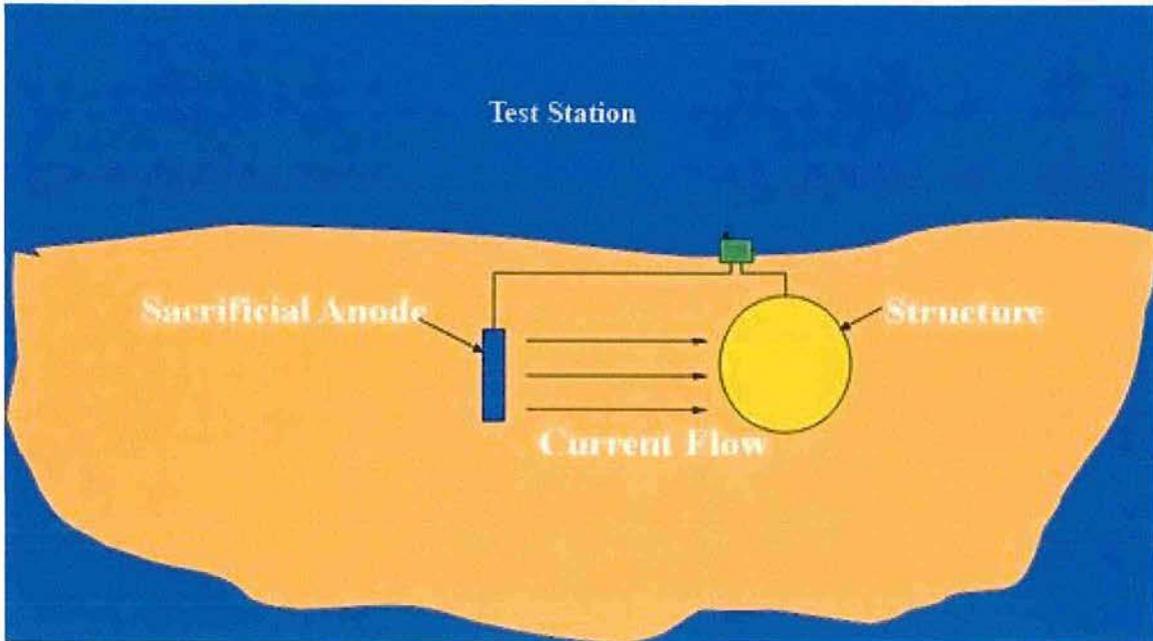
The Basic Corrosion Cell



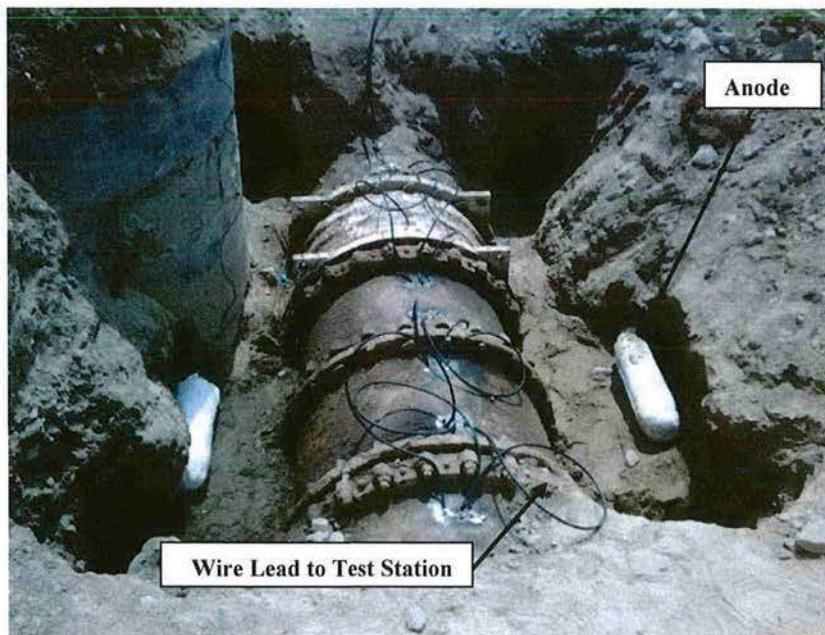
There are two types of cathodic protection: the passive sacrificial anode cathodic protection system and the impressed current cathodic protection system.

Passive Sacrificial Anode Cathodic Protection System

The anode is made from a metal alloy with a more negative electrochemical potential than the metal of the structure it is protecting (the cathode). The difference in potential between the two metals causes the sacrificial anode material to corrode in preference to the structure. As a result, this stops the oxidation reactions (corrosion) on the metal of the structure being protected.



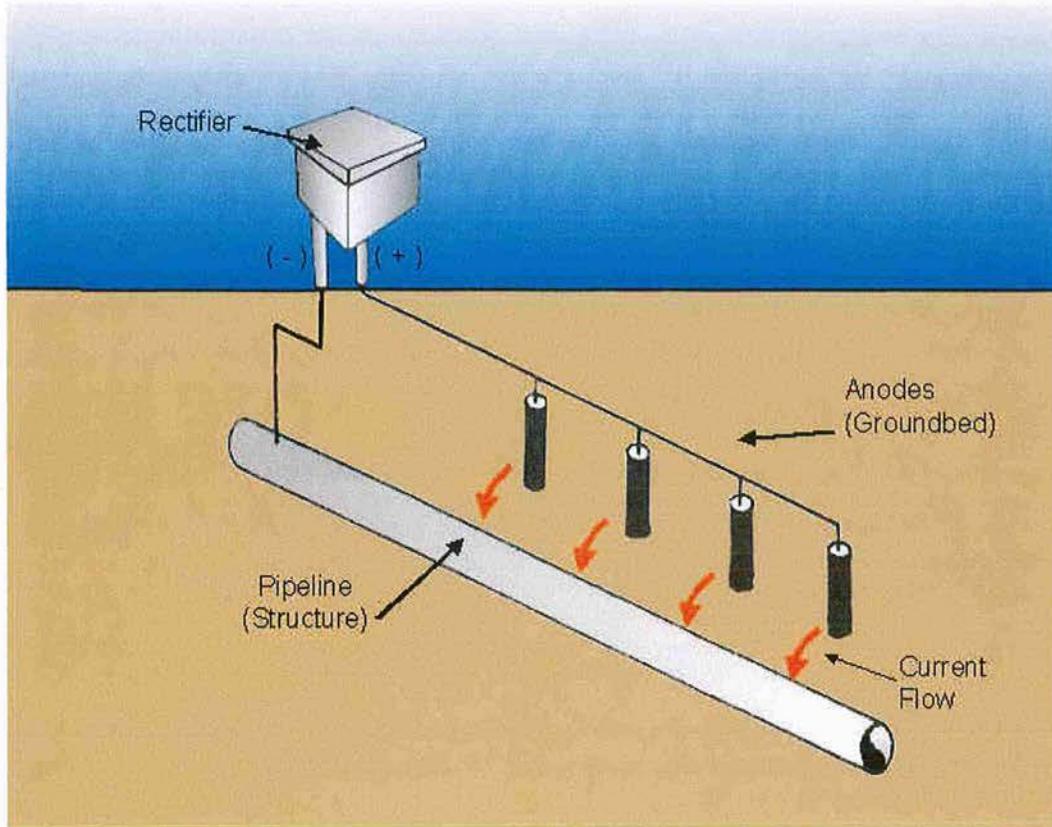
Passive Sacrificial Anode Cathodic



Passive Sacrificial Anode System

Impressed Current Cathodic Protection System

An impressed current cathodic protection system, also referred to as a rectifier system, is used to provide cathodic protection to structures where a passive sacrificial anode cathodic protection system is not adequate. AC power is converted via a rectifier to DC. Connections from the structure and the anodes are made at the rectifier to complete the electrochemical cell.



Impressed Current Cathodic Protection

Existing Cathodic Protection Systems

MWRA has over 1450 cathodic protection test stations: 1,100 cathodic protection test stations and 17 rectifier systems in the water system; 21 cathodic protection test stations in the sewer system; and 335 cathodic protection test stations at Deer Island. The sacrificial anodes typically have a life expectancy of 15 to 20 years which is driven by the corrosiveness of the soil over time; anodes deplete and require replacement to achieve adequate cathodic protection.

Water System

The Water System includes 183 miles, or 61% of the distribution pipes, that are equipped with cathodic protection. Pipelines that are susceptible to corrosive environments have cathodic protection installed to protect them from corrosion. Cathodic protection along these pipelines is monitored at test stations. (See Attachment A – MWRA Water System Cathodic Protection Test Stations).

MWRA also has six steel storage tanks in the distribution system: Arlington Heights Standpipe, Bellevue Standpipe 1, Bellevue Standpipe 2, Deer Island Tank, Turkey Hill Tank and Walnut Hill Elevated Tank. All tanks except the Deer Island Tank are equipped with an impressed current cathodic protection system to protect the interior surface of the tank from corrosion.

The Deer Island elevated tank was constructed in 1994 without a cathodic protection system. Routine inspection showed that the interior coatings did not require action, but the submerged surfaces had localized corrosion. Staff will continue to monitor the tank for corrosion. A cathodic protection system will be added when the tank is repainted.

Sewer System

The Sewer System includes a network of interceptors, siphons, tunnels, CSO and emergency outfalls, manholes and other structures. Most of the interceptors have brick material and can be subject to hydrogen sulphide corrosion. Only one sewer interceptor, 30-inch ductile iron Squantum Pumping Station Force Main, is equipped with passive sacrificial anode cathodic protection. (See Attachment B – MWRA Sewer System Cathodic Protection Test Stations).

Deer Island Treatment Plant Cathodic Protection Systems

Deer Island is equipped with passive sacrificial anode cathodic protection systems with over 300 test stations. (See Attachment C - Deer Island Treatment Plant Cathodic Protection Test Stations). The cathodic protection systems were installed when the plant was built in the 1990's to protect the various buried metallic pipeline systems against corrosion.

DISCUSSION:

Cathodic Protection Replacement Program

Staff have developed a Cathodic Protection Replacement Program to assess, make repairs and to develop and implement plan to maintain the existing cathodic protection systems. The following measures have been identified to ensure operation of these systems:

A contract was awarded to ARK Engineering in August 2015 to test and evaluate test stations associated with passive sacrificial anode systems and the rectifier systems in the water and sewer systems. This contract includes identifying any deficiencies with the systems and recommending remedial measures. Testing results indicated that over 90% of the test stations have inadequate cathodic protection, or the cathodic protection systems are depleted. Based on the testing results and recommendations, the following tasks are being completed:

In-house Cathodic Protection Replacement Design and Construction: Staff have designed and are installing replacement cathodic protection systems for approximately 16,000 linear feet of Section 57, a 79-year-old, 48-inch diameter steel water main. Each replacement system includes isolation joint test stations, a rectifier, sacrificial anodes and in-line test stations. To date, replacement of three of the eleven systems has been installed. Staff have tested the new rectifier systems and are optimizing them for better performance;

Additional in-house design and replacement will include impressed current cathodic protection systems for a portion of Section 53, a 20-year old, 48-inch 120,000 linear feet

steel water main which runs along Eastern Avenue in Malden, and WASM 3 Section W16, a 54-inch to 60-inch steel water main which runs along Mystic Avenue in Medford. Also, design and replacement of the passive sacrificial anode systems along Section 98, a 24-inch ductile iron water main in Winthrop will be completed by in-house staff.

Shaft 5A/5 Cathodic Protection Replacement: Shaft 5A/5 site was originally equipped with a sacrificial anode cathodic protection system. Results from routine testing showed that the system is no longer providing the full cathodic protection of the original system and design of a new impressed current system was recommended and installed. Construction Contract 7477, Cathodic Protection Replacement was awarded in November 2016 and was substantially complete in June 2017;

Shaft E and L Cathodic Protection Replacement: Similar to Shaft 5A/5, the cathodic protection at these sites was reported as not meeting full protection criteria and in some areas, it was completely depleted. Currently design is underway for a construction contract for replacement systems at these sites;

Steel Storage Tanks Re-painting and Repair: The steel storage tank cathodic protection systems were installed inside the tanks to preserve the tank structures from metal loss. Cathodic protection reduces the frequency of tank maintenance. Recent tanks internal inspections and testing results indicate that the existing cathodic protection systems are in need of replacement. A design contract is being procured for painting and repair of these tanks. The scope of work will include re-painting the exterior and interior of the tanks and replacement of the cathodic protection systems;

Deer Island Treatment Plant Cathodic Protection Rehabilitation: Procurement for a design to replace and restore the functionality of the Deer Island systems has been attempted twice, with limited competition and no recommendation for award. The scope of services for this contract, which will include design and engineering services during construction for the rehabilitation of the existing systems, will be incorporated into a future contract for other work at Deer Island;

Future Contracts: The remaining water and wastewater cathodic protection systems will be replaced under future design and construction contracts. Staff will propose two design and two construction contracts in the FY2019 CIP to replace these systems as indicated in Table 2 below.

Test stations and rectifier units are mapped in the Authority's Geographic Information System (GIS). The data obtained from the Cathodic Protection Testing and Evaluation contract will be made available in MAXIMO and used in implementing a preventive maintenance program.

BUDGET/FISCAL IMPACT:

The FY18 CIP includes budget for cathodic protection work as indicated in Table 1 below.

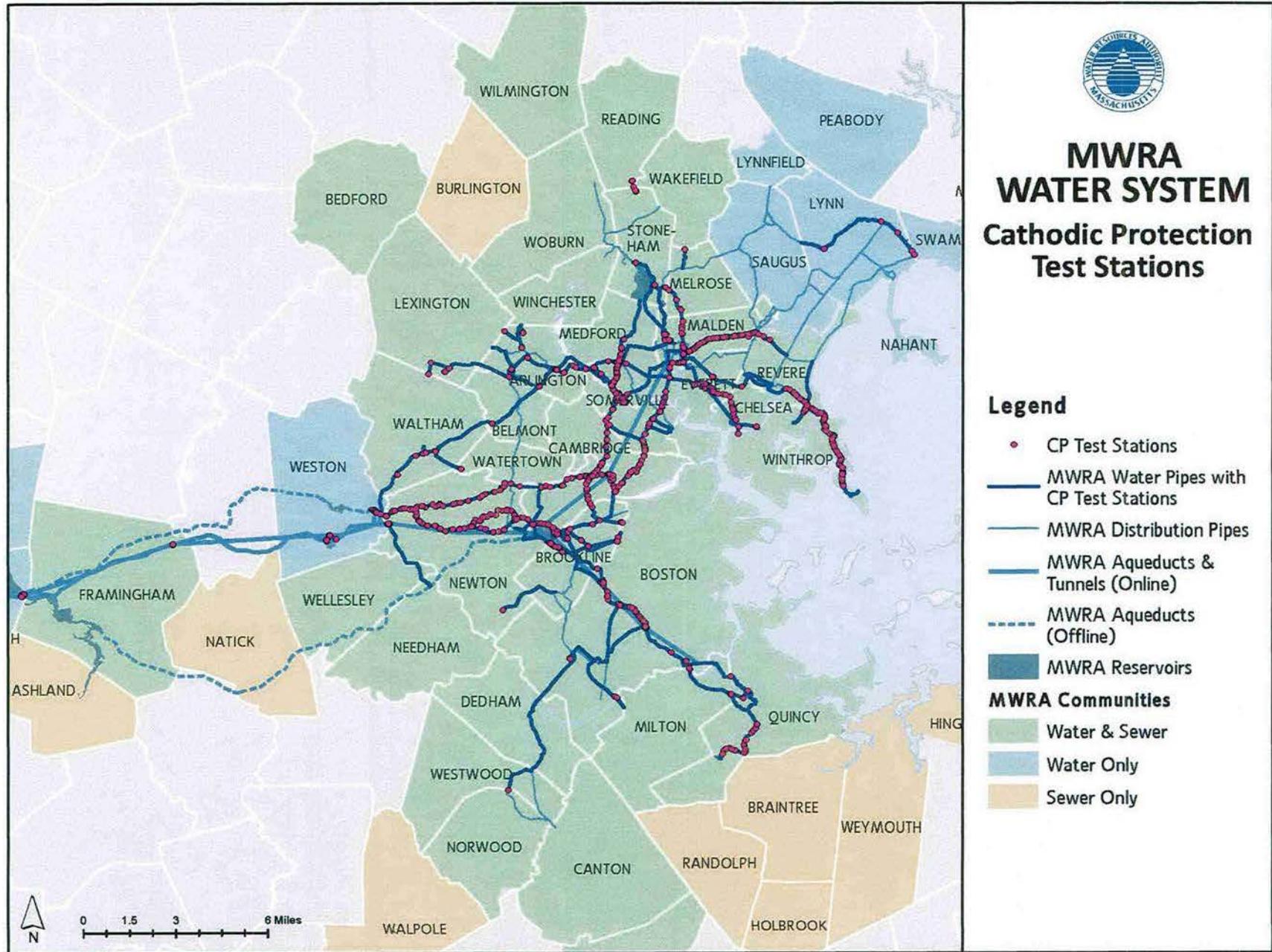
Table 1 – FY18 CIP Cathodic Protection Budget

Contract	Description	Notice-To-Proceed	Substantial Completion	Estimated Cost
7497, Task Order No. 20	Shaft E and Shaft L, Cathodic Protection Replacement – Design and Bidding Services	May-17	Jan-18	\$160,000
6880	DITP Cathodic Protection - Design/ESDC	Oct-17	Nov-23	\$1,360,000
6440	Shaft E and Shaft L, Cathodic Protection Replacement – Construction	Jan-18	Jan-19	\$531,159
6832	Steel Tank/Improvements – Design/ CA/RI	Jan-18	Mar-22	\$3,000,000
7493	Steel Tank/Improvements Construction	Mar-19	Mar-21	\$13,950,000
7056	DITP Cathodic Protection - Construction	Apr-20	Oct-22	\$ 6,471,420

Table 2 – FY 19 Proposed Cathodic Protection New Projects

Contract	Description	Notice-To-Proceed	Substantial Completion	Estimated Cost
Future Contract	Cathodic Protection Replacement (Western System) – Design/ CA/RI	July – 19	June – 21	\$930,000
Future Contract	Cathodic Protection (Western System) Replacement – Construction	July – 21	June – 23	4,300,000
Future Contract	Cathodic Protection Replacement (Metro System) – Design/ CA/RI	July – 20	June – 24	\$9,900,000
Future Contract	Cathodic Protection (Metro System) Replacement – Construction	July – 22	June - 26	\$47,100,000

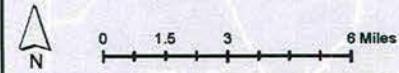
Attachment A



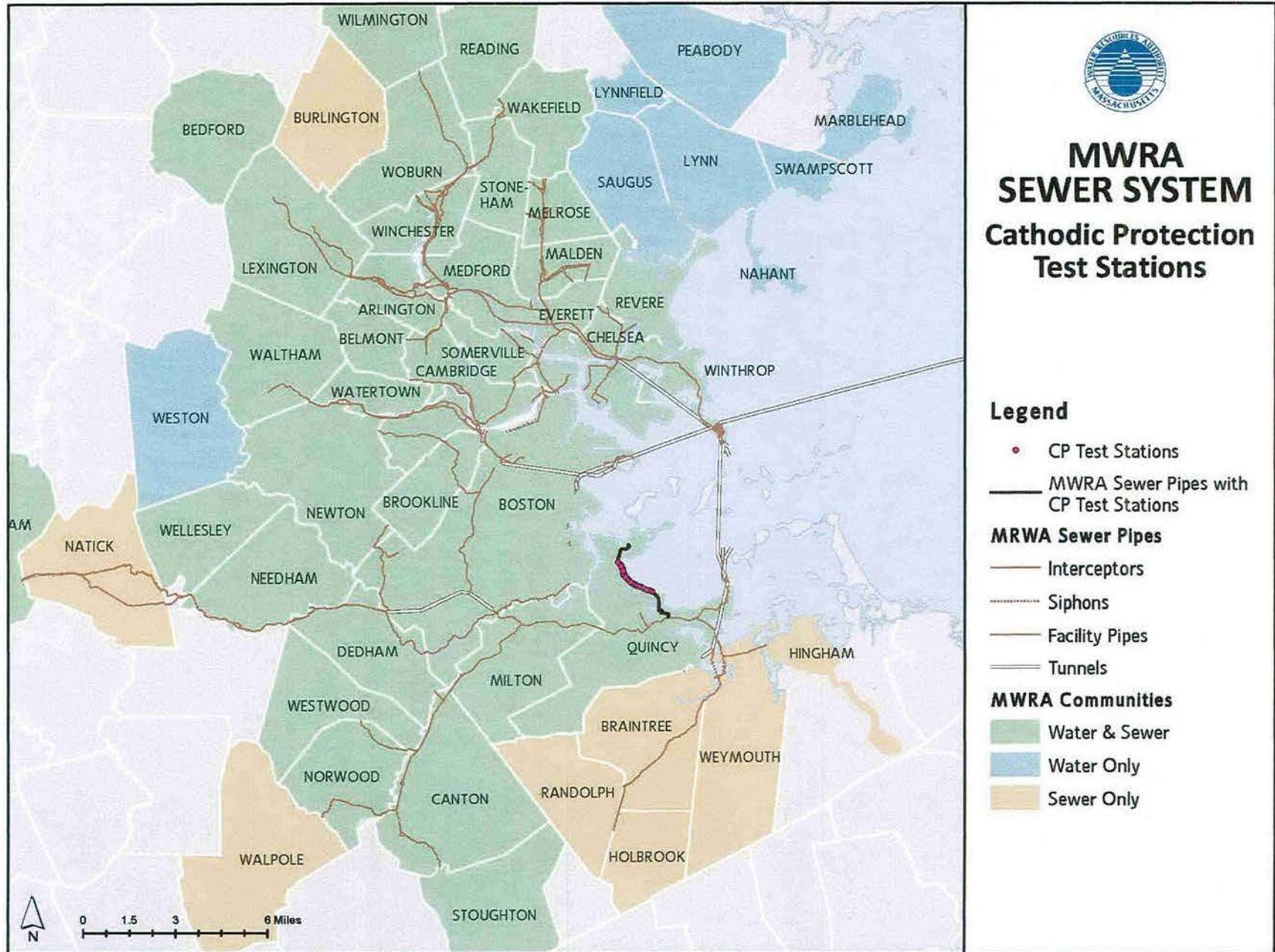
MWRA WATER SYSTEM Cathodic Protection Test Stations

Legend

- CP Test Stations
- MWRA Water Pipes with CP Test Stations
- MWRA Distribution Pipes
- MWRA Aqueducts & Tunnels (Online)
- - - MWRA Aqueducts (Offline)
- MWRA Reservoirs
- MWRA Communities**
- Water & Sewer
- Water Only
- Sewer Only



Attachment B



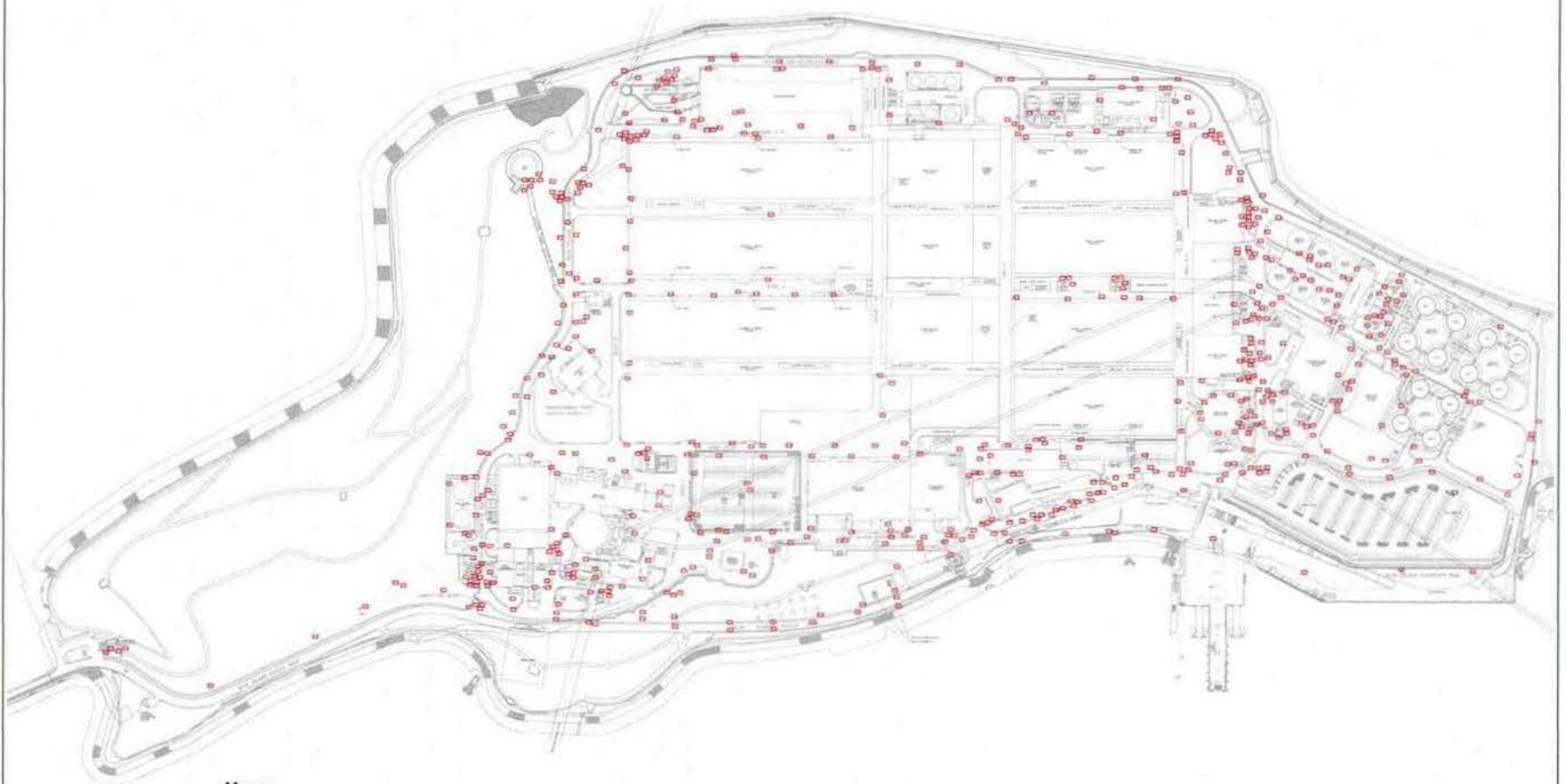
MWRA SEWER SYSTEM Cathodic Protection Test Stations

Legend

- CP Test Stations
- MWRA Sewer Pipes with CP Test Stations
- MWRA Sewer Pipes**
 - Interceptors
 - Siphons
 - Facility Pipes
 - Tunnels
- MWRA Communities**
 - Water & Sewer
 - Water Only
 - Sewer Only

Attachment C

Deer Island Treatment Plant Cathodic Protection Test Stations



Key:

 Cathodic Protection Test Station

STAFF SUMMARY

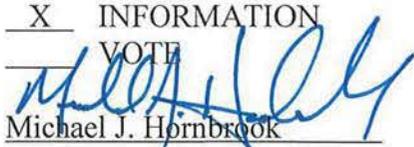
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Status Update of North Reading and the MWRA



COMMITTEE: Water Policy & Oversight

Pamela Heidell, Policy and Planning Manager
Carolyn Fiore, Deputy Chief Operating Officer
Preparer/Title

X INFORMATION
VOTE


Michael J. Hornbrook
Chief Operating Officer

On September 5, 2017 a presentation "Water MWRA vs. Andover" was made to the North Reading Board of Selectmen (Attachment 1), after which the Selectmen approved a motion authorizing the Town Manager to move forward with drafting an extension to the Town's existing Intermunicipal Water Supply Agreement with Andover as well as a long term successor Agreement with Andover. The Board of Selectmen also voted to postpone until no later than April 30, 2018 further permitting, design and construction related to the MWRA interconnection. This is a departure from the direction that North Reading had been pursuing to join the MWRA and connect by mid- 2019. An article on North Reading's October Town Meeting warrant includes further evaluation of feasibility of both water and wastewater options. In light of these developments, this staff summary has been prepared.

RECOMMENDATION:

For information only.

DISCUSSION:

North Reading now derives approximately 0.5 mgd from wells in the Ipswich River Basin and 1.0 mgd from purchases from Andover. Its maximum day demand is approximately 2.3 mgd. North Reading's water system goals are to provide a long-term sustainable option for water supply, to reduce water system complexity and to mitigate stress on the Ipswich River Basin.

Since 2014, North Reading has undertaken a series of actions related to its long-term water supply plan, and admission to MWRA has been a central focus. In 2014, the Town filed an Environmental Notification Form stating the Town's intent to become a fully served MWRA community: its 2016 Draft Environmental Impact Report (DEIR) for water supply solutions reiterated this intent. In 2015 and 2016, North Reading Town Meeting approved warrant articles for the funding of engineering, design, and permitting of water connection to MWRA. In 2017, legislation was enacted for North Reading to become a member of MWRA. A study was also undertaken to evaluate wheeling water from MWRA through the Town of Reading water system to North

Reading, and to determine infrastructure improvements required to assure a reliable supply and adequate pressure to both communities. The study yielded recommendations to upsize certain pipelines in Reading and to construct a new interconnection between Reading and North Reading.

Over the past few years, staff have worked cooperatively with both North Reading and Reading, provided assistance to North Reading in the development of the DEIR and technical studies, and have attended many meetings in North Reading. In addition, MWRA continues to advance its Northern Intermediate High (NIH) Redundancy project to increase hydraulic capacity at NIH communities' meter connections and also enhance reliability.

Throughout this time, Andover continued to pursue the possibility of supplying water to North Reading. In its 2016 comment letter on North Reading's DEIR for joining the MWRA, Andover took exception to statements in the DEIR that seemingly dismissed the viability of Andover's ability to meet all of North Reading's current and forecasted needs. In its September PowerPoint presentation "Water MWRA vs. Andover" (attached), North Reading indicated Andover's DEIR comments lead North Reading to re-open discussions with Andover.

Regarding Andover water to North Reading, the presentation noted the following:

- North Reading and Andover have met 11 times to understand how Andover can supply 100% of North Reading's water needs from Andover's source waters in the Merrimack River Basin.
- Andover raised concerns over losing 20% of its water revenue should North Reading become fully supplied by MWRA, and is moving towards a tiered rate structure.
- Under the proposed Summary of Terms of the Andover-North Reading Intermunicipal Agreement, Andover would supply North Reading up to 2.6 mgd initially, then 3 mgd to meet peak demands. Andover proposes to charge North Reading 95% of its tier 1 rate and to cap escalation to no more than 2.5% annually for the first ten years of a 99-year Agreement. (See Summary of Terms in Attachment 2).
- The Andover option entails no entrance fees and no wheeling charges. Lower historical water rate escalation was cited as an advantage.
- North Reading's cost estimate for infrastructure improvements necessary for wheeling of MWRA through Reading to North Reading (improvements in Reading's distribution system and a pump station at North Reading's border) total \$9.8 million. In contrast, Andover proposes to be responsible for all capital expenses to supply North Reading, and to reimburse North Reading for expenses already incurred.
- Cited advantages of MWRA include the permanence of the solution, North Reading's representation in MWRA governance, a pipeline design that is underway, and prior Town Meeting votes to approve capital funding.

- A consideration for both the MWRA and Andover options is the extent to which each may facilitate sewerage in sections of North Reading (with wastewater to MWRA via Reading/Wilmington and wastewater to the Greater Lawrence Sanitary District via Andover's interceptors).

North Reading's September presentation included a chart comparing the cost of Water Operations. MWRA Finance examined North Reading's chart and the information in North Reading's presentation and then recreated it to better understand its assumptions. This is included in Attachment 3. It shows a wide divergence in MWRA vs. Andover's rate. Regarding the chart and a comparison of MWRA rates vs. Andover rates, MWRA staff make the following observations:

- MWRA and Andover's FY 2020 rates are similar (based on 95% of the Tier 1 2020 rate published on Andover's web page), but MWRA's rate is slightly lower, \$3,865 per mgd, versus \$3,962 per mgd for Andover.
- North Reading projected rates out to 2056, and assumed that MWRA's rate will continue to escalate at slightly less than 4% annually. It appears that an escalation rate of 2.5% for Andover over the next 40 years was used, even though the proposed Intermunicipal Agreement Summary of Terms is silent on the period beyond ten years. If MWRA's escalation in the out-years is less than 4% and Andover's escalation is more than 2.5%, the divergence in MWRA and Andover would be markedly less. Since MWRA does not project rates out to 2056 and Andover's capital needs and financing beyond ten years is not known, this complicates making a true comparison between the MWRA and Andover.
- North Reading's cost comparison appears to be based on the assumption that the maximum day demand of 2.6 mgd will occur 365 days a year rather than assuming an annualized average day demand (1.6 mgd).
- MWRA's entrance fee would be slightly less than the \$7.6 million assumed by North Reading. MWRA's FY18 entrance fee is \$4.367 million per mgd, or \$6.98 million for 1.6 mgd. Under the current policy of no-interest payment of the entrance fee over a period of 25 years with the first three-year grace period, the annual entrance fee payment is \$316,745 per year.

ATTACHMENTS:

1. North Reading Presentation: "Water MWRA vs. Andover"
2. Summary of Terms Intermunicipal Agreement for Potable Water Service
3. MWRA Finance Analysis and Recreation of North Reading's Cost Comparison

Water
MWRA vs. Andover

September 5, 2017



Why are we discussing this?

- After the 20 year Andover water agreement ran out, and while we were negotiating a new agreement, we asked if they could supply all of our water. They said no.
- This forced us to consider the MWRA. In the process we had to file a DEIR defining our project intent to connect to the MWRA by wheeling water through the Town of Reading
- Andover commented on the DEIR stating they could supply all of our water needs, leading us to reopen discussions with them, while continuing to move the MWRA project forward.
- Sewer is an increasing viable option, sooner than initially believed

Objectives for Tonight

- Review the updated status of the discussions with Andover and status of MWRA project
- **Determine if Andover's voted and approved proposal is worthy of consideration**
- If it is, discuss impact on MWRA capital expenditures, timelines and permitting
- Potentially seek formal IMA extension with Andover

What changed in Andover

- Soon after us signing the current 5 year agreement, Andover hired a new Town Manager, Assistant Town Manager and a consultant who reviewed their rates, recommended moving to a tiered rate and raised concern over losing 20% or more of their water revenue.
- We met with this team numerous times (11) to understand why they can now supply all of our water
- Their water consultant answered most of our question which lead to a letter from their Town Manager that they made a error.

Summary of Andover Agreement

- Service – Up to 2.6MG/Day, option after 6 years to 3MG/Day
- Capital Expense – Andover will be responsible
- Water Rate – 95% of their tier 1 rate, not to exceed 2.5% for a term of 10 years
- Will reimburse North Reading for costs already incurred up to \$953,000 beginning in July 1 2018 in the amount of \$95,300.
- Term – 99 years pending Town Meeting & Legislature approval
- Termination Right – Either party 5-years prior notice, Exiting party to pay 5-years-revenue

Summary of Andover Agreement (cont.)

- Work with North Reading to the extent feasible to be an emergency backup water supply to the Town of Reading through the North Reading water infrastructure
- Service Quality & Quantity – Andover responsible for meeting State and Federal requirements. Water ban supplies to be shared equally
- Permitting/Approvals – Each Town responsible for their own, Andover to supply engineering and administrative support to obtain permits to assist to obtain the necessary permitting
- Interim Agreement extended, rate of 5% for FY2019, 0% for FY2020 and 2.5% FY2021
- If a long term agreement is reached then the rate goes to 95% of Andover's tier 1 rate at the beginning of the fiscal year the agreement is signed
- Sewer Collaboration

Voted and Signed Agreement Proposal



Qualifications

- Both sources (Quabbin for MWRA and Merrimack River for Andover) have capacity sufficient to meet the long term water supply needs of North Reading
- Wright Pierce has confirmed in letter dated August 31, 2019 that their opinion is that the Merrimack River has substantial capacity to provide drinking water to large population centers without risk of significantly reducing or impacting the flows and water quality.
- Both suppliers provide water that consistently meets all primary and secondary drinking water standards
- Both suppliers have a history of being very reliable in delivering water
- Both can meet our water needs today and tomorrow

Note: Customers of both suppliers have had service interruptions since 2010

Remaining Challenges

<p style="text-align: center;">MWRA Water</p> <ul style="list-style-type: none"> • Approval of getting pipe across the Mill Street Bridge from Reading Historic and Conservation committees • Legislative approval for the same • Approval of a 2.6 million gallon a day IBT • Wheeling agreement 	<p style="text-align: center;">Andover Water</p> <ul style="list-style-type: none"> • Negotiations leading to a 99 year legal agreement • Andover Town Meeting approval of 99 year agreement • Legislative approval also needed • Approval of an additional 1.1 million gallon a day IBT
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Pros

<p style="text-align: center;">MWRA</p> <ul style="list-style-type: none"> • Permanent solution • NR Representation • Community is on board • Design is underway to meet July 1, 2019 cutover • Mill Street property has been purchased for required pumping station • Capital funding has been approved by Town Meeting 	<p style="text-align: center;">ANDOVER</p> <ul style="list-style-type: none"> • There are two existing water connections between Andover and North Reading • No pumping is required • Any infrastructure costs in Andover will be funded by Andover • No buy in costs • No wheeling charges • Lower historical water rate changes 1.2% vs 4% • Supports connection to Greater Lawrence sewer district
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Cons

<p style="text-align: center;">MWRA</p> <ul style="list-style-type: none"> • Higher level of permitting required • Getting approval to cross the Ipswich River at Mill Street • Requirement to make improvements to the Reading water infrastructure • MWRA is not bring supply directly to NR • All costs to be borne by NR • Single connection at Mill St • Water needs to be pumped into NR • Will have to add chloramines at pumping station • Buy in to MWRA is \$7.6 Million • Lose or delay connection to greater Lawrence sewer district • Wheeling charge • Special legislation to allow water line through conservation land 	<p style="text-align: center;">Andover</p> <ul style="list-style-type: none"> • We will not be a member of Andover's water commission • Agreement lacks permanence, only for 99 years • Chlorine will have to be added at two entry points • We may lose MWRA sewer opportunity on Concord Street • Special Legislation needed for the 99 year agreement
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Things to Consider

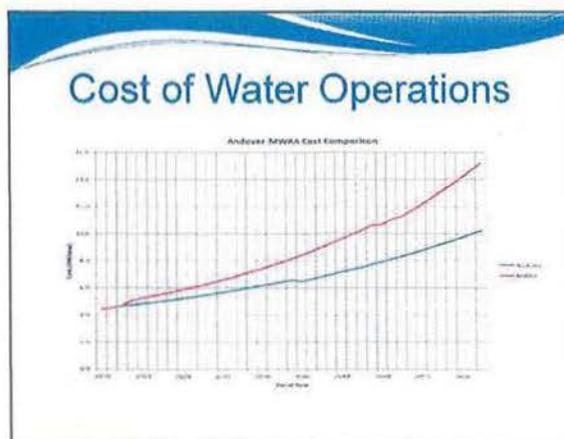
- Capital cost avoidance (~\$5 million) assuming grant for pump station is received
- MWRA buy in (~\$7.6 million)
- Cost of water over time
 - MWRA average annual increase over 10 years is 4.1%
 - Andover average annual increase over 20 years is 1.2%
- Path to sewer for Route 28, Martins Pond and Concord Street via Greater Lawrence Sewer District
- MWRA sewer expansion on Concord Street
- We will have to spend additional consulting money to continue the review of going down the path of Andover

Fixed Cost Comparison

Expenses	MWRA	Andover
Consulting	\$1,650,000	\$325,000
Reading/Andover Infrastructure	\$4,670,000	\$0.00
Pumping Station Construction	\$2,550,000	\$0.00
Booster Chlorine Stations	\$0.00	-\$1,150,000
North Reading Improvements	\$1,000,000	-\$2,500,000
Reimbursement for money spent on MWRA		-\$653,000
totals	\$9,870,000	-\$3,032,000
Buy in cost	\$7,680,000	\$0.00

Annual Operating Cost

	MWRA	Andover
Pump Station & Chloramine	TBD	\$0.00
Chlorine Distribution	\$0.00	TBD
Well Maintenance	-\$202,440	-\$202,440
Labor Related to Well Operation	-\$187,840	-\$187,840



- ### Objectives for Tonight
- Review the status of the discussions with Andover and status of MWRA project
 - Determine if Andover's current proposal is worthy of consideration
 - If it is, discuss impact on MWRA capital expenditures, timelines and permitting
 - Potentially seek formal IMA extension with Andover

ATTACHMENT 2

COPY

Motion: I move that the Board of Selectmen authorize the Town Manager to move forward with drafting an extension to the existing Inter-Municipal Agreement for Potable Water Service with the Town of North Reading and a long term successor agreement, and take any other measures related thereto, with the terms below serving as a framework for such an agreement.

**SUMMARY OF TERMS
Inter-Municipal Agreement
for
Potable Water Service**

SUPPLIER: Town of Andover, MA ("Andover")

CUSTOMER: Town of North Reading, MA ("North Reading," and together with Andover, the "Towns," or, individually, a "Town")

SERVICE PROVIDED: Up to 2.6 million gallons per day (MGD), maximum day demand, effective July 1, 2019. Option for up to 3.0 million gallons per day (MGD) after six years, subject to permitting and appropriation.

CAPITAL EXPENSE: Andover will be responsible for capital expenses in Andover related to the delivery of potable water to the North Reading town line.

COSTS INCURRED: Andover will reimburse North Reading's costs already incurred to join the MWRA, up to [\$953,000], which costs will be reimbursed by Andover through credits to North Reading's water invoices, starting July 1, 2018 in the amount of \$95,300 annually, ending on the date North Reading executes a long term agreement with the MWRA. North Reading will provide Andover with documentation acceptable to Andover for all such costs assumed.

WATER RATE: 95% of Andover's Tier 1 Rate, with annual increases not to exceed 2.5% for a term of 10 years.

TERM: 99 years pending each Town's Town Meeting and Legislative Approval.

SERVICE QUALITY AND QUANTITY: Andover to be responsible for water meeting all state and federal guidelines at time of delivery to the North Reading town line. Any reductions in water service quantities, caused by water bans/restrictions and the like, to be borne proportionately by the two Towns based on usage volumes. Both parties agree that all water limitations placed by Andover on its users will be applied equally to North Reading.

BACK-UP WATER SUPPLY TO READING: The Towns agree to commit to working with North Reading to establish Andover as the emergency back-up water supply for the

**PERMITTING/
APPROVALS:**

Town of Reading, to the extent feasible, through North Reading's water infrastructure (the "Reading Transaction"). Entry by Andover into any definitive agreement relating to the Reading Transaction will be contingent upon Andover being appropriately indemnified and held harmless.

Each Town to be responsible for their own municipal approvals. The Towns will cooperate in obtaining any necessary "Home Rule" petition. Andover will coordinate and obtain any Andover permits to deliver water in accordance with this agreement. Andover will provide engineering and administrative support needed to obtain permits to assist North Reading with inter-basin transfer permitting.

**EXTENSION OF
CURRENT INTER-
MUNICIPAL
AGREEMENT:**

The Towns will extend the current inter-municipal agreement for one-year extension of the existing agreement on the above terms, with automatic renewal to a second year unless notice is given by North Reading before November 1, 2019. All existing terms of the current Inter-Municipal Agreement between the Towns will remain in full force and effect, with the exception of the Water Rate, which shall increase by 5% beginning July 1, 2018, 0% beginning July 1, 2019, and 2.5% beginning July 1, 2020.

**NEW LONG TERM
SUCCESSOR
AGREEMENT:**

If the parties agree to a long-term Successor Agreement, Andover agrees to set the effective rate of 95% of Andover's Tier 1 rate retroactively to the beginning of the fiscal year in which the Successor Agreement is executed.

**SEWER
COLLABORATION:**

Andover recognizes that North Reading intends to further investigate the feasibility of connecting through Andover's sewer network to the Greater Lawrence Sanitary District sewer treatment facility. Andover is committed and will fully cooperate with this effort.

Motioned by Selectwoman Leura Gregory

Seconded by Selectman Bob Laundry

4 Yea
1 Nay

COPY

Attachment 3

Analysis of North Reading Water Presentation September 5, 2017

MWRA

FY16 \$/MG	\$ 3,488.04
Assumed MGD	2.6
Calculated: \$/yr	\$ 3,310,149.96
Rate of Increase to water	3.70%

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Assessments	\$ 3,310,149.96	3,432,626	3,559,633	3,691,339	3,827,919	3,969,552	4,116,425	4,268,733	4,426,676	4,590,463	4,760,310	4,936,441	5,119,090	5,308,496	5,504,910	5,708,592
Entrance Fees	7,600,000.00	@3.5% for 25yrs			0	0	0	461,123	461,123	461,123	461,123	461,123	461,123	461,123	461,123	461,123
Consulting	1,650,000.00	@4.0% for 30yrs			95,420	95,420	95,420	95,420	95,420	95,420	95,420	95,420	95,420	95,420	95,420	95,420
Reading Infrastructure	4,670,000.00	@4.0% for 30yrs			270,067	270,067	270,067	270,067	270,067	270,067	270,067	270,067	270,067	270,067	270,067	270,067
Pumping Station Construction	2,550,000.00	@4.0% for 30yrs			147,467	147,467	147,467	147,467	147,467	147,467	147,467	147,467	147,467	147,467	147,467	147,467
North Reading Improvements	1,000,000.00	@4.0% for 30yrs			57,830	57,830	57,830	57,830	57,830	57,830	57,830	57,830	57,830	57,830	57,830	57,830
MWRA Total			4,398,702	4,540,335	4,687,208	5,300,638	5,458,582	5,622,369	5,792,216	5,968,347	6,150,996	6,340,402	6,536,816	6,740,498		
MWRA			\$ 4.40	\$ 4.54	\$ 4.69	\$ 5.30	\$ 5.46	\$ 5.62	\$ 5.79	\$ 5.97	\$ 6.15	\$ 6.34	\$ 6.54	\$ 6.74		

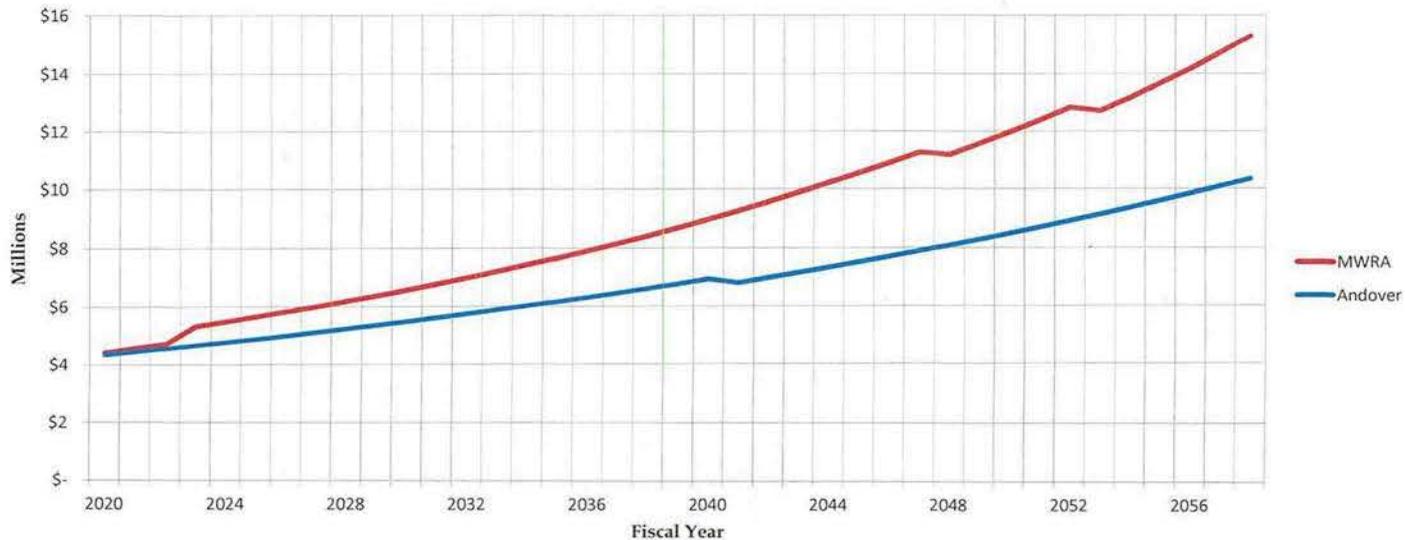
Andover

FY16 \$/MG	\$ 3,850.00
Assumed MGD	2.6
Calculated: \$/yr	\$ 3,653,650.00
Rate of Increase to water	2.50%

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Assessments	\$ 3,653,650.00	3,744,991	3,838,616	3,934,581	4,032,946	4,133,770	4,237,114	4,343,042	4,451,618	4,562,908	4,676,981	4,793,905	4,913,753	5,036,597	5,162,512	5,291,575
Consulting	325,000.00	@4.0% for 20yrs			23,914	23,914	23,914	23,914	23,914	23,914	23,914	23,914	23,914	23,914	23,914	23,914
Booster Chlorine Stations	1,150,000.00	@4.0% for 20yrs			84,619	84,619	84,619	84,619	84,619	84,619	84,619	84,619	84,619	84,619	84,619	84,619
North Reading Improvements	2,500,000.00	@4.0% for 20yrs			183,954	183,954	183,954	183,954	183,954	183,954	183,954	183,954	183,954	183,954	183,954	183,954
Reimbursement	(953,000.00)	@0.0% for 20yrs			-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650	-47,650
Andover Total			4,325,433	4,426,257	4,529,601	4,635,529	4,744,105	4,855,396	4,969,468	5,086,393	5,206,241	5,329,084	5,454,999	5,584,062		
Andover			\$ 4.33	\$ 4.43	\$ 4.53	\$ 4.64	\$ 4.74	\$ 4.86	\$ 4.97	\$ 5.09	\$ 5.21	\$ 5.33	\$ 5.45	\$ 5.58		



Andover - MWRA Cost Comparison



Assumptions to be verified:

- Are assumed flows 2.6MGD, 1.6MGD or something else?
- Are debt issuance assumptions correct?
- MWRA assessment growth rate calculates to 3.7%. 4.0% was provided, 4.1% is referenced in body of presentation
- Is Andover 2016 cost of \$3,850/MG accurate?

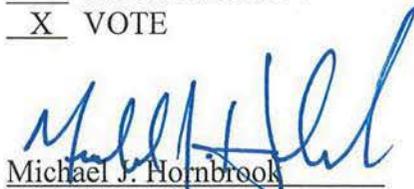
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services
Stantec Consulting Services, Inc.
Contract 7156, Amendment 4

COMMITTEE: Water Policy & Oversight

 INFORMATION
 X VOTE

William G. Sullivan, P.E., Sr. Program Manager
A. Navanandan, P.E., Chief Engineer
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

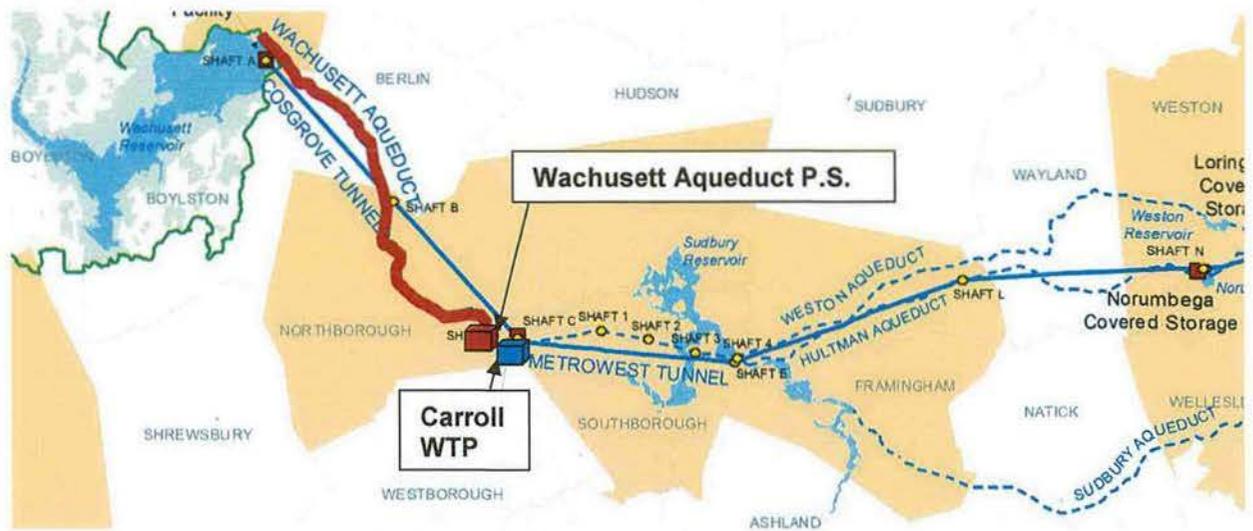
RECOMMENDATION:

To authorize the Executive Director, on behalf of the Authority, to approve Amendment 4 to Contract 7156, Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services with Stantec Consulting Services, Inc., in the amount of \$711,617.02 increasing the contract amount from \$6,891,983.08 to an amount not to exceed \$7,603,600.10 with no change in the contract term.

DISCUSSION:

On January 18, 2012, the Board approved the award of Contract 7156, Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services to Fay, Spofford and Thorndike, LLC. Subsequently, Fay, Spofford and Thorndike, LLC was acquired by Stantec Consulting Services, Inc., and on February 10, 2016 the Board approved the assignment of this contract to Stantec.

This contract is part of MWRA's long-term redundancy plan for the water transmission system. The pumping station, located adjacent to the John J. Carroll Water Treatment Plant in Marlborough (see location map and artist's rendering on the following page), will address a major weakness in the current redundancy from the Wachusett Reservoir to the Carroll Treatment Plant in Marlborough. When complete, this project will provide redundancy for the Cosgrove Tunnel, currently the sole water supply conduit to the Carroll Treatment Plant.



Location Plan – Wachusett Aqueduct Pumping Station



Rendering – Wachusett Aqueduct Pumping Station

This Amendment

This amendment request is to provide funds for additional engineering services during construction identified after the original contract execution. Changes include differing site conditions at the surge tank, energy optimization, increased operational resiliency for the pumps and upgrade of the obsolete Carroll plant fire alarm system. This work is described below:

Additional Shop Drawing/Submittal Reviews \$289,257.08

The original contract scope of work was based on the review of 700 shop drawings and related submittals. This number has been exceeded. An additional 400 submittals are anticipated by the end of the project. The number of shop drawings was estimated by staff prior to the beginning of design based on the number of shop drawings submitted on previous MWRA projects. The project has evolved substantially since that time in size and complexity, which has resulted in a greater number of shop drawings.

Additional Change Order Assistance \$115,507.26

As indicated above, the project is larger and more complex than anticipated when the consultant contract was executed. The level of effort required to support the preparation of change orders has exceeded the budget in the original contract. This work includes reviewing change order requests, assisting in negotiations, preparing independent cost estimates and preparation of contract document revisions.

Additional Geotechnical Investigation and Surge Tank Foundation Redesign \$79,826.50

A differing site condition was found in the rock profile under the proposed surge tank. A boring was drilled in the center of the 14-foot diameter surge tank during design. However, during excavation for the surge tank foundation, the contractor found that the rock profile varied sharply from the centerline rock elevation found by the boring. As a result, additional geotechnical investigation was required to confirm the rock profile, and a redesign of the surge tank foundation was required including twelve micropiles and a thicker 2-foot 4-inch thick mat foundation.

Correction of a Computational Error in Amendment 2 \$50,575.73

Subsequent to the Board's approval of the cost of additional Resident Inspection Services in Amendment No. 2, MWRA staff discovered an error in the spreadsheet provided by Stantec calculating the budget required to perform the Resident Inspection Services. The basis (hours and rates) for this work is not in dispute. The correct cost would have been included in Amendment No. 2, but for the spreadsheet error; thus the amount is corrected by inclusion in this amendment.

Design for Power Fluctuation Ride-Through Capability

\$34,027.98

Short duration power fluctuations can occur during switching operations in the electrical utility's system. These fluctuations can result in the shutdown of equipment that is sensitive to these fluctuations. The pump motor manufacturer for the contract would not guarantee that its motors could ride through power fluctuations unless optional ride-through components were added. Modifications were required to the surge control system to ensure that the control valves would continue to operate during power fluctuations. Stantec investigated alternatives to add this ride-through capability and designed these modifications. Sensitivity to power fluctuations is not typically a problem with pumping equipment because either the equipment will not shut down or it can be quickly restarted. However, without the addition of ride-through components to this contract, the pumping station could trip off line during a power fluctuation which would cause the Carroll Water Treatment Plant to shutdown. The cost of the additional design is included in this amendment; and the ride-through capability will be added to the construction contract by change order.

Engineering Assistance with the Carroll Treatment Plant Fire Alarm System

\$32,064.20

The existing fire alarm system at the Carroll Water Treatment Plant that was installed in 2005 is no longer supported by the manufacturer. To ensure that the latest version was installed at the Carroll Plant, MWRA decided that this work should be completed after construction of the pumping station commenced so that the Carroll Plant and the pumping station fire alarm panels would be the same version. The Carroll Plant fire alarm panels are being upgraded under a change order to the Wachusett Aqueduct Pumping Station construction contract also being presented at this Board meeting. This upgrade will make the Carroll Plant fire alarm system compatible with the Wachusett Aqueduct Pumping Station fire alarm system which will allow the main fire alarm master panel at the plant to monitor the fire alarm systems in the pumping station and the guard house. Additional professional services are required of Stantec to support this upgrade including submittal reviews, testing, start-up, operations and maintenance manual, training and record drawings.

Pipe Gallery Dehumidification

\$25,840.64

Recent operating experience with the Carroll Plant Ultraviolet Room dehumidification system has shown that the as-bid dehumidifiers in the pumping station pipe gallery should be changed to a desiccant-type system. The level of effort for the evaluation of alternatives and design of the dehumidification system will exceed the available budget.

Additional Equipment Testing

\$22,034.41

Resolution of manufacturer control issues during the start-up of the ozone destruct units in the Carroll Ozone Building resulted in an additional level of effort for testing than budgeted in the original contract.

Redesign of the Air/Vacuum Valves

\$16,553.03

The design of the air/vacuum valves on the 120-inch pipe that will supply the Carroll Plant from the pumping station was based on the plant record drawings. During construction, the locations of the existing pipes, buried vaults and duct banks were found to be different than indicated on the record drawings. The construction contractor utilized vacuum excavation to confirm the locations of the existing structures. Redesign of the air/vacuum vaults and piping was required to reflect actual conditions.

Hultman Intake Bar Racks

\$14,506.78

During construction, bar racks were found in the Hultman Intake Building that were not shown on the record drawings and access was obstructed during the design phase. Once exposed during construction, it was determined that replacement of these racks was necessary. Hydraulic modeling and the design for the replacement bar racks was conducted.

Other Changes:

\$31,423.41

Additional changes include:

- Redesign was needed for the pumping station electrical metering equipment to reflect utility requirements after bidding that led to changing from net metering to on-site usage;
- Security camera technology was updated; and
- An additional pump factory witness test trip was required due to the failure of one of the pumps in the first test.

CONTRACT SUMMARY:

	<u>AMOUNT</u>	<u>TIME</u>	<u>DATED</u>
Original Contract:	\$4,542,283.24	1,857 Days	2/1/2012
Amendment 1*	\$231,612.93	0 Days	4/2/2014
Amendment 2	\$1,768,344.15	1,157 Days	7/15/2015
Amendment 3	\$349,742.76	0 Days	12/14/2016
Proposed Amendment 4:	<u>\$711,617.02</u>	<u>0 Days</u>	Pending
Adjusted Contract:	\$7,603,600.10	3,014 Days	

*Approved under delegated authority

BUDGET/FISCAL IMPACT:

FY18 CIP contains a budget of \$7,141,983 for Contract 7156. Including this amendment, the adjusted subphase total will be \$7,603,600.10 or \$461,617.10 over budget. This amount will be covered within the five-year CIP spending cap.

MBE/WBE PARTICIPATION:

The contractual MBE and WBE participation requirements of 7.59% and 10.10%, respectively, remain unchanged by this amendment.

STAFF SUMMARY

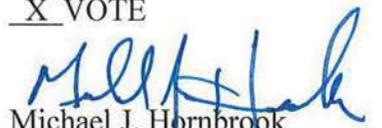
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Wachusett Aqueduct Pumping Station
BHD/BEC JV 2015, A Joint Venture
Contract 7157, Change Order 21



COMMITTEE: Water Policy and Oversight

 INFORMATION
 X VOTE

Vincent Spada, Construction Coordinator
Corinne M. Barrett, Director, Construction
Preparer/Title



Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To authorize the Executive Director, on behalf of the Authority, to approve Change Order 21 to Contract 7157, Wachusett Aqueduct Pumping Station, with BHD/BEC JV 2015, A Joint Venture, for a lump sum amount of \$285,385, increasing the contract amount from \$47,911,923.29 to \$48,197,308.29, with no increase in contract term.

Further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 7157 in an amount not to exceed the aggregate of \$250,000, in accordance with the Management Policies and Procedures of the Board of Directors.

DISCUSSION:

The water transmission system between Wachusett Reservoir and the John J. Carroll Water Treatment Plant consists of the Cosgrove Tunnel and the Wachusett Aqueduct. The Cosgrove Tunnel provides the primary raw water supply to the Carroll Plant and the Wachusett Aqueduct is an emergency back-up. Although rehabilitation of the Wachusett Aqueduct in 2003 allowed its use during short winter duration so that the Cosgrove Tunnel could be connected to the Carroll Plant, it is limited in its flow capacity and it cannot meet the grade line requirements of the Carroll Plant in the event of an emergency. Since the Wachusett Aqueduct operates at a lower hydraulic grade line than the Cosgrove Tunnel, water cannot flow from it into the Carroll Plant's ozone contactors without pumping. If the Wachusett Aqueduct were needed in an emergency, the Carroll Plant would have to be shut down and temporary chlorination facilities would have to be installed at the Wachusett Reservoir-end of the aqueduct to provide disinfection.

Once completed, this new pumping station will allow the Wachusett Aqueduct to provide redundancy for the Cosgrove Tunnel. Completion of the Hultman Aqueduct rehabilitation and

interconnections project provided redundancy for the MetroWest Water Supply Tunnel. Together, these projects will provide water transmission redundancy from Wachusett Reservoir to the metropolitan tunnel system.

This Change Order

Change Order 21 consists of the following item:

Remove and Replace the Existing Fire Alarm Control Panels and Furnish and Install Fiber Optic Cables \$285,385

The contract requires the Contractor to furnish and install an Edward Systems Technology (Edwards) fire alarm control panel at the Wachusett Aqueduct Pumping Station and at the new Front Entrance Guard House that can interface with the existing Carroll Water Treatment Plant EST fire alarm system.

All fire alarms at the Carroll Water Treatment Plant buildings are also alarmed and monitored at the Carroll Operations Building control center. The design intent is to add the pump station and the Front Entrance Guard House fire alarm signals to the plant control center so that operations staff is notified of any fire alarms. The existing main fire alarm control panels in the Operations Building and the remote fire alarm panels in the Generator Building, Post Treatment Building and UV A and UV B Buildings are currently Edward Systems Technology Model EST 2.

After award of the pump station construction contract, Edward Systems Technology discontinued the manufacture, technical support, and production of spare parts for the EST 2 model. In addition, the new model, EST 3, cannot interface with the installed Carroll Treatment Plant EST 2 model, which will result in the main fire alarm control panel unable to monitor fire alarm signals from the remote unmanned pump station and the new Front Gate Guard House fire alarm control panels.

To resolve the incompatibility between the EST 2 and EST 3, staff considered bidding the existing fire alarm control panels in the Carroll buildings as a separate construction contract. However, staff determined that replacement of the existing Carroll EST 2 fire alarm panels should be done by the WAPS electrical contractor in order to ensure proper coordination of the fire alarm systems and to assign responsibility for scheduling, testing and startup to a single party.



New EST 3 Fire Alarm Panel in the Guard House



Existing Main EST2 Fire Alarm Panel at Admin. Bldg.

The EST 3 model requires fiber optic cable in lieu of copper wires to transmit their signals. The fiber optic cable from the Wachusett Aqueduct Pumping Station and Front Entrance Guard House to the Carroll plant control center was specified under this contract. However, the existing EST 2 copper communication wires must also be removed and fiber optic communication cable must be installed between the fire alarm control panels.

This change order is to remove the existing Carroll plant fire alarm control panels and replace with the EST 3 model and furnish and install fiber optic cables.

The approved PCO for this item has been identified by MWRA staff as an unforeseen condition. MWRA staff, the Consultant, and the Contractor have agreed to a lump sum amount of \$285,385 for this additional work with no increase in contract term. The Contractor proceeded with this work at its own risk in order to proceed with the remainder of the contract work.

CONTRACT SUMMARY:

	<u>Amount</u>	<u>Time</u>	<u>Dated</u>
Original Contract:	\$47,011,000.00	1,260 Days	03/01/16
Change Orders:			
Change Order 1*	(\$1,500,000.00)	(180) Days	07/25/16
Change Order 2*	\$14,766.00	0 Days	10/26/16
Change Order 3*	\$24,822.00	0 Days	11/16/16
Change Order 4*	\$199,629.92	0 Days	12/12/16
Change Order 5	\$328,039.00	0 Days	12/23/16
Change Order 6*	\$23,202.00	0 Days	01/18/17
Change Order 7*	\$24,533.12	0 Days	02/06/17
Change Order 8*	\$189,495.00	0 Days	03/06/17
Change Order 9	\$100,079.80	0 Days	03/23/17
Change Order 10*	\$24,521.45	0 Days	04/03/17
Change Order 11*	\$24,455.00	0 Days	04/12/17
Change Order 12*	\$24,659.00	0 Days	04/19/17
Change Order 13*	\$22,491.00	0 Days	05/03/17
Change Order 14*	\$19,515.00	0 Days	05/22/17
Change Order 15	\$306,664.00	0 Days	06/12/17
Change Order 16*	\$200,000.00	0 Days	07/24/17
Change Order 17*	\$23,350.00	0 Days	07/27/17
Change Order 18	\$608,007.00	0 Days	07/27/17
Change Order 19*	\$19,866.00	0 Days	08/14/17
Change Order 20*	\$222,828.00	0 Days	Pending
Change Order 21	\$285,385.00	0 Days	Pending
Total of Change Orders:	\$1,186,308.29	(180) Days	
Adjusted Contract:	\$48,197,308.29	1,080 Days	

*Approved under delegated authority

If Change Order 21 is approved, the cumulative total value of all change orders to this contract will be \$1,186,308.29 or 2.52% of the original contract amount. Work on this contract is 62% complete.

BUDGET/FISCAL IMPACT:

The FY18 CIP includes a budget of \$47,159,267 for Contract 7157. Including this change order for a lump sum amount of \$285,385, the adjusted sub phase total will be \$48,197,308.29 or \$1,038,041.29 over budget. This amount will be absorbed within the five-year CIP spending cap.

MBE/WBE PARTICIPATION:

The MBE/WBE participation requirements for this project were established at 3.4% and 3.8%, respectively.



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

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

to be held on

Wednesday, September 20, 2017

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

Time: Immediately following Water Comm.

AGENDA

A. Approvals

1. PCR Amendment – September 2017
2. Appointment of Chemist III, Laboratory Services
3. Appointment of Chemist III, Laboratory Services
4. Appointment of Regional Manager, Toxic Reduction and Control Dept.
5. Appointment of Manager, Energy, Operations Division
6. Appointment of Program Manager, Energy Management, Operations Division
7. Appointment of Manager, Metering and Monitoring, Planning Department
8. Appointment of Manager, SCADA and Process Control
9. Appointment Project Manager, Service Contracts, Metro Maintenance
10. Appointment of Senior Medium Voltage Electrical Specialist, Western Maintenance
11. Appointment of Supervisor, Transmission and Treatment Operations, Carroll Water Treatment Plant

STAFF SUMMARY

TO: Board of Director
FROM: Frederick A Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: September PCR Amendment



COMMITTEE: Personnel and Compensation
Karen Gay-Valente
Karen Gay-Valente, Director of Human Resources
Joan C. Carroll, Manager Compensation
Preparer/Title

 INFORMATION
 X VOTE
Michele S. Gillen
Michele S. Gillen
Director, Administration

RECOMMENDATION:

To approve the amendment 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 Committee.

September PCR Amendment

There is one PCR amendment related to a change in the Operations Division.

The amendment is:

1. Title change to a vacant position in the Process Control Department, Operations Division, Project Engineer, Pilot Plant, U9 Grade 21, to Project Engineer, Process Control, Unit 9 Grade 21, to align position with current needs in the department.

This amendment requires approval by the Personnel and Compensation Committee.

BUDGET/FISCAL IMPACT:

There is no budget impact associated with this change.

ATTACHMENTS:

New/Old Job Descriptions

MASSACHUSETTS WATER RESOURCES AUTHORITY
POSITION CONTROL REGISTER AMENDMENTS
FISCAL YEAR 2018

PCR AMENDMENTS REQUIRING PERSONNEL & COMPENSATION COMMITTEE APPROVAL - September 20, 2017

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
P1	Operations Process Control 2938517	V	T	Project Engineer, Pilot Plant	9	21	Project Engineer, Process Control	9	21	N/A	N/A - N/A	N/A - N/A	To align title with current needs in the Process Control Department, Operations Division
PERSONNEL & COMP COMMITTEE TOTAL=					1						SUBTOTAL:	\$0 - \$0	

PCR AMENDMENTS REQUIRING BOARD APPROVAL - September 2017

BOARD TOTAL =	0	SUBTOTAL:	\$0 - \$0
GRAND TOTAL =	1	TOTAL ESTIMATED COSTS:	\$0 - \$0

MWRA
POSITION DESCRIPTION

OLD

POSITION: Project Engineer, Pilot Plant

PCR#:

DIVISION: Sewerage

DEPARTMENT: Process Control/Deer Island

BASIC PURPOSE:

Provides for day-to-day process control and operation of the Deer Island Permanent Pilot Plant.

SUPERVISION RECEIVED:

Works under the general supervision of the Project Manager, Process Engineering.

SUPERVISION EXERCISED:

None.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Provides for day-to-day process control and operation of the Pilot Plant, including the direction of Shift and Area Managers during off-hours. Operates equipment manually and through instrument panel and programmable logic control units and /or PICS.
- Monitors, analyzes, and modifies process at the Permanent Pilot Plant including flows, residuals, secondary bio-mass, and oxygen systems.
- Carries out Pilot Plant experimental programs as directed by supervisor.
- Performs process control tests including total solids, suspended solids, dissolved oxygen, pH, sludge blanket, settleometers, microscopic biology examination, etc.

- Provides for all composite and grab sampling and samplers. Splits, preserves, and analyzes samples. Communicates directly with the Deer Island Central Lab, Residuals, NPDES and others on sampling schedules, set-ups and deliveries.
- Monitors, inspects and records operating conditions and makes process adjustments with direction from Senior Program Manager. Performs Process control calculations such as MCRT, Surface Overflow Rates, F/M.
- Provides hands-on training to operators, apprentice, and interns as requested.
- Follows established safety, operating, and emergency response procedures and policies established by MWRA. Trains in Confined Space Entry, CPR and First-Aid and participates in the Emergency Response team.
- Communicates with Operators, Area Supervisors, and Shift Managers regarding operational and process control conditions to ensure adequate information for all weekday and weekend operations.

SECONDARY DUTIES:

- Assists in preparing Pilot Plant short and long term budgets, and technical program development.
- Performs other related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A four (4) year college program in civil, sanitary, or environmental engineering or related field; and
- (B) Two (2) to five (5) years experience in wastewater treatment process control engineering. Must have three (3) years of wastewater operator experience, with two years minimum in secondary treatment; and
- (C) Experience in all basic wastewater treatment plant laboratory and analysis, including

microbiology; and

- (D) Experience in operating distributive control systems and basic understanding of computers required; or
- (E) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of principles and practices of sanitary engineering.
- (D) Ability to prepare SOPs and SOJPs with regard to process modifications.
- (E) Knowledge of safety practices in operation of wastewater equipment and the treatment plant facility required.

SPECIAL REQUIREMENTS:

Massachusetts Wastewater Treatment Plant Operations Grade VI certification, or ability to obtain within one (1) year.

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 stand, walk, climb or balance, stoop, kneel, crouch, or crawl, taste or smell.

The employee must frequently lift and/or move up to 10 pounds. Specific vision abilities required by this job include close vision, distance vision, color 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 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 an office setting.

August, 1999

MWRA
POSITION DESCRIPTION

NEW

POSITION: Project Engineer, Process Control

PCR#:

DIVISION: Operations

DEPARTMENT: Process Control DI

BASIC PURPOSE:

Provides process control support to Deer Island Operations

SUPERVISION RECEIVED:

Works under the general supervision of the Program Manager, Process Engineering.

SUPERVISION EXERCISED:

none

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Generates engineering and monitoring reports from plant performance and laboratory analysis data compiled from DITP Process Information System (PI), DITP Operations Management System (OMS), Process Laboratory Information System (PLIS), Waste Water Quality (WWQ) database (housing Laboratory Information Management System (LIMS) data), the transport SCADA system, and other data centers as needed.
- Critiques and reviews reports and data for technical accuracy and flags questionable data for review by management.
- Works with Process Engineers and other Deer Island and MWRA personnel to develop standardized and customized process data presentations.
- Works with Process Engineers and other Deer Island and MWRA personnel to develop new and/or refine existing monitoring programs to support operations and process control.

- Routinely reviews and evaluates data to monitor plant performance, process goals, and plant efficiencies.
- Routinely provides process updates to Process Engineers, managers, and other Deer Island personnel.
- Utilizes spreadsheets, databases, and other types of software to enter/import data, create, and modify reports.
- Performs process control and compliance field readings and measurements on a daily basis in accordance with Standard Operating Procedures (SOPs) for air monitoring and wastewater performance testing.
- Performs daily readings for air emissions compliance requirements and for odor control treatment monitoring.
- Performs a variety of process control laboratory tests, including microscopic examinations and solids testing.
- Performs sample collection of air, wastewater, sludge, or other materials as needed.
- Monitors and performs minor troubleshooting of various process laboratory and sampling equipment or other monitoring instrumentation used in Process Control.
- Provides technical support for process optimization projects, including engineering calculations, data analysis, and report preparation
- Reviews and prepares process schematics and procedures under the direction of the Program Manager, Process Engineering

SECONDARY DUTIES:

- Performs other related duties as required

MINIMUM QUALIFICATIONS:

Education and Experience:

- A four-year Bachelor of Science Degree either in engineering, biology, or chemistry required; and

- Two (2) to four (4) years of experience in wastewater engineering, wastewater treatment process control, and/or laboratory analysis; and
- Two (2) to four (4) years in the use of computer operating systems and application software such as Microsoft Windows (Window XP or Window 7), and Microsoft Office2007 (most specifically Microsoft Excel and Microsoft Access), and/or process control systems; and
- Two (2) years of environmental laboratory experience in wastewater sampling, chemical and microbiological analysis is desirable; or
- Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of wastewater unit operations, process control theory, practices and principles and computer applications.
- (B) Demonstrated written and communication skills.
- (C) Familiarity with basic laboratory testing procedures, the operation, calibration, and maintenance of basic laboratory equipment and instrumentation.

SPECIAL REQUIREMENTS:

- Massachusetts Wastewater Treatment Plant Operator Grade IV Certification, or ability to obtain within one (1) year.
- A valid Massachusetts Class D Motor Vehicle Operators license.

TOOLS AND EQUIPMENT USED:

Sampling and monitoring equipment for wastewater, sludges, and air. Laboratory test equipment. 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 stand, walk, 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 lbs. Specific vision abilities required by this job include close vision, distance vision, color 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 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 can occasionally work in highly 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 an office setting.

September 2017

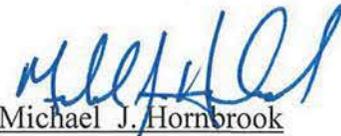
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Chemist III, Laboratory Services

COMMITTEE: Personnel and Compensation

 INFORMATION
 X VOTE

Karen Gay-Valente, Director, Human Resources
Carolyn M. Fiore, Deputy Chief Operating Officer
Michael F. Delaney, Director, Laboratory Services
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Ms. Melissa Sturk to the position of Chemist III (Unit 9, Grade 22) at the recommended salary of \$91,416.02 commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Chemist III, was posted in August 2017 when the previous incumbent was promoted. This position reports to a Laboratory Supervisor II.

The Chemist III performs a variety of highly complex chemical, biological, and microbiological analysis on water, wastewater and solids. Also, the Chemist III coordinates projects to assure their satisfactory performance in support of various MWRA programs, including Deer Island and Clinton Treatment Plants, Harbor and Outfall Monitoring, and the Drinking Water programs.

Selection Process

This position is one of two which were posted internally. Five candidates applied for these positions. The Director of Laboratory Services, the two Laboratory Managers, and the Manager of Operations Support, representing Human Resources, interviewed all candidates. Upon completion of the interviews, Ms. Sturk was identified as the most qualified candidate, based upon her education, experience and knowledge of the requirements of the position.

Ms. Sturk was hired by the MWRA as a contract Lab Technician in 2000 and as a regular Lab Technician in 2001. She was promoted to Sampling Association in TRAC in 2004, and returned to Laboratory Services as a Chemist I in 2005. She was promoted to Chemist II in 2013. In 2013, she was acting Client Services Coordinator. In 2016, she was actively involved in sample coordination for the School Lead special project and electronically reporting drinking water

results. She has served on the Deer Island Emergency Response Team and is part of the on-call supervisor rotation. She also participates in the CSO wet weather testing team.

Ms. Sturk has performed all of her previous responsibilities at the MWRA at a high level and has demonstrated excellent communication skills, initiative, and leadership. She has been an integral part of the MWRA Central Laboratory team.

Ms. Sturk earned a Bachelor of Arts Degree in Environmental Science from the University of Maine.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENTS:

Resume of Ms. Melissa Sturk
Position Description
Organization Chart

Melissa Sturk

EDUCATION

Bachelor of Arts; Environmental Science, May 2000
University of Maine at Farmington, Farmington, ME

Coursework: General Biology, General Chemistry, Instrumental Analysis, Analytical Chemistry, Environmental Law, Statistics, Ecology, Zoology, Conservation Biology, Geology.

SKILLS

Computer: Microsoft Word, Excel, Outlook, LIMS database,

Laboratory: Free and Total Chlorine residual analysis, pH analysis, Sample Preservation, Bacterial collection and analysis. Wastewater sampling, Clean Metals sampling, Fluoride ISE analysis.

Grade IV Wastewater Operators License prep

EXPERIENCE

Massachusetts Water Resources Authority

Deer Island, Winthrop, MA (full time 12/00-present)

Chemist II

Currently working as a member of the Sample Management division of the Central Laboratory collecting daily samples of wastewater to be analyzed. Monitors water quality parameters such as pH, Total Chlorine Residual, fecal coliform, and Fluoride. Sets up sampling equipment according to Standard Operating Procedures. Performs data entry and validation of sampling results for internal and external clients. Prepares sampling sets for daily sampling as well as for internal and external clients. Reviews reports and data, identifies discrepancies, and takes corrective action. Trains new personnel in standard procedures.

Acting Client Services Coordinator (April-August 2013)

Updated/created projects in Labware, as well as assisting lab staff with Labware-related issues. Provided a schedule of projects for sampling team to prep and delivery, along with coordination of projects with outside labs/clients. Responsible for reporting monthly and quarterly data to outside clients along with preparing data files for eDEP.

Sampling Associate, TRAC (12/04-11/05)

Performed flow proportional calibrations and sampling at industrial sites permitted with the MWRA. Responsible for taking samples at MWRA sites such as combined sewer overflows as well as industrial sites. Wrote monitoring reports detailing sampling setup and individual site specifics. Responsible for maintaining upkeep and inventory of field equipment such as pH meters, gas meters, tubing, pumps, chemicals and TCR meters.

**MWRA
POSITION DESCRIPTION**

POSITION: Chemist III

PCR#: 5710002, 5710009, 5710013, 5710014, 5710024, 5710025,
5710039, 5710045, 5710053, 5710059, 5710068

DIVISION: Operations

DEPARTMENT: Laboratory Services

BASIC PURPOSE:

Performs and/or coordinates a variety of highly complex chemical , biological, and microbiological analysis on water, wastewater and solids. Coordinates projects to assure their satisfactory performance in accordance with client needs. Provides a range of duties, but will not necessarily perform all the duties included below.

SUPERVISION RECEIVED:

Works under the general supervision of a Laboratory Supervisor II or III.

SUPERVISION EXERCISED:

None.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Performs the most complex chemical, biological, or microbiological analyses utilizing the most complex equipment and techniques, in accordance with Standard Operating Procedures (SOPs).
- Plans/schedules complex analytical studies, and coordinates related work tasks for scientific and technical personnel assigned on a project basis, to assure timely completion.
- Reviews analytical results and performs data interpretation of highly complex qualitative and quantitative analysis, whether performed in-house or by outside laboratories, and recommends corrective action where appropriate.
- Provides technical direction to Chemists I and II, technicians and laboratory support personnel by monitoring activities, reviewing test results, and providing instruction to assure conformity to SOPs.

- Specifies or writes new or revised SOPs.
- As assigned, provides consultation to client groups to assist in defining analytical problems and foster the utilization of Laboratory resources. Advises on appropriate methodologies, provides interpretation of data, and coordinates activities to help assure client satisfaction.
- Assures the proper operation, maintenance, calibration and repair of highly complex analytical systems and equipment, as assigned, and the keeping of accurate maintenance and repair logs. Instructs and coordinates maintenance and calibration tasks of other employees. Expedites repairs to minimize downtime and performs complex troubleshooting.
- Maintains a current knowledge of technical developments in equipment and procedures applicable to complex chemical analysis. Recommends new or improved equipment and procedures and helps coordinate their successful implementation.
- Assures that analytical activities result in data of the highest quality, and verifies its efficient transfer into the LIMS system.
- Assures the utilization of statistical displays and graphical techniques appropriate to render data meaningful to user.
- Assures the production of project reports to clients, and the timely response to status inquiries from the Laboratory Client Service Manager.
- Recommends the purchase of equipment, computer software and hardware. Writes justifications and technical specifications.
- Assists in the preparation of capital and operating budgets.
- Provides instruction to employees in laboratory procedures, SOPs quality control, and safe working conditions.
- Monitors activities to help assure clean, safe working conditions, and assists in the development of safety practices.

SECONDARY DUTIES:

- Performs other related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A bachelors degree in analytical chemistry or a related field. Masters degree in analytical chemistry desirable; and
- (B) Four (4) to six (6) years of related chemistry, biological, or microbiological laboratory experience that includes advanced knowledge of laboratory procedures and operations, method development and validation procedures, quality control procedures, specialized computer software and statistical techniques, LIMS systems, project management techniques, and the ability to operate and troubleshoot all kinds of specialized laboratory equipment; or
- (C) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Thorough knowledge of state of the art modern chemical laboratory methods, procedures, materials and equipment.
- (B) Skill in the operation of the listed tools and equipment.
- (C) Thorough knowledge in proper sampling techniques and analytical procedures.

SPECIAL REQUIREMENTS:

A valid Massachusetts Class D Motor Vehicle Operators License.

TOOLS AND EQUIPMENT USED:

Laboratory equipment and instruments, 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, stand and walk. The employee is occasionally required to 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:

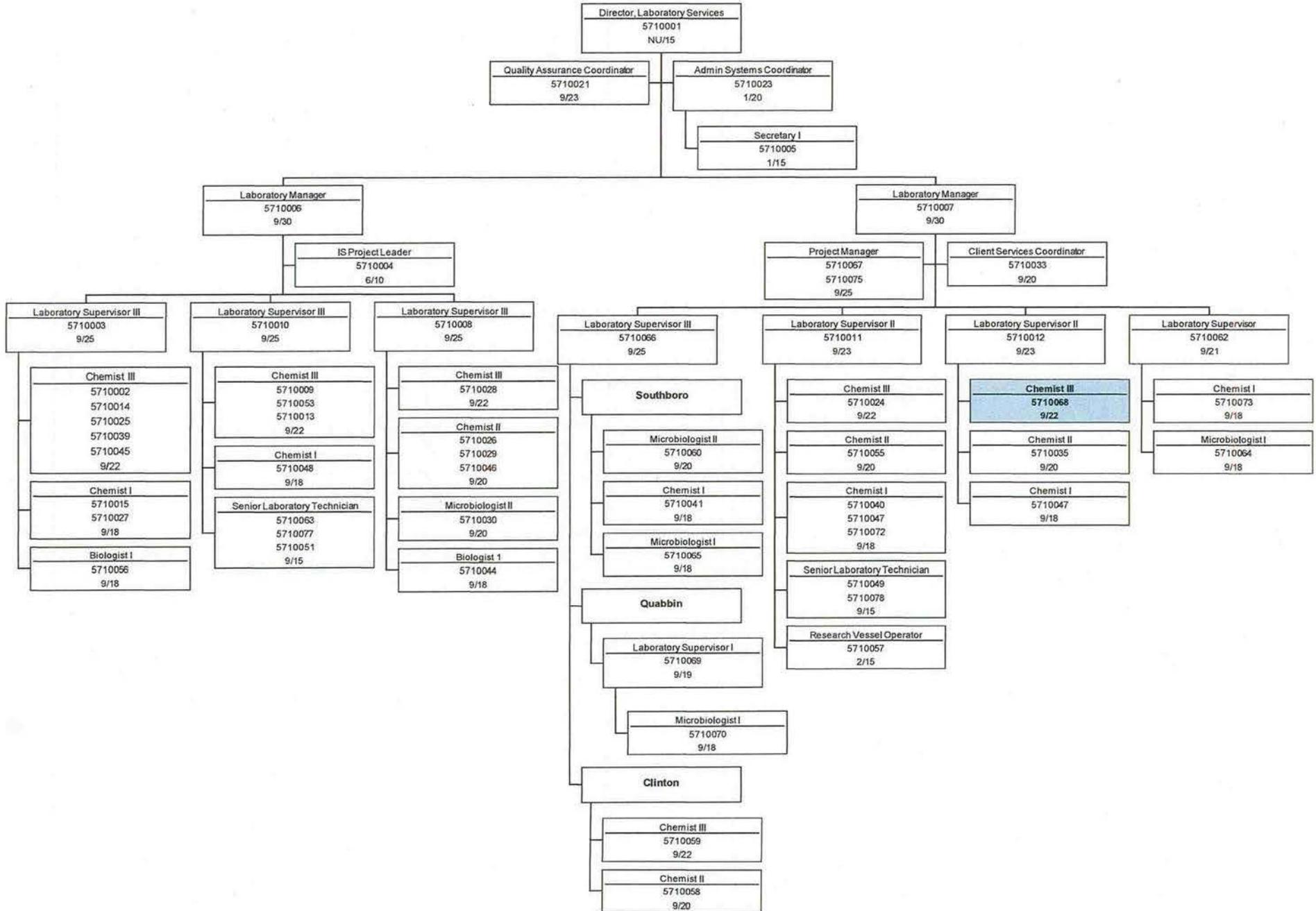
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

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. The employee is occasionally exposed to fumes or airborne particles and toxic or caustic chemicals.

The noise level in the work environment is moderately quiet in a laboratory environment.

October, 2004

Programs, Policy & Planning
Laboratory Services
 September 2017



STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Chemist III, Laboratory Services

COMMITTEE: Personnel and Compensation

 INFORMATION
 X VOTE

Karen Gay-Valente, Director, Human Resources
Carolyn M. Fiore, Deputy Chief Operating Officer
Michael F. Delaney, Director, Laboratory Services
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Kevin Constantino to the position of Chemist III (Unit 9, Grade 22) at the recommended salary of \$91,416.02 commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Chemist III, was posted in August 2017 when the previous incumbent was promoted. This position reports to a Laboratory Supervisor III.

The Chemist III performs a variety of highly complex chemical, biological, and microbiological analysis on water, wastewater and solids. Also, the Chemist III coordinates projects to assure their satisfactory performance in support of various MWRA programs, including Deer Island and Clinton Treatment Plants, Harbor and Outfall Monitoring, and the Drinking Water programs.

Selection Process

This position is one of two which were posted internally. Five candidates applied for these positions. The Director of Laboratory Services, the two Laboratory Managers, and the Manager of Operations Support, representing Human Resources, interviewed all candidates. Upon completion of the interviews, Mr. Constantino was identified as the most qualified candidate, based on his education, experience and knowledge of the requirements of the position.

Mr. Constantino was hired by MWRA Laboratory Services as a Senior Laboratory Technician in 2008. He was promoted to Chemist I in 2009 and to Microbiologist II in 2014. Prior to working at the MWRA he was worked as a chemist for several years at two commercial testing laboratories.

Mr. Constantino has worked on the Central Lab's Nutrients Team where he is certified for all tests on the team, including operating autoanalyzers, ion chromatographs, the elemental analyzer, and the flow injection analysis instrument for cyanide. Over the past two years he has made significant contributions to his team on bringing into production two new instruments (ion chromatography and elemental analyzer) and in performing cyanide experiments.

Mr. Constantino has performed all of his previous responsibilities at the MWRA at a high level and has demonstrated excellent communication skills, initiative, and leadership. He has been an integral part of the MWRA Central Laboratory team.

Mr. Constantino earned a Bachelor of Science Degree in Biology and a Bachelor of Science Degree in Mathematics from Fitchburg State College.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENTS:

Resume of Mr. Kevin Constantino
Position Description
Organization Chart

Kevin Constantino

WORK EXPERIENCE

CHEMIST II Oct. 2014-Present
CHEMIST I Mar. 2009-Oct. 2014
SENIOR LAB TECHNICIAN Apr. 2008-Mar. 2009

*Massachusetts Water Resources Authority
Winthrop, MA*

- Analyze samples using instrumental, electrometric, and gravimetric methods.
- Utilize digestion methods to prepare samples for analysis.
- Collect samples and perform various sample management tasks.
- Prepare standards and reagents to be used for analysis.
- Troubleshoot and maintain instrumentation.
- Review data for validation.
- Make revisions to Standard Operating Procedures.
- Assist with records archiving.
- Perform ADOC and complete necessary paperwork.
- Train and advise new team members.
- Order supplies and reagents.

LABORATORY TECHNICIAN July 2006-April 2008

*Environmental Testing and Research Laboratories
Leominster, MA*

- Analyzed samples by instrumental methods such as GC/MS, ICP and ICP/MS.
- Used spectrophotometer to analyze samples by colorimetric methods.
- Measured various wet chemistry properties including pH, conductivity, turbidity, and alkalinity.
- Performed various microbiological tests such as standard plate count, total coliform enumeration, and fungi identification.
- Assisted with quality control program by developing control charts and performing statistical analysis of QC data.
- Wrote SOP's and participated in method development.

PREP CHEMIST Apr. 2004-Aug. 2005

*Alpha Analytical Laboratories
Westboro, MA*

- Performed organic extractions of soil and water samples.
- Concentrated extracted samples to desired final volume.
- Prepared various reagents and consumables.

EDUCATION

FITCHBURG STATE COLLEGE

Fitchburg, MA

Bachelor of Science in Biology, May 2001

Bachelor of Science in Mathematics, May 2003

**MWRA
POSITION DESCRIPTION**

POSITION: Chemist III

PCR#: 5710002, 5710009, 5710013, 5710014, 5710024, 5710025,
5710039, 5710045, 5710053, 5710059, 5710068

DIVISION: Operations

DEPARTMENT: Laboratory Services

BASIC PURPOSE:

Performs and/or coordinates a variety of highly complex chemical , biological, and microbiological analysis on water, wastewater and solids. Coordinates projects to assure their satisfactory performance in accordance with client needs. Provides a range of duties, but will not necessarily perform all the duties included below.

SUPERVISION RECEIVED:

Works under the general supervision of a Laboratory Supervisor II or III.

SUPERVISION EXERCISED:

None.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Performs the most complex chemical, biological, or microbiological analyses utilizing the most complex equipment and techniques, in accordance with Standard Operating Procedures (SOPs).
- Plans/schedules complex analytical studies, and coordinates related work tasks for scientific and technical personnel assigned on a project basis, to assure timely completion.
- Reviews analytical results and performs data interpretation of highly complex qualitative and quantitative analysis, whether performed in-house or by outside laboratories, and recommends corrective action where appropriate.
- Provides technical direction to Chemists I and II, technicians and laboratory support personnel by monitoring activities, reviewing test results, and providing instruction to assure conformity to SOPs.

- Specifies or writes new or revised SOPs.
- As assigned, provides consultation to client groups to assist in defining analytical problems and foster the utilization of Laboratory resources. Advises on appropriate methodologies, provides interpretation of data, and coordinates activities to help assure client satisfaction.
- Assures the proper operation, maintenance, calibration and repair of highly complex analytical systems and equipment, as assigned, and the keeping of accurate maintenance and repair logs. Instructs and coordinates maintenance and calibration tasks of other employees. Expedites repairs to minimize downtime and performs complex troubleshooting.
- Maintains a current knowledge of technical developments in equipment and procedures applicable to complex chemical analysis. Recommends new or improved equipment and procedures and helps coordinate their successful implementation.
- Assures that analytical activities result in data of the highest quality, and verifies its efficient transfer into the LIMS system.
- Assures the utilization of statistical displays and graphical techniques appropriate to render data meaningful to user.
- Assures the production of project reports to clients, and the timely response to status inquiries from the Laboratory Client Service Manager.
- Recommends the purchase of equipment, computer software and hardware. Writes justifications and technical specifications.
- Assists in the preparation of capital and operating budgets.
- Provides instruction to employees in laboratory procedures, SOPs quality control, and safe working conditions.
- Monitors activities to help assure clean, safe working conditions, and assists in the development of safety practices.

SECONDARY DUTIES:

- Performs other related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A bachelors degree in analytical chemistry or a related field. Masters degree in analytical chemistry desirable; and
- (B) Four (4) to six (6) years of related chemistry, biological, or microbiological laboratory experience that includes advanced knowledge of laboratory procedures and operations, method development and validation procedures, quality control procedures, specialized computer software and statistical techniques, LIMS systems, project management techniques, and the ability to operate and troubleshoot all kinds of specialized laboratory equipment; or
- (C) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Thorough knowledge of state of the art modern chemical laboratory methods, procedures, materials and equipment.
- (B) Skill in the operation of the listed tools and equipment.
- (C) Thorough knowledge in proper sampling techniques and analytical procedures.

SPECIAL REQUIREMENTS:

A valid Massachusetts Class D Motor Vehicle Operators License.

TOOLS AND EQUIPMENT USED:

Laboratory equipment and instruments, 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, stand and walk. The employee is occasionally required to 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:

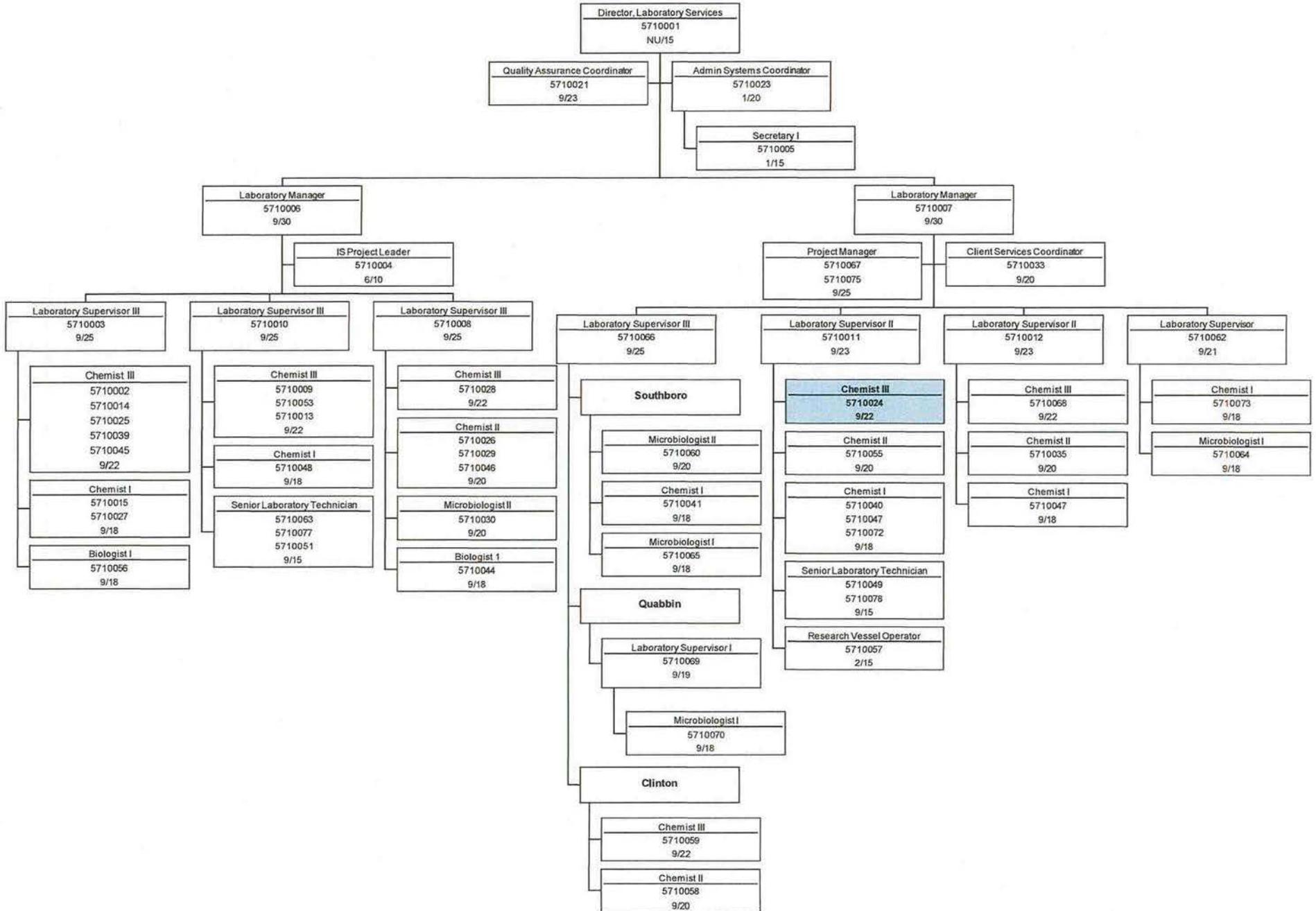
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While performing the duties of this job, the employee regularly works in outside weather conditions. The employee regularly works near moving mechanical parts and is occasionally exposed to wet and/or humid conditions. The employee is occasionally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

The noise level in the work environment is moderately quiet in a laboratory environment.

October, 2004

Programs, Policy & Planning
Laboratory Services
 September 2017



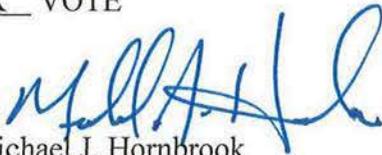
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Regional Manager, Toxic Reduction and Control

COMMITTEE: Personnel and Compensation

 INFORMATION
 X VOTE

Karen Gay-Valente, Director, Human Resources
Carolyn M. Fiore, Deputy Chief Operating Officer
John Riccio, Director, Toxic Reduction and Control
Preparer/Title


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Alix Pierre-Louis to the position of Regional Manager, Toxic Reduction and Control (Unit 9, Grade 29) at an annual salary of \$110,228.55 commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Regional Manager, Toxic Reduction and Control (TRAC) became vacant in July, 2017, when the previous incumbent transferred to another position within the MWRA.

This position is responsible for the day-to-day management of TRAC's inspections and permitting staff who carry out these requirements as part of MWRA's EPA-approved pretreatment program and perform other functions in support of various MWRA programs.

The Regional Manager's duties include supervising staff and managing all aspects of TRAC's inspection and permitting program, ensuring consistency of inspection and permitting practices and procedures, developing and maintaining Standard Operating Procedures for inspection and permitting, reviewing Sewer Use Discharge Permits to ensure that industrial discharges are properly regulated as described in TRAC's procedures, reviewing and evaluating inspection and permitting documentation for accuracy in support of TRAC enforcement and/or legal actions, working with TRAC's Pretreatment Information Management System (PIMS) to track and document staff work, and participating in TRAC's On-Call Manager rotation for response to spill events after hours. Organizationally, the Regional Manager reports to the Sr. Program Manager, Field Operations and Permitting in TRAC.

Selection Process

This position was posted internally, a total of six candidates applied for the position and four qualified candidates were referred for interview by the Director of TRAC, the Senior Program Manager, Field Operations and Permitting, and the Affirmative Action's Program Manager, Monitoring and Compliance. Upon completion of the interviews, Mr. Alix Pierre-Louis was selected as the best candidate for the position based on his education, experience, and knowledge of the requirements of the position.

Mr. Pierre-Louis has twenty-eight years of experience at MWRA, in progressively responsible TRAC positions directly related to the Regional Manager position. Currently, Mr. Pierre-Louis holds the position of Project Manager, Inspections, where he is responsible for managing the day-to-day work of eleven Industrial Coordinators, setting weekly schedules, preparing and reviewing daily dispatches, and reviewing and approving inspection reports. Mr. Pierre-Louis previously held the positions of Sampling Associate, Industrial Coordinator, and Source Coordinator in TRAC and served as Acting Regional Manager for TRAC's Inspections & Permitting.

Mr. Pierre-Louis has performed all of his previous TRAC responsibilities at a high level and he has demonstrated excellent communication skills, initiative, and leadership.

Mr. Pierre-Louis earned his Bachelor of Science Degree in Electrical Engineering from Northeastern University and an Environmental Management Certificate from Bentley College.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENTS:

Resume of Alix Pierre-Louis
Position Description
Organization Chart

Alix Pierre-Louis

EDUCATION

Bentley College, Waltham, MA May 2003
School of Continuing and Professional Studies: Environmental Management Certificate

Northeastern University, Boston MA June 1987
Bachelor of Science in Electrical Engineering, *Cum Laude*
Specialization in Process Control

PROFESSIONAL EXPERIENCE

Massachusetts Water Resources Authority (MWRA) June 1989 to Present

Project Manager, Inspections March 2007 - Present

- Review and evaluate inspection reports generated by Industrial Coordinators for accuracy, consistency to support legal and enforcement actions
- Review and comment on new state and federal regulations, identify potential impacts on our pretreatment program
- Train new Industrial Coordinator
- Provide directive to inspection staff for inspection practice and procedure's consistency and completeness
- Write Standard Operation Procedure for permitting and inspection's consistency
- Work and assist in the redesigning and development of the "Inspection and Vehicle Scheduling Plan" which increased work efficiency by more than 60%
- Develop, analyze and produce tracking schedule system to ensure that TRAC meets newly inspection goal.
- Take lead on new and existing projects from start to completion
- Document workflows and deliver timely and measurable outcomes
- Compile monthly inspections and provide inspection beancount for the MWRA Yellow Notebook

Acting Program Manager, Monitoring October - December 2012

- Reviewed and evaluated inspection and permitting documents generated by Industrial Coordinators to ensure that these documents are accurate, clear and precise to any reader and can support enforcement and legal actions
- Provided technical support and assistance to inspection staff. Maintained project documentation, creation of process workflows and new/updated policies and procedures
- Managed all operational activities necessary to meet targeted objectives, goals, and deadlines within implementation cycle
- Tracked permit issuance goal and accomplishments to ensure that TRAC issues permits in timely manner and provided reports on permit issuance.
- Acting while performing my current position's essential duties and responsibilities.

Alix Pierre-Louis

Industrial Coordinator

June 1998 - March 2007

- On-call Manager for TRAC; responded to numerous spills of varying nature
- Industrial inspections and permit development in numerous towns throughout the MWRA district
- Reviewed building and treatment system plan
- Worked closely with Enforcement group on industries violating MWRA regulations
- MWRA Industrial and municipal official contact for assigned communities
- TRAC Safety Committee member
- Provided direction to staff during off hours wet weather events.

Sampling Associate

April 1990 - June 1998

- Coordinated, scheduled, prepared and conducted sampling projects within industries, sewer lines, treatment plants, septage hauler, sanitary landfills and beaches in accordance with standard operating procedures
- Collected and preserved samples of wastewater following the MWRA Standard Operating Procedure guidelines
- Performed maintenance and calibration on sampling equipments/air quality instrumentations and maintained inventory of equipments and supplies
- Corresponded with industry sampling contacts
- Created written reports of monitoring reports
- Assisted Regional Manager, Monitoring in overseeing daily sampling activities and ensured quality field operations by providing guidance to Junior Field sampling personnel
- Served a lead coordinator on special projects and emergency sampling
- Performed training sessions on sampling procedures and coordinated safety drills
- Instructor for the MWRA Confined Space Training Program

Senior Analysis Engineering Technician

June 1989 - April 1990

- Supervised and participated in preventive maintenance of electronic metering equipments
- Tested, troubleshot and calibrated telemetry system equipments for conformance with specs
- Supervised and instructed Tech technician on low meters and pressure system equipments
- Repaired and worked on Telog, Chessell and Rosemount transmitters control system. Calibrated and maintained gas monitoring instruments.

Russell Electric, Hingham, MA

December 1988 – June 1989

Field Service Engineer

- Responsible for on-site installations testing and preventive maintenance of automatic transfer switches and generator control switch gears
- Maintained field services, customer engineering technical assistance and system
- Coordinated and ensured timely submittal of repair equipment to customers.

Alix Pierre-Louis

Foxboro Co., Bridgewater, MA

August 1987 – December 1988

Junior Test Engineer

- Repair test equipment and performed preventive maintenance on electronic test and processing equipments
- Assisted Engineers in the development of new test equipment. Built and troubleshoot prototypes
- Conducted experiments and tested medical instrumentation for quality control
- Increased testing efficiency and accuracy in production by updating test fixtures design.

CERTIFICATIONS:

- OSHA 40-Hour Trained for Hazardous Waste Response
- Grade 4 Collections Systems Certification
- EPA Air Monitoring for Hazardous Materials

PROFESSIONAL MEMBERSHIPS:

Institute of Electrical and Electronics Engineers (IEEE)
The International Association of Engineers (IAENG)

**MWRA
POSITION DESCRIPTION**

POSITION: Regional Manager

PCR#: 2210048, 2210063

DIVISION: Operations

DEPARTMENT: TRAC

BASIC PURPOSE:

Manages the Toxic Reduction and Control (TRAC) Department's Inspection and Permitting Program or Monitoring Program. Directs all inspection and permitting or monitoring activities for the department and provides assistance to other sections within the department.

SUPERVISION RECEIVED:

Reports to the Sr. Program Manager, Field Operations and Permitting

SUPERVISION EXERCISED:

Supervises assigned inspection, permitting or monitoring staff.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Recommends agency, program or department policy by analyzing all pertinent issues and information regarding the impact of proposed policy and by determining the resources necessary to implement the policy. Reviews, recommends, and manages the implementation of policies and standard operating procedures within TRAC to maintain efficient, high quality programs that are in compliance with EPA and other regulatory requirements.
- Performs administrative duties such as interviewing and recommending staff for hiring and promotion, reviewing and evaluating staff, scheduling work, developing budgets, managing vehicles, equipment, and supply acquisitions and maintenance, approving time sheets, helping to develop and implement training for staff members, and maintaining discipline.
- Ensures that staff coordinate with other TRAC groups and sections and with other MWRA departments and divisions as needed.
- Performs administrative duties including, but not necessarily limited to, interviewing and recommending personnel for hiring or promotion, approving time sheets, scheduling work, developing budgets, performance evaluations, and maintaining discipline.

- Uses computer systems to schedule and coordinate work, to ensure that staff time and functions are appropriately tracked and reported, and to carry out other job responsibilities.
- Coordinates (as required) TRAC staff preparation and response to emergency spills/releases into sewer system and participates in development and implementation of emergency response policy.
- Participates in development and implementation of TRAC policies and procedures.
- Participates in the selection and hiring of project consultants and oversees the consultant's planning process.
- Participates in liaison, coordination, and educational activities within the MWRA and with other governmental agencies and the public.

Inspection Program

- Provides overall direction to inspection staff concerning the implementation of local limits, planning, and database preparation to meet regulatory requirements.
- Reviews and evaluates monitoring reports, engineering reports, pretreatment proposals and associated technical information, inspection reports, permit applications, and permits and recommends appropriate standards and follow-up actions.
- Develops and implements training programs for staff personnel in inspections and permitting procedures, state-of-the-art waste treatment applications and Federal, State and local regulations.
- Coordinates, as required, inspection staff preparation and response to emergency spills and releases into the sewer system.
- Reviews and evaluates inspection and permitting documents generated by the inspection staff and ensures that they will support enforcement and legal actions and stand up to scrutiny in actions brought by MWRA or others.

Monitoring Program

- Provides overall direction to sampling staff concerning technical requirements for sampling to ensure that there is consistency and coordination among and within the staff on sampling practice, procedure, and implementation.
- Oversees the maintenance of the Monitoring Manual and its SOPs and keeps the manual up-to-date.
- Serves as the primary liaison with the MWRA Central Laboratory on sampling and analysis issues.

- Manages TRAC's sampling operations at the Chelsea facility; ensures that sampling equipment and supplies are available and maintained; develops the TRAC sampling field equipment budget.
- Coordinates, as required, monitoring staff preparation and response to emergency spills and releases into the sewer system.
- Reviews and evaluates monitoring documents generated by the sampling staff and ensures that they will support enforcement and legal actions and stand up to scrutiny in actions brought by MWRA or others.

SECONDARY DUTIES:

- Acts as On-Call Manager for TRAC in rotation with other TRAC staff.
- Participates actively in TRAC multi-disciplinary work groups.
- Drafts reports, memoranda, and other documents.
- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- Four year undergraduate degree in the chemistry, biology, environmental sciences, a related engineering or science discipline, computer science or information systems science, legal studies or other related field. Advanced degree preferred.
- Knowledge and understanding of environmental regulatory issues, policies, and practices related to industrial wastewater treatment and discharge, as acquired through a minimum of 7 to 9 years of experience, of which at least 3 years should be in a supervisory capacity. This should include an understanding of industrial permits, and enforcing environmental requirements.
- Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- Knowledge of the use, development, maintenance and management of complex computer-based information systems as a tool for supporting pretreatment program.
- Ability to negotiate and reach agreement in an enforcement setting and to work with attorneys.
- Ability to plan and implement programs.

- (D) Demonstrated effectiveness working across organizational boundaries and with persons at all levels in an organization.
- (E) Strong written and oral communication skills.
- (F) Ability to manage staff, including to organize, direct, train, assign duties to, supervise, motivate, and evaluate staff.

SPECIAL REQUIREMENTS:

Massachusetts Class D 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 or 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 the job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the essential functions 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 regularly lift and/or move up to 10 pounds, occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision and the ability to adjust focus.

WORK ENVIRONMENT:

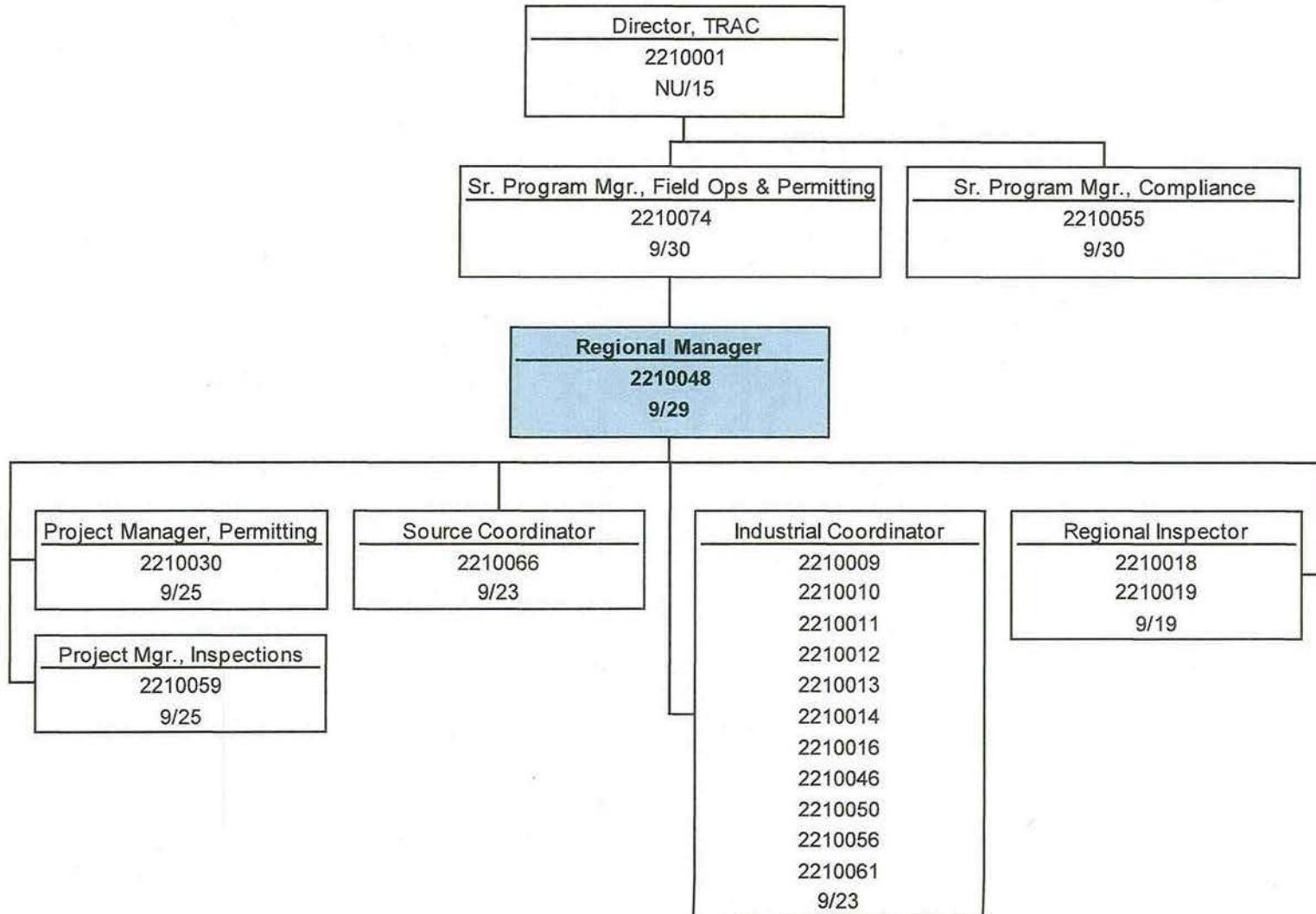
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. While performing the duties of this job, the employee regularly works in an office environment.

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

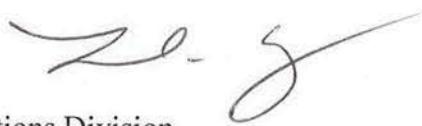
October 2012

Toxic, Reduction and Control

Inspection Unit
September 2017

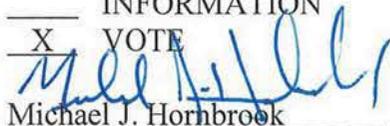


STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Manager, Energy, Operations Division

COMMITTEE: Personnel & Compensation

Karen Gay-Valente, Director, Human Resources
Carolyn M. Fiore, Deputy Chief Operating Officer
Preparer/Title

 INFORMATION
 X VOTE

Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Michael E. McDonald to the position of Manager, Energy (Non-Union, Grade 14) in the Operations Administration Department, at the recommended annual salary of \$129,683, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Manager, Energy, is a new position created and approved by the Board of Directors in June 2017 to oversee the Energy Management Unit. This position reports to the Deputy Chief Officer, Programs, Policy and Planning, and will oversee MWRA's renewable energy portfolio, energy efficiency initiatives, and cost reduction programs and contracts related to the operations of MWRA facilities. The position is responsible for the overall upgrade and implementation of a comprehensive Energy Management Plan, and will recommend Authority policy on energy. The Manger Energy will provide oversight of all energy-related initiatives including MWRA's energy conservation program and competitive energy procurements. The position will evaluate the technical, regulatory and economic benefits of emerging energy technologies, markets and regulations regarding their potential application to MWRA. The position will oversee assigned staff and play a central role within the agency, providing coordination and communication with MWRA management and staff, as well as outside agencies and regulators.

Selection Process

This position was posted internally and externally. A total of 26 candidates applied for the position. Two internal and five external candidates were determined to meet the qualifications of the job. All seven candidates were interviewed by the Deputy Chief Operating Officer of Programs, Policy, and Planning, the Associate General Counsel, the Manager of Policy and Planning, and the Special Assistant for Affirmative Action and Compliance. Upon completion of the interviews, it was determined that Mr. Michael E. McDonald was the most qualified candidate to fill the position based upon his education, knowledge and wide-ranging energy

management experience in the water and wastewater sector.

Mr. McDonald has 24 years of experience in environmental and civil engineering in progressively responsible positions. Over the last six years, he has developed and managed American Water's (a national provider of water and wastewater services operating in the U.S. and Canada) corporate energy program in its delivery of services in the water and wastewater industry. He has direct experience in the development of energy efficiency projects resulting in energy and dollar savings and carbon dioxide emission reductions. He will provide internal expertise on energy efficiency and demand response. Mr. McDonald is a member and Board representative at the Alliance to Save Energy, and he chairs the Water/Energy Nexus Subcommittee. In this position he has provided information to congressional staff on water/wastewater infrastructure and its relation to water/energy. He has significant experience in private consulting firms managing complex engineering design and construction projects in the environmental arena, including work at Black & Veatch, Camp Dresser & McKee, and Montgomery Watson Harza.

Mr. McDonald earned a Bachelor of Science Degree in Geology from the University of Massachusetts and a Master of Science Degree in Environmental Engineering from Stanford University. He is a Certified Energy Manager and is a Registered Professional Engineer in Massachusetts.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 CEB for this position.

ATTACHMENTS:

Resume of Michael E. McDonald
Position Description
Organizational Chart

MICHAEL E. McDONALD, P.E., C.E.M

ENERGY EFFICIENCY PROGRAM MANAGER

Program manager and internal energy consultant promoting and encouraging technologies, alternative energy, energy resiliency and demand response/management to corporate water and wastewater subsidiaries. Developed, implemented and currently managing corporate energy program. Responsible for small team focused on achieving cost and energy savings that satisfy corporate return on investment. Present quarterly summaries of state and corporate initiatives to executive management while directing internal and external corporate energy policy through government affairs, white papers and outside committees. Provide front-facing and strategic business development support and technical support for patented geothermal program.

KEY ACHIEVEMENTS

- Developed and implemented current corporate energy program, resulting in \$700k in energy savings (combination of energy efficiency savings electric demand cost reduction) and commensurate CO2 reduction across operating units. Met and exceeded 2016 KPI target of \$500,000 in energy and demand cost savings.
- Advanced real time energy monitoring, data analytics and technology sharing among key states, presenting and justifying to management that at least 5% energy and demand savings are attainable with automated technology.
- Developed alternative approach for calculating internal payback using several life cycle costing methods, increasing the number of eligible energy efficiency and DSM projects.
- Coordinated program with general construction contractor to develop a design, performance and construction template for patented geothermal project using reuse wastewater as an uninterrupted heat source/sink. Successfully managed bid/construct contract for first installation and currently developing business development strategy to expand the program.
- Member and Board representative at "Alliance to Save Energy" - chair of "Water/Energy Nexus" subcommittee, including presentation to congressional aides on water/wastewater infrastructure and its relation to water/energy.

PROFESSIONAL EXPERIENCE & ACCOMPLISHMENTS

American Water, Mount Laurel, NJ - 2011 to Present

ENERGY EFFICIENCY PROGRAM MANAGER

Corporate energy program manager, including energy efficiency assessment/verification, energy demand reduction, alternative energy analysis, economic and financial analysis, Clean Power Plan ("CPP") strategy, energy data analytics, life cycle assessment, and energy resiliency analyses.

- Developed and implemented comprehensive, vertically integrated energy efficiency program across current companies' (American Water) national footprint. The program has been incorporated in to the companies' long term capital planning process as a tool for increasing operational efficiency and implementing carbon savings measures, while improving resiliency. Includes building, industrial (mainly pumping technologies), and operational and alternative energy analyses, with economic assessment of suggested energy conservation measures.

- Conducted one year pilot test using real time pump data analytics as justification for implementing capital program for long term energy savings. Currently coordinating with operations, engineering and vendor for software integration.
- Coordinating with electric service providers on a regional scale across the country, with the intent of incorporating a demand side management and efficiency partnership program.
- Provide internal expertise, webinars and workshops on energy efficiency and demand response technologies, while encouraging and promoting programs and technologies across operating units. Provide energy efficiency presentations at conferences, Rutgers University and other outside forums.
- Strategic support, business development, client management and general contractor management for the implementation and construction of current companies' patented geothermal program.
- Develop internal and external white papers and talking points related to the "water-energy nexus". Work with executive corporate leadership and state presidents to develop relevant talking points at public events.

INTERNAL ENGINEERING CONSULTANT

- Manage a team of scientists and engineers in assessing system capital upgrade needs, while monitoring scoped budget and schedule. Coordinate with state teams and present/recommend findings for project recommendations in to their five-year capital plan.
- Mentor to junior and mid-level engineers for engineering and energy evaluations and assessments.

Black & Veatch, Boston, MA 2005 to 2011 - PROGRAM & PROJECT MANAGER - DESIGN BID/DESIGN BUILD

Served as program and project facilitator and technical resource for multi-disciplined design and construction projects.

- Program manager for public infrastructure design/bid/construct projects. Roles ranged from design engineer to program manager to construction management.
- Developed strategy, approach, and resources for fast track Capital Improvement Program via Suez Environment/United Water (Investor-Owned Utility), delivering on program goals 3 years ahead of schedule.
 - ⇒ Directed multiple engineering consulting firms and internal personnel across multiple projects.
 - ⇒ Coordinated with state president, legal counsel, finance, procurement, New York Public Service Commission, town boards, and county regulatory agencies.
 - ⇒ Oversaw concept, design, and design/build contracts, including feasibility and costs; managed schedule, budget, and resourcing for multi-disciplinary design and permitting team,

Independent Engineering Consultant, Boston, MA 2004 to 2005 - CIVIL ENGINEER Advised on Safe Drinking Water Act regulations and Groundwater Under the Influence.

GeoInsight, Inc - Londonderry, NH 2003 to 2004 - PROJECT MANAGER Managed, authored, and implemented U.S. Army Corps of Engineering (ACE) Environmental Impact Study for large scale civil project, coordinating with multiple agencies and stakeholders.

Camp Dresser & McKee, Boston, MA 1999 to 2003 - DESIGN ENGINEER/PROJECT MANAGER

Managed multi-discipline design engineers to produce Massachusetts MGL Chp 149 design/bid packages.

- Met with local officials to address construction impact and develop plan based on town concerns; facilitated partnering meetings between municipalities.

Montgomery Watson Harza - Andersen Air Force Base Office, Walnut Creek, CA 1993 - 1999

PROGRAM MANAGER AND SUPERVISING ENGINEER

Served as office manager, client manager:

- Managed engineers and scientists for restoration program as primary contact for Air Force Center for Environmental Excellence, USEPA, and Guam EPA for \$3.5-million contract as well as Navy Remedial Action Contracts and CLEAN Projects, and US ACE Projects.

EDUCATION

MASTER OF SCIENCE, ENVIRONMENTAL ENGINEERING, Stanford University, 1993

BACHELOR OF SCIENCE, GEOLOGY, University of Massachusetts - Amherst, 1985

PROFESSIONAL REGISTRATIONS

MASSACHUSETTS REGISTERED PROFESSIONAL (CIVIL) ENGINEER #41749

CERTIFIED ENERGY MANAGER #24075

PUBLICATIONS & RESEARCH

- "A Utility Case Study of Energy Use and Savings" - ACE13, Denver, CO
- "Water and Electric Utility Integrated Planning" - WRF #4669
- 'Expand Utility Efficiency to Save Energy and Water' - OpFlow (Oct, 2016)
- DOE - Plan for Collaboration - White Paper (Oct 2016)
- "Integrated Water Management" - WRF #4550
- "Opportunities and Barriers for Distributed Energy Resource Development at Water and Wastewater Utilities" - WRF 4625

MWRA
POSITION DESCRIPTION

POSITION: Manager, Energy

PCR#:

DIVISION: Operations

DEPARTMENT: Operations Administration

BASIC PURPOSE:

Provides management of Energy Management Unit. Responsible for the development and implementation of a comprehensive Energy Management Plan. Oversees MWRA's renewable energy portfolio, energy efficiency initiatives, and cost reduction programs and contracts related to the operations of MWRA facilities. The position will play a central role within the agency, providing coordination and communication with MWRA management and staff, as well as outside agencies and regulators, to ensure the continued success of these programs.

SUPERVISION RECEIVED:

Works under the general supervision of the Deputy Chief Operating Officer, Programs, Policy and Planning.

SUPERVISION EXERCISED:

Provides direct supervision of the Program Manager, Energy Management; Program Manager, Energy and Environmental Management and Project Engineer, and other staff as assigned.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Develops and oversees implementation of a Comprehensive Energy Management Plan.
- Oversees and directs MWRA and consultant staff in the execution of projects related to energy supply for all MWRA facilities, including power and/or combined heat and power generation, transmission and distribution, and fuel supply.
- Coordinate energy management team with representation from variety of MWRA Departments.
- Oversees MWRA's renewable energy portfolio, and manages Renewable Portfolio Standards (RPS) Contracts for renewable energy certificates (RECs).

- Recommends new renewable energy projects and oversees the development of the planning and design phases of renewable energy and energy efficiency projects including feasibility and operational impact reports, detailed plans and specifications, permitting, work schedules, technical assistance, progress review and evaluation.

- Oversees management of new projects from development of scope of services, specifications, cost estimates, work schedules, through negotiations, and preparations of contract award recommendations. Oversees compliance with contract budgets, schedules and terms.
- Stays abreast of energy-related regulations, grant funding opportunities,
- Oversees management of ongoing energy contracts.
- Oversees the development of energy management budget.
- Oversees the management of energy-related data including collection, evaluation and summary of energy usage, costs, savings, and variables impacting them.

- Directs and oversees the developments energy conservation programs. Such programs will include: (a) a method for evaluating what level of energy conservation is cost-effective for particular facilities; (b) facility energy conservation plans; and (c) a priority list for energy conservation projects.
- Recommends agency, program or division energy policy by analyzing cost, operational and environmental impacts of proposed policy on division projects.
- Represents MWRA and coordinates projects with communities, government agencies, professional organizations and other MWRA departments. Oversees the provision of technical information and assistance. Addresses professional and community groups and initiates outreach projects as required, and acts as liaison with representatives of other agencies.
- Oversees the preparation of and reviews, as necessary, staff summaries to the Board of Directors.
- Ensures compliance with MWRA policies, procedures and directives, and regulatory requirements and applicable engineering standards. Ensures all activities are coordinated with operation staff, MWRA divisions and outside concerns as appropriate.
- Serves on MWRA consultant selection committees as requested.

SECONDARY DUTIES:

- Oversees personnel management. Ensures that major initiatives and policy changes are properly communicated to all staff. Identifies needed improvements to work practices

and works with Operations Management and Labor Relations staff to bring about changes.

- Identifies organizational needs and proposes re-organization plans to address changing needs.

- Oversees staff productivity monitoring and continual improvement through staff skills development, strategic planning, SOP improvements and research and implementation of technology advances.
- Reviews assigned employees' performance per MWRA procedures.
- Assists in maintaining harmonious labor management relations through proper applications of collective bargaining agreement provisions and established personnel policies.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A four (4) year college program in environmental, civil or mechanical engineering or related field; and,
- (B) Master's degree in public policy, public administration, planning, environmental, civil or mechanical engineering with a focus on energy/sustainability preferred; and
- (C) Ten (10) or more years of experience in the area of energy management related to complex industrial/wastewater/water facilities, with at least 4 in a supervisory capacity; and

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of energy markets at the state and federal level.
- (B) Knowledge of equipment energy demand principles, energy production systems and their impacts on plant performance and budgets.
- (C) Knowledge of state and federal regulations related to energy.
- (D) Outstanding computer skills to include proficiency with MS Office software package as well as MS Project and statistical data analysis packages.
- (E) Demonstrated excellent organizational, written and verbal communication skills.

SPECIAL REQUIREMENTS:

None

TOOLS AND EQUIPMENT USED:

Office machines as normally associated with the use of telephone, personal computer including word processing, databases and other software, copy machine and fax machine. Field equipment used may include flashlight, tape measure, air, water and soil sampling equipment and sampling containers, and various hand held measuring devices such as LEL meters.

PHYSICAL DEMANDS:

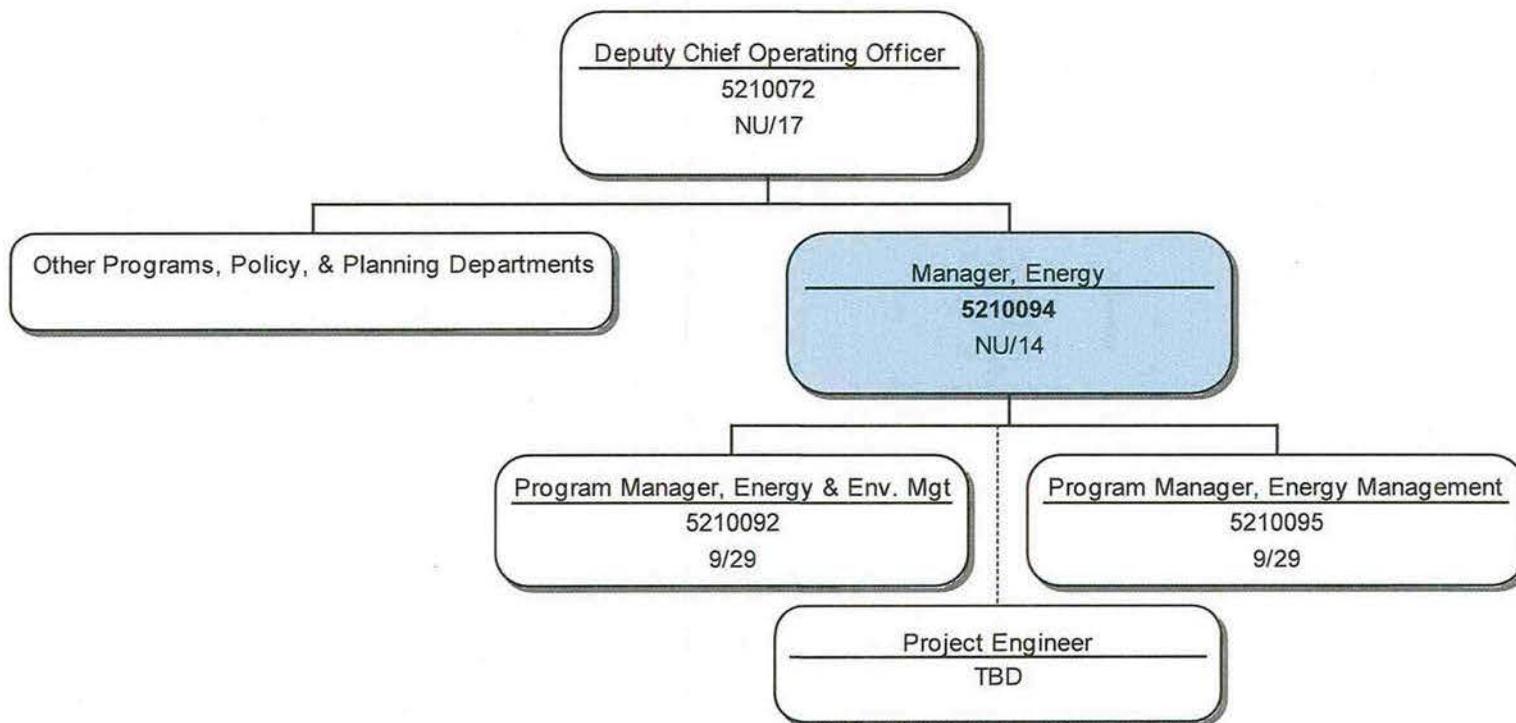
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to sit and talk or hear. The employee is frequently required to use hands to finger, handle or operate objects, including office equipment and controls, and reach with hands and arms, and unroll plans. The employee is also required to stand, walk and be able to climb staging and or ladders as associated with construction site visits in order to see facilities, associated equipment, and observe conditions, record information, and collect samples or take meter readings. In addition, the employee will need to be able to lift and carry reports, proposals and project files.

WORK ENVIRONMENT:

The work environment characteristics described here are representative of those an employee would encounter performing the essential functions of the job. While performing the duties of this job the employee works in an office environment as well as working in the field, at facilities, construction sites, or pipelines and easements.

Programs, Policy & Planning
Energy Management
September 2017



STAFF SUMMARY

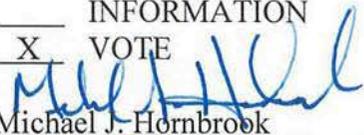
TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Program Manager, Energy Management, Operations Division

COMMITTEE: Personnel & Compensation

Karen Gay-Valente, Director, Human Resources
Carolyn M. Fiore, Deputy Chief Operating Officer
Preparer/Title

 INFORMATION

 X VOTE


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Ms. Courtney Fairbrother to the position of Program Manager, Energy Management (Unit 9, Grade 29) in the Operations Administration Department, at the recommended annual salary of \$93,061.78, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Program Manager, Energy Management, became vacant in February when the previous incumbent left the MWRA. This position reports to the newly created Manager, Energy (subject of a separate appointment at this Board Meeting). The position is responsible for assisting in the update and implementation of a comprehensive Authority-wide Energy Management Plan, and will provide support and expertise to the MWRA's Energy Manager. The position is responsible for the development of renewable energy and efficiency projects from the design through oversight of implementation, and review of costs and energy savings. The Program Manager, Energy Management will provide direction to MWRA and consultant staff in the execution of projects related to energy supply for MWRA facilities, including power generation, transmission and distribution and fuel supply.

Selection Process

This position was posted internally and externally. A total of eleven candidates applied for the position. Two external candidates were determined to meet the qualifications of the job description. Both candidates were interviewed by the Deputy Chief Operating Officer of Programs, Policy, and Planning, the Associate General Counsel, the Manager of Policy and Planning, and the Special Assistant for Affirmative Action and Compliance. Upon completion of the interviews, it was determined that Ms. Fairbrother was the best candidate to fill the position based upon her combination of education, experience and knowledge of the requirements of the position.

Ms. Fairbrother has approximately 7 years of experience in the energy sector. She currently

holds the position of Senior Associate at the Rocky Mountain Institute. In this position, she has been responsible for managing projects related to clean energy access for low and moderate income communities. She has also provided consulting services and strategic advice to the New York Public Service Commission on Reforming the Energy Vision Proceeding parameters of the future electric distribution market in New York. She has experience in constructing electric, natural gas, and steam tariff models, and performing economic and energy modeling for solar and combined heat and power systems. Prior to her work at the Rocky Mountain Institute, she held progressively responsible positions in the consulting firms GI Energy and Sapere Consulting LLC.

Ms. Fairbrother has a Bachelor of Arts degree in Environmental Studies from Washington and Lee University in Lexington, Virginia. She is a certified LEED Green Associate, and holds a certificate in Energy Innovation and Emerging Technologies from the Stanford Center for Professional Development.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget for this position.

ATTACHMENTS:

Resume of Courtney Fairbrother
Position Description
Organizational Chart

EXPERIENCE

Rocky Mountain Institute New York, NY & Boulder, CO – Jan. 2015 - Present
Senior Associate *Sept. 2016 - Present*
Associate *Jan. 2015 - Sept. 2016*

- **Current Project:** eLab Leap initiative, focused on identifying and overcoming barriers to clean energy access for low and moderate income (LMI) communities through convening a social change lab and disseminating information on innovative business models
- Managed eLab Accelerator, a 4-day project boot camp for cutting edge distributed energy projects across North America
 - Managed \$500k project budget as well as a team of 20 staff
 - Recruited 60% more project applications than previous years' event
 - Facilitated project team focused on advancing access to community solar and energy efficiency for LMI customers
- Provided strategic advice to the New York Public Service Commission (NYPSC) on the Reforming the Energy Vision (REV) Proceeding
 - Co-managed the Market Design and Platform Technology Working Group, a coalition of 50 individuals helping to design key parameters of the future electric distribution market in New York
 - Provided research on the latest methods for valuing distributed energy resources for the NYPSC
- Convened 3 of the most innovative investor-owned utilities across the United States to determine the best methods for advancing utility pilots and demonstration projects and published a public report to disseminate findings

GI Energy Senior Analyst New York, NY – Jan. 2013 - Dec. 2014

- Constructed electric, natural gas, and steam tariff models for energy rates in the United Illuminating, Con Edison, Yankee Gas, National Grid, and Connecticut Light and Power utility territories
- Conducted monthly analysis of existing combined heat and power (CHP) plants to determine economic savings and energy offset
- Performed economic and energy modeling for a variety of energy measures, including solar photovoltaics, CHP, and demand reduction measures
- Conducted preliminary feasibility studies for potential microgrid sites in the state of Connecticut

Sapere Consulting LLC, Project Management Consultant Washington, D.C. – June 2011 - Dec. 2012

- Improved project management process within several divisions of a Department of Energy (DOE) nuclear weapons decommissioning site by conducting two pilot projects to implement better project management standards
- Consulted on a 3G cellular network market launch in Chile, Mexico, Argentina, Peru, and Brazil for a Fortune 500, multi-national telecommunications company
 - Supported Information Technology (IT) project assessments in order to determine system impacts
 - Prepared and distributed compliance and cross-functional IT team status reports
 - Outlined client business processes in a series of Visio flows to improve commercial offer management IT assessment process

Rentricity Inc., Sales and Marketing Intern New York, NY – Summer 2010

- Created brochures, press releases and other corporate collateral to support sales efforts for a micro-hydro electric startup
- Provided marketing support to sales team focused on improving channel partner program outreach

Washington and Lee University (WLU), Carbon Inventories Research Intern Lexington, Virginia – Summer 2010

- Researched Green House Gas Protocol inventory assessments to compile a comprehensive paper on the merits of its reporting methodology
- Conducted research on the Carbon Disclosure Project to determine patterns in industries participating in the initiative

Centro de Educación Creativa (CEC), Renewable Energy Education Intern Monteverde, Costa Rica – Fall 2009

- Taught multiple classes on renewable energy to 3 different grades of Costa Rican students
- Designed lesson plans for additional grades focusing on Wind Power, Hydro Power, Geothermal, and Solar Power

PROFESSIONAL CERTIFICATIONS

LEED Green Associate, United States Green Building Council April 2015 - Present
Energy Innovation and Emerging Technologies Certificate, Stanford Center for Professional Development Summer 2016

EDUCATION

Washington and Lee University, Lexington, VA 2007 - 2011
Bachelor of Arts in Environmental Studies with a concentration in Business Administration:
Major GPA 3.71; Overall GPA 3.43

Council on International Educational Exchange Program, Monteverde, Costa Rica Aug. 2009 - Dec. 2009

TECHNICAL SKILLS

Expert in Microsoft Office Suite Programs (Excel, Visio, Word, PowerPoint, Project)
Proficient in ArcGIS, ERDAS ER Mapper, and eQUEST

MWRA
POSITION DESCRIPTION

POSITION: Program Manager, Energy Management

PCR#:

DIVISION: Operations

DEPARTMENT: Operations Administration

BASIC PURPOSE:

Provides management of renewable energy, energy efficiency and cost reduction programs and contracts related to the operations of MWRA facilities. The position will play a central role within the agency, providing coordination and communication with MWRA management and staff, as well as outside agencies and regulators, to ensure the continued success of these programs.

SUPERVISION RECEIVED:

Works under the general supervision of the Manager, Energy.

SUPERVISION EXERCISED:

Assists in the supervision of assigned project managers or other trade staff.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Researches and proposes energy management strategies resulting in conserving and reducing energy.
- Assists in the development of comprehensive energy management plan.
- Manages the planning and design phases of renewable energy and energy efficiency projects including feasibility and operational impact reports, detailed plans and specifications, permitting, work schedules, technical assistance, progress review and evaluation.
- Manages all phases of consultant selection including development of scope of services, specifications, cost estimates, work schedules, negotiations, and preparations of contract award recommendations. Ensures compliance with contract budgets, schedules and terms.

- Oversees and directs MWRA and consultant staff in the execution of projects related to energy supply for MWRA facilities, including power generation, transmission and distribution and fuel supply.
- Manage MWRA and consultant activities associated with exploring renewable energy projects. Activities include consultant contract management, grant funding opportunities, and acting as lead MWRA liaison to appropriate parties associated with these projects.
- Manage ongoing energy contracts.
- Develops energy conservation programs. Such programs will include: (a) a method for evaluating what level of energy conservation is cost-effective for particular facilities; (b) facility energy conservation plans; and (c) a priority list for energy conservation projects.
- Performs energy-use reviews of facilities to identify and recommend adoption of operating practices, which can result in significant energy savings. Coordinates the adoption of such practices as required throughout MWRA.
- Recommends agency, program or division energy policy by analyzing cost, operational and environmental impacts of proposed policy on division projects.
- Initiates new renewable energy or energy efficiency projects and prepares capital or current expense budget requests required.
- Coordinates projects with communities, government agencies, professional organizations and other MWRA departments. Provides technical information and assistance. Addresses professional and community groups and initiates outreach projects as required, and acts as liaison with representatives of other agencies.
- Prepares and reviews, as necessary, staff summaries to the Board of Directors.
- Drafts professional services contracts and amendments to contracts.
- Ensures compliance with MWRA policies, procedures and directives, and regulatory requirements and applicable engineering standards. Ensures all activities are coordinated with operation staff, MWRA divisions and outside concerns as appropriate.
- Serves on MWRA consultant selection committees as requested.

SECONDARY DUTIES:

- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- Completion of a four (4) college program in civil, sanitary , or environmental engineering or related field
- Seven (7) to nine (9) years of energy management and renewable energy project management experience; or
- Any equivalent combination of experience or education

Necessary Knowledge, Skills, and Abilities:

- Demonstrated ability to work effectively as part of a project team and also to function independently with minimal supervision.
- Knowledge of Massachusetts bidding laws, including MGL Chapter 25A bidding regulations.
- Understanding of the evolving electricity market, and state and federal energy programs.
- Excellent interpersonal, oral and written communication skills.
- Experience in Microsoft Word, databases and similar computer software.
- Ability to read and understand technical reports and energy regulations.
- Ability to interact effectively with MWRA facility staff, consultants, and regulatory agencies.

SPECIAL REQUIREMENTS:

None

TOOLS AND EQUIPMENT USED:

Office machines as normally associated with the use of telephone, personal computer including word processing, databases and other software, copy machine and fax machine. Field equipment used may include flashlight, tape measure, air, water and soil sampling equipment and sampling containers, and various hand held measuring devices such as LEL meters.

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

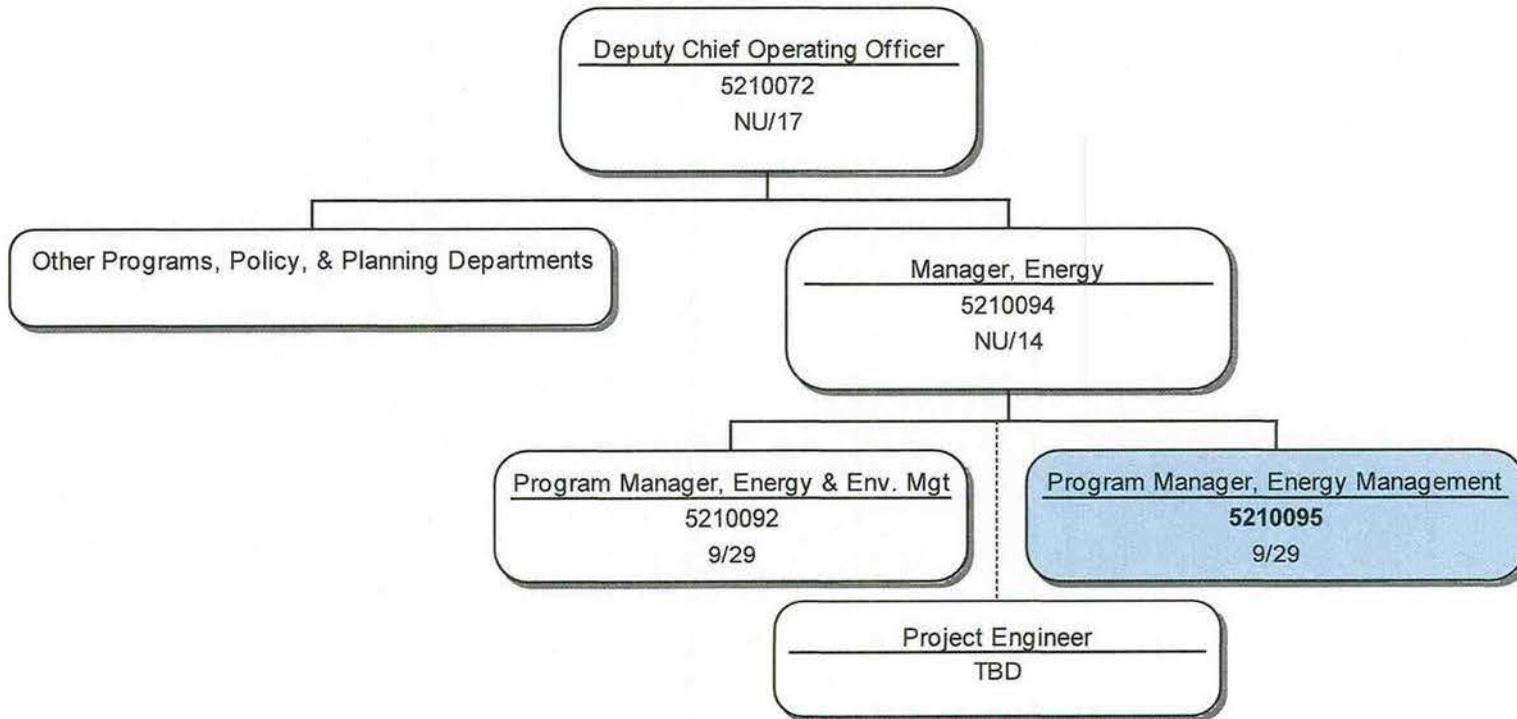
accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly required to sit and talk or hear. The employee is frequently required to use hands to finger, handle or operate objects, including office equipment and controls, and reach with hands and arms, and unroll plans. The employee is also required to stand, walk and be able to climb staging and or ladders as associated with construction site visits in order to see facilities, associated equipment, and observe conditions, record information, and collect samples or take meter readings. In addition, the employee will need to be able to lift and carry reports, proposals and project files.

WORK ENVIRONMENT:

The work environment characteristics described here are representative of those an employee would encounter performing the essential functions of the job. While performing the duties of this job the employee works in an office environment as well as working in the field, at facilities, construction sites, or pipelines and easements.

Programs, Policy & Planning
Energy Management
September 2017



STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 20, 2017
SUBJECT: Appointment of Manager, Metering and Monitoring



COMMITTEE: Personnel & Compensation

INFORMATION
 VOTE

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



Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. David A. Liston to the position of Manager, Metering and Monitoring (Non-Union, Grade 14), in the Operations Division, Planning Department, at an annual salary of \$129,682, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Manager, Metering and Monitoring, became vacant in July 2017 as a result of the retirement of the incumbent. This position reports to the Director of Planning and sustainability.

This position is responsible for the supervision of a staff of 7 analysts and engineers who are responsible for overseeing the collection, accuracy and quality assurance of all water and wastewater flow data used for operational and rate revenue allocation purposes.

The Manager, Metering and Monitoring's duties include working closely with the staff in Operations who maintain the metering field equipment installed in water and wastewater pipes, staff in the Finance Division who use the data to allocate shares of the rate revenue requirement to each served community, staff in the Planning Department who use the data to report on Inflow and Infiltration and assist communities in managing I/I, and community staff who use the data to manage their systems and understand their water and sewer charges.

Selection Process:

This position was posted internally. Eight candidates applied for the position. One candidate withdrew and five candidates were determined to be qualified for the position and were referred for interview. The Director of Planning and Sustainability, Director of Metropolitan Operations, Manager Operations Support, and Director of Emergency Planning and Preparedness conducted the interviews. Upon completion of the interviews, Mr. Liston was selected as the most qualified candidate, based on his education, experience and knowledge of the requirements of this position.

Mr. Liston has over 30 years experience at the MWRA, primarily with the meter data group. He is currently the Program Manager, Meter Data and Engineering. In this position, he oversees the work of the engineers and analysts in the group. His experience includes work at the MWRA overseeing efforts to successfully reduce leakage in the MWRA and community water systems; and prior to working for MWRA, he worked before for a leak detection firm, dealing primarily with Boston's water system.

Mr. Liston is familiar with all aspects of this position and will be able to step into the role effectively. He has substantial experience with data quality assurance practices, and good working relationships with key staff at customer communities associated with flow data and community assessments. His work in thoroughly reviewing water and wastewater flow data frequently results in identifying potential problems within community water or sewer systems which he promptly communicates with local staff. This often results in the community being able to search out and locate a leak which might have cost the community hundreds or thousands of dollars per day.

Mr. Liston has a Bachelors of Science Degree in Civil Engineering from the Lowell Technical Institute (now University of Massachusetts, Lowell).

BUDGET /FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget for this position.

ATTACHMENTS:

Resume of David A. Liston
Position Description
Organization Chart

David A. Liston

Summary Statement

Have over 20 years of experience overseeing data collection, quality assurance, and total flow calculations used for allocation of MWRA's rate revenue requirements for the water and wastewater systems. Have over thirty years of experience offering MWRA communities assistance in their water loss issues.

Education

Lowell Technological Institute

May 1973

Bachelor of Science in Civil Engineering

Work Experience

Massachusetts Water Resources Authority

March 1987 – August 2017

- Responsibilities grew over time after starting as Program Manager of Leak Detection and Repair. During this time period Leak Detection and Repair in Community distribution systems was used as a means of solving MWRA's supply problems.
- As Program Manager of Water Accountability was overseeing all field maintenance of MWRA community meters and was responsible for final accountability of water purchased from the MWRA distribution system.
- As Program Manager of Meter Data and Engineering was responsible for final accounting of all Community Water and Wastewater Meters.
- Was always monitoring community water flow data in order to inform communities when they might have increase hidden leakage potential. Assisted communities with their water loss issues.

Pitometer Associates

May 1973 – March 1987

- Conducted water loss surveys in eight distribution systems with the last eleven years being spent working within the Boston water system.
- Was promoted to Assistant District Manager in 1986.

Volunteer Activities

- Member of American Water Works Association since 1977. Member of AWWA Water Loss Committee since 1988. Chairperson of that Committee from 1995-1998.
- Member of New England Water Works Association since 1977. Member of Distribution and Storage Committee since 2005. Chairperson of the Leak Detection Sub-Committee since 2008.

**MWRA
POSITION DESCRIPTION**

POSITION: Manager, Metering & Monitoring

PCR#: 1520001

DIVISION: Operations

DEPARTMENT: Planning

BASIC PURPOSE:

Oversees data collection, quality assurance, and total flow calculations used for allocation of MWRA's rate revenue requirements for the water and wastewater systems using revenue meters, master meters, and other associated equipment.

SUPERVISION RECEIVED:

Works under the general supervision of the Director, Planning and Sustainability.

SUPERVISION EXERCISED:

Exercises close supervision of professional, engineering, technical and administrative personnel within the meter data management group. Coordinates closely with the meter maintenance group and Operations Engineering in field operations, community support staff in Planning, the MWRA rates manager, SCADA, Engineering and Construction staff.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Oversees water and wastewater meter data collection, quality control, data access for users and customer reporting.
- Coordinates with the meter maintenance group to ensure emergency and preventive maintenance on all meters used in the measurement and recording of water and wastewater flow and pressure.
- Recommends, develops and implements policies and procedures related to metering of water and wastewater flows for revenue, operational, and regulatory matters.
- Represents MWRA in discussions with member communities related to water or wastewater flows and works to resolve discrepancies.

- Oversees the preparation of staff summaries to the Board of Directors, and presents meter and flow related information to the Board. Prepares the monthly submissions for the Management Indicators reports (Yellow and Orange Notebooks).
- Directs and/or oversees direction of consultant contracts related to meter design, selection, installation, and/or maintenance.
- Coordinates with Management Information Systems Department and external consultants to ensure up-to-date and user friendly data management systems integral to MWRA's meter program.
- Participates in meter design, construction and start-up for capital or other projects.
- Oversees planning and implementation of appropriate in-house or consultant-led training programs.
- Oversees development, training, periodic review and updating of applicable Standard Operating Procedures (SOPs), manuals and MWRA safety policies and procedures.
- Oversees personnel management. Ensures that major initiatives and policy changes are properly communicated to all staff. Identifies needed improvements to work practices and works with Operations Management and Labor Relations staff to bring about changes.
- Prepares for and hears Step-One grievances and pre-disciplinary hearings. Identifies organizational needs and proposes re-organization plans to address changing needs.
- Oversees staff productivity monitoring and continual improvement through staff skills development, strategic planning, SOP improvements and research and implementation of technology advances.
- Oversees budget management for meter data management unit. Ensures that budget resources are allocated appropriately. Monitors spending and ensures budget compliance.

SECONDARY DUTIES:

- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) Knowledge of water and wastewater metering, instrumentation, electronics and data management as normally attained through a four (4) year Bachelor of Science degree in

civil, electrical or mechanical engineering or related field. Masters degree preferred; and

- (B) Eight (8) to ten (10) years experience with water and wastewater metering, and associated electrical, electronic, pneumatic and mechanical instrumentation systems including at least four (4) years in a supervisory position; and
- (C) Experience with data quality assurance processes, and
- (D) Work process continuous improvement preferred; or
- (E) Any equivalent combination of education or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of water and wastewater metering, and associated data communication and management systems
- (B) Proficiency in computer hardware and software, including communications technology, databases, data presentation and analysis tools, HMI design and Microsoft Office.

SPECIAL REQUIREMENTS:

Massachusetts Class D Drivers License

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, 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; climb or balance; stoop, kneel, crouch, or crawl; taste or smell.

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

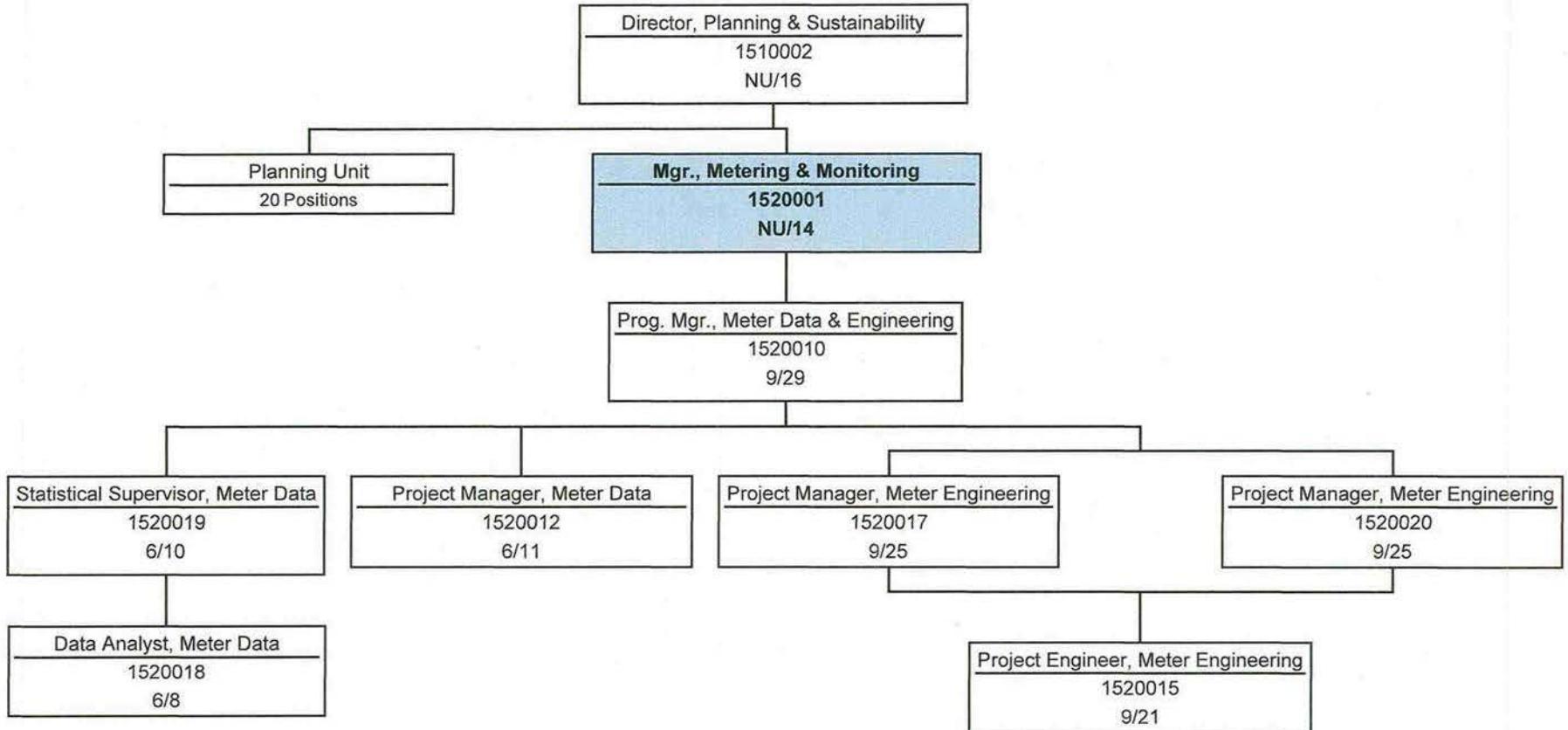
WORK ENVIRONMENT:

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

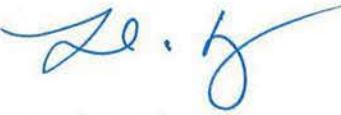
While performing the duties of this job, the employee regularly works in an office environment. The employee occasionally exposed to outdoor weather conditions. The employee is occasionally exposed to fumes and airborne particles.

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

Programs, Policy & Planning
Planning - Meter Data
September 2017



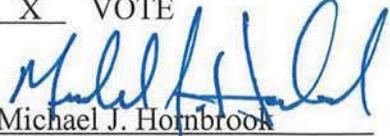
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Manager, SCADA and Process Control

COMMITTEE: Personnel & Compensation

Karen Gay-Valente, Director, Human Resources
John P. Vetere, Deputy Chief Operating Officer
Mark H. Johnson, P.E., Director of Metropolitan Operations
Preparer/Title

 INFORMATION
 X VOTE


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Augustin Serino to the position of Manager, SCADA and Process Control (Non-Union, Grade 14) at an annual salary of \$134,769 commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Manager, SCADA (Supervisory Control and Data Acquisition) and Process Control became vacant when the incumbent was promoted in July 2017. This position reports to the Director of Metropolitan Operations.

This position oversees the development, maintenance, and implementation of SCADA and Process Control systems for twenty-three wastewater and thirty-one water facilities.

The Manager, SCADA & Process Control's responsibilities include automation activities aimed at improving facility performance and reducing energy consumption, process control issues for maintenance and construction projects, and process control for day-to-day operations of a large number of unique facilities (pump stations, CSOs, headworks and storage facilities) each having its own hydraulic considerations, treatment and/or control nuances.

Selection Process

This position was posted internally. Only one candidate, Mr. Augustin Serino, applied for the position. It was determined that he met the qualifications of the job. Mr. Serino was interviewed by the Director of Waterworks and the Director of Metropolitan Operations. Upon completion of the interview it was determined that Mr. Serino is an excellent candidate for this position based on his education, experience, and knowledge of the requirements of the position.

Mr. Serino has over twenty years of engineering experience working mainly in control systems applications and SCADA on water and wastewater systems. He has worked in the MWRA SCADA group for the last 13 years with increasing levels of responsibility. Mr. Serino was an important member of the start-up and testing team for the Carroll Water Treatment Plant and played a key role in the initial implementation of the Wastewater SCADA control system. He was promoted to Program Manager in 2009 to focus on developing maintenance and enhancement programs for the eastern SCADA system. In recent years Mr. Serino has led MWRA efforts to reinforce and improve the SCADA system cyber security. He was promoted to his current title of Senior Program Manager, overseeing the entire SCADA group, in 2014. He is respected by his SCADA colleagues, MIS and security staff with whom he works closely, and by the water and wastewater operations groups that he supports. Mr. Serino's experience and skills are directly relevant to the responsibilities of this position and make him well qualified for the position.

Mr. Serino has a Bachelor of Science Degree in Mechanical Engineering from the University of Massachusetts, Amherst. He is a Registered Professional Control Systems Engineer in Massachusetts. He holds a Grade 4T in Training Water Treatment license, a Grade 4 Wastewater Collections license, and security analyst certificates.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENTS:

Resume of Augustin Serino
Position Description
Organizational Chart

Summary of Qualifications

- 13 Years of experience in MWRA SCADA group with in depth experience and knowledge of systems for Water Transmission, Treatment & Distribution, as well as Wastewater Collections, Transport, Combined Sewer Overflow Treatment and alternative power generation
- 10 years experience managing staff, including delegation of work, supervision, hiring, and conflict resolution
- MA Professional Engineers License in Control Systems Engineering

Skills & Abilities

- Excellent Verbal and Written Communications Skills
- Expert Troubleshooting Ability
- Ability to recognize staff capabilities and utilize appropriately
- In-depth knowledge of controls, electro-mechanical, hydraulics, power, information technology systems, as well as treatment, engineering design, and construction processes

Experience

Senior Program Manager, SCADA, MWRA, Chelsea, MA (4/14 – Present)

Responsible for development, oversight and operations of SCADA program, including management of thirty staff members, three staff offices. Responsible for the SCADA support of Water & Wastewater Operations, Engineering & Construction at approximately one hundred facilities. Responsible for the ensuring proper functionality and reliability of water and wastewater controls systems, as well as identifying and implementing continual system improvements and expansion. Responsible for ensuring a strong cyber security posture for water and waste water process control systems and processes.

Specific duties, initiatives and strengths include:

- Develop and manage of \$4.8Million CEB budget
- Initiation and oversight of \$18.5Million CIP budget to replace PLC technology
- Responsible for hiring of SCADA staff and contracted employees
- Prepare staff summaries, sole source requests, standardization memos, and contract requisition documents
- Manage staff including monitoring & oversight of sick time usage, vehicle usage, earned time use, emergency storm coverage, overtime, and on-call coverage
- Focus on succession planning including staff and training
- Initiated & implemented policy changes, new technologies, enhanced utilization of existing systems to improve security, reliability and robustness of SCADA system
- Initiated the development of a boiler plate non-disclosure agreement with Law Department and implemented SCADA policy changes regarding the handling of sensitive SCADA information with external resources
- Developed a policy & procedure to secure the transferring files from external sources into the SCADA system,
- Have become a “go to” person for Industrial Controls Systems Cyber Security related issues
- Represented MWRA in Washington DC, for an EPA Sponsored workshop for Cyber Security research areas
- Served as both voting & non voting member of member of various selection committees
- Provide high level technical support to SCADA & Maintenance staff
- Established CIP project to upgrade existing mature PLCs to newer product line
- Set in motion project to evaluate and redesign control system architecture at Carroll Water Treatment Plant to improve plant operability during control system failures and maintenance activities
- Established SCADA network security monitoring program, directed intern staff for system development using system with open source tools on existing hardware to provide a low cost solution for MWRA
- Initiated a project to enhance SCADA graphics per new standards designed to optimize operator effectiveness
- Leading an ongoing project to upgrade SCADA network to a domain architecture
- Initiated and directed Data Diode project from to evaluation through implementation
- Initiated participation in a Department of Homeland Security’s “Design Architecture Review” program to assess MWRA SCADA/PICS cyber security posture. Received a positive assessment of SCADA staff’s work in the area of cyber security.
- Spearheaded the evaluation and adoption of new network technology on the SCADA system
- Conceptualized and directed execution of an alert mechanism for unauthorized control system changes
- Key member of team focused in design and installation of physical protection systems to reduce water system vulnerability to cyber attack or control system malfunction
- Member of Information Security Council and regularly present at Security Task Force

Program Manager, SCADA, MWRA, Chelsea, MA (3/09 - 4/14)

Responsible for supervising the eastern SCADA engineering staff. Responsible for maintaining and enhancing the SCADA system for the MWRA Metro Water and Wastewater Systems, as well as, supporting MWRA Operations, Maintenance, Engineering & Construction departments. Responsible for the continual improvements for SCADA system cyber security. Supervise five SCADA engineering staff.

Specific duties included:

- Identify, prioritize and execute work related to the function and security of the Eastern Water & Wastewater SCADA System.
- Supervisor of two Project Managers and three Sr. Monitoring and Controls Systems Engineers
- Provide Troubleshooting support in all eastern facilities
- Coordinate work with various MWRA disciplines such as Electrical, Mechanical, HVAC, Operations & NQUAL
- Assisted Engineering & Construction departments on SCADA/controls systems related issues
- PLC programming & HMI Development
- Design, Implement, Secure and Maintain SCADA network including configuration of routers, firewalls, switches, network security software, network monitoring systems, and antivirus systems.
- Active role in hiring of both permanent and contract staff

Project Manager, SCADA, MWRA, Chelsea, MA (4/07 - 3/09)

Responsible for maintaining and enhancing the SCADA system for the MWRA Wastewater Transport and CSO Treatment systems. Actively involved in the managing the execution of the Wastewater Transport SCADA Implementation Project. Specific duties in the included: facility start-up testing, contractor over-sight, technical support, system enhancements, and troubleshooting. Implemented and maintained the wastewater and eastern water SCADA Communications system. Specific duties include:

- Identifying, prioritizing and executing work
- Supervision of two Senior Monitoring and Controls Engineers
- Troubleshooting control system problems
- Coordinating work with other MWRA departments
- Supporting Engineering & Construction departments on SCADA/controls systems related issues
- PLC programming & HMI Development
- Development of SCADA Alarm database
- SCADA network and security configuration/maintenance

Senior Monitoring & Controls Engineer, SCADA, MWRA, Southboro, MA (7/04 - 4/07)

Responsible for maintaining and enhancing the SCADA system for the MWRA western water department. Actively involved in the start-up, testing and enhancements of the Carroll Water Treatment Plant. Responsible for the modification and enhancement of the Turbine Control System at the Cosgrove Intake. Specific duties include: PLC programming & HMI Development, controls system troubleshooting, Microsoft Access database development, contributor to MWRA SCADA Standards, SCADA network and security configuration/maintenance. Gained valuable experience in MWRA SCADA system architecture & standards as well as MWRA Water Transmission & Treatment System and processes.

Controls Systems Applications/Design Engineer, CDM, Cambridge, MA (11/99 - 7/04)

Responsible for control system design, developing Process and Instrumentation Diagrams (P&ID's), designing Control System Architectures, writing Instrumentation and Controls sections of design specifications, as well as, PLC & HMI programming, and system start-up and testing for various municipal and environmental applications including water & waste water treatment facilities, contaminated site remediation facilities and sewer systems.

Field Service Engineer, Westinghouse Electric Co. Westmont, IL (6/97 - 10/98)

In-depth power plant experience working on steam turbine overhauls. Responsible for union labor management, ordering of renewal parts, report writing, trouble shooting, and engineering research. Managed workers, coordinated contracted services, and provided technical assistance on Westinghouse turbine overhauls for various power producers. Inspected and repaired oil operated turbine control systems, steam sealing systems, heat transfer equipment and a variety of other specific repairs.

Education & Certifications

BS, Mechanical Engineering, 1997, University of Massachusetts, Amherst, MA

PE Certificate in Control Systems (MA Lic. # 46914)

Grade IV Water Treatment License (MA Lic. # 20018)

Grade IV Wastewater Collections License

Certified Intrusion Analyst (Analyst #9678)

Global Industrial Cyber Security Professional (Analyst #902)

**MWRA
POSITION DESCRIPTION**

POSITION: Manager, SCADA and Process Control

PCR#:

DIVISION: Operations

DEPARTMENT: SCADA

BASIC PURPOSE:

The Manager, SCADA and Process Control oversees the development, maintenance, and implementation of SCADA and Process Control systems for assigned water and wastewater facilities. Responds to emergency situations 24 hours per day, seven days per week.

SUPERVISION RECEIVED:

Works under the general supervision of Director, Metropolitan Water Operations

SUPERVISION EXERCISED:

Exercises close supervision of assigned professional, engineering, technical, maintenance and operations staff.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Directs the further development, implementation, and optimization of SCADA and Process Control Standards for all water and wastewater facilities (excluding CWTP, DITP, and WDF).
- Develops and implements new SCADA and Process Control initiatives to ensure efficient, reliable and secure SCADA and Process Control operation of all assigned water and sewer facilities. Ensures that major initiatives and policy changes are properly communicated to all staff.
- Reports to senior staff on department initiatives and progress towards agency goals.
- Recommends, develops and implements policies and procedures for the SCADA and Process Control groups.

- Directs the use of MWRA databases and software to develop, improve, and produce reports to monitor and track water and wastewater facility performance.
- Develops and implements continued updates of control strategies to ensure clear documentation of automated facility controls and alarming functions.
- Directs the study and implementation of automated facility control modifications, to reduce energy consumption, maintenance requirements, and improve facility performance.
- Directs the development and implementation of cross departmental (operations, SCADA, maintenance, process control) work plans to implementation facility audits to ensure automation, alarming functions, and emergency safeguards are functioning as designed and documented.
- Directs the operation, modification and continued improvement of the communication infrastructure to support transmission of SCADA and security data throughout MWRA's system.
- Directs the documentation of all control panels and instrumentation installations with support from other departments.
- Directs in-house and contract instrumentation maintenance, modifications and upgrades.
- Oversees the review of capital project designs, and directs staff support of construction and new equipment startup with regard to group responsibilities to ensure adherence to standards and effective integration into overall SCADA system.
- Directs the maintenance and implementation of PLC and HMI programming to support operations needs.
- Oversees staff productivity monitoring and continual improvement through staff skills development, strategic planning, SOP improvements and research and implementation of technology advances.
- Identifies needed improvements to work practices and works with Operations Management and Labor Relations staff to bring about changes. Oversees personnel management.
- Manages unit budget. Assesses resources needed to effectively meet department objectives, prepares budget requests and in depth justification, explains budget variances, and controls unit spending to ensure overall budget compliance.

- Reviews assigned employees' performance per MWRA procedures.
- Assists in maintaining harmonious labor management relations through proper applications of collective bargaining agreement provisions and established personnel policies.
- Prepares for and hears Step-One grievances and pre-disciplinary hearings.
- Participates in collective bargaining negotiations.

SECONDARY DUTIES:

- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A four (4) year Bachelor of Science degree in civil, electrical or mechanical engineering or related field. A masters degree preferred; and
- (B) Ten (10) to twelve (12) years experience in engineering, construction management, operations and maintenance in a water or wastewater environment including at least four (4) years of experience in a supervisory position; and
- (C) Five (5) to Seven (7) years experience in design, startup and managing water/wastewater SCADA and process control systems; and
- (D) Knowledge of computer hardware and software such as SCADA and communications technology, routers and networking, cyber security, PLC control programming, HMI programming, databases, data presentation and analysis tools; and .
- (E) Experience in working in a union environment desirable.

Necessary Knowledge, Skills and Abilities:

- (A) Knowledge of engineering principles and practices.
- (B) Ability to read and interpret plans and drawings.

- (C) Proficient in the use of personal computers and associated MicroSoft Office software programs, including Word, Excel, and Access.
- (D) Experience with the CMMS Software MAXIMO.

SPECIAL REQUIREMENTS:

A valid Massachusetts Class D Drivers License required.
Registered Professional Engineer license required.

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, 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; climb or balance; stoop, kneel, crouch, or crawl; taste or smell.

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

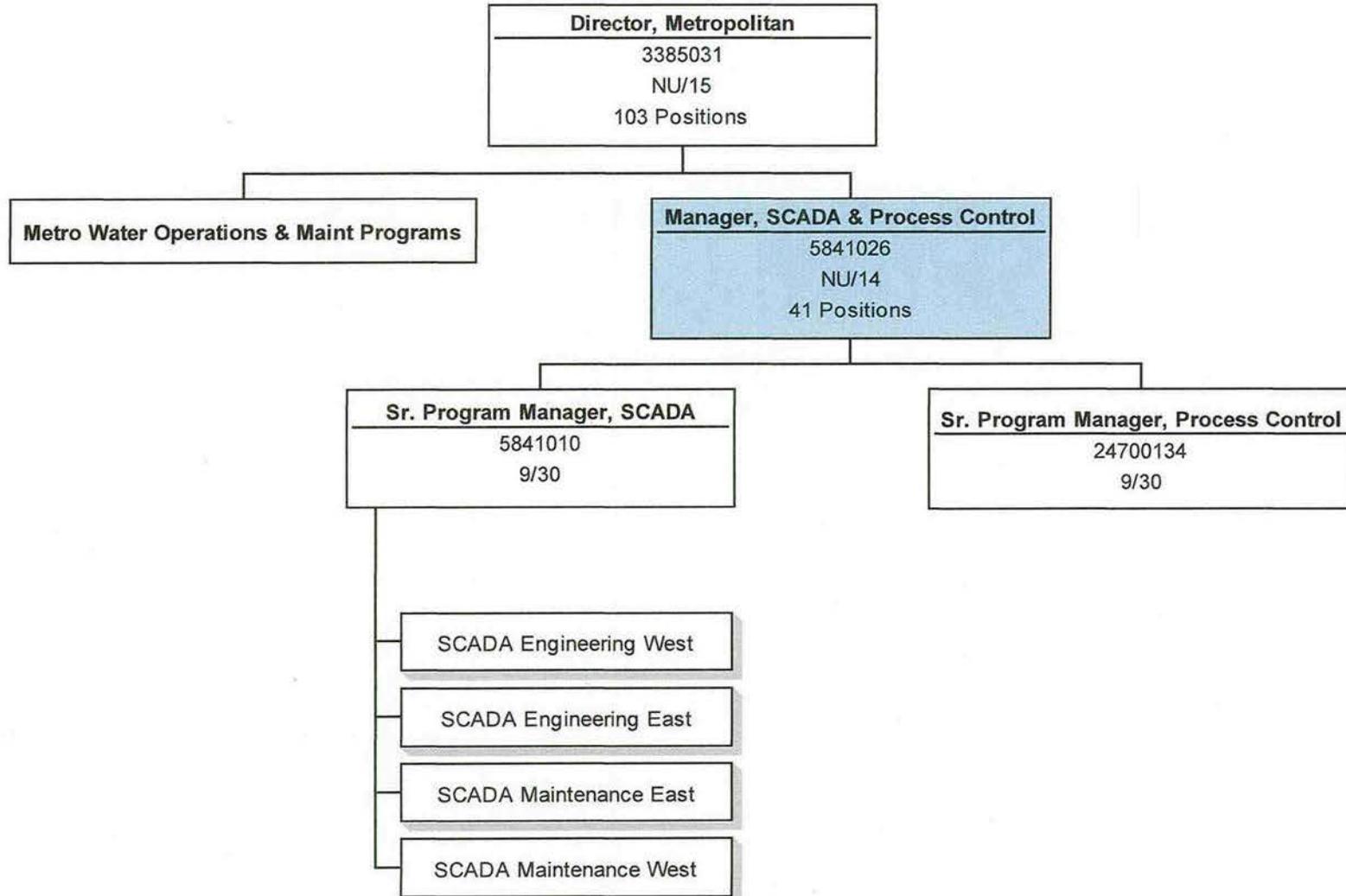
WORK ENVIRONMENT:

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 exposed to outdoor weather conditions. The employee is occasionally exposed to fumes and airborne particles.
The noise level in the work environment is a moderately quiet in office setting.

SCADA Maintenance & Process Control

September 2017

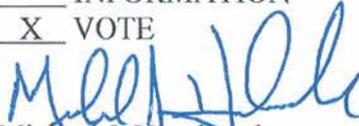


STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Project Manager, Service Contracts, Metro Maintenance

COMMITTEE: Personnel & Compensation

Karen Gay Valente, Director Human Resources
Stephen D. Cullen, Director Wastewater O & M
John P. Vetere, Deputy Chief Operating Officer
Preparer/Title

____ INFORMATION
X VOTE

Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Altaf Bhatti to the position of Project Manager, Service Contracts, (Unit 9 Grade 25) in the Operations Division, Metropolitan Maintenance Department, at an annual salary of \$90,774.59, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Project Manager, Service Contracts is a new position approved by the Board on June 7, 2017, that was created to manage service contracts for metropolitan Boston facilities, equipment, systems and property. This position reports to the Senior Program Manager, Metro Maintenance.

The Project Manager, Service Contracts is responsible for soliciting input from staff and developing and managing new and modified service contracts as assigned, to ensure contract effectiveness and continuity. This position's job duties include preparing required documentation to procure service contracts, working with procurement staff and managers to finalize all required contract and award documentation, administering assigned service contracts, including scheduling, documenting, tracking project budgets, and inputting data into the Computerized Maintenance Management System (MAXIMO), and coordinating project and service contract activities with engineering consultants, contractors, manufacturers, and operations and maintenance staff.

Selection Process

This position was posted internally. Two candidates applied for the position. The Manager, Maintenance Metro East, Senior Program Manager, Metro Maintenance and a representative from the Affirmative Action Unit, interviewed both candidates. Upon completion of the interviews, Mr. Altaf Bhatti was selected as the most qualified candidate for the position based upon his education, experience, and knowledge of the requirements of the position.

Mr. Bhatti has over thirty-four years experience working at the MWRA. He has vast experience with, and demonstrated knowledge of the procurement and administration of maintenance service contracts. Since 1985, Mr. Bhatti has held the position of Project Engineer responsible for compiling specifications, and procuring and coordinating day to day activities for service contracts for both water and wastewater facilities. He has demonstrated a proven ability to interact and communicate effectively with staff at all levels of the agency and has earned the respect of managers and peers.

Mr. Bhatti has a Bachelor of Science Degree in Civil Engineering from Northeastern University, and a Bachelor of Science Degree in Mathematics and Physics from Punjab University. He holds an Engineer In-Training certificate.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENT:

Resume of Altaf Bhatti
Position Description
Organizational Chart

M. Altaf Bhatti

Education/Certification:

B.S., Civil Engineering (environmental minor), Northeastern University, Boston, MA, 1982

Construction Project Management, Northeastern University, Boston, MA, 1995

B.S., Math, Physics, Punjab University, Lahore, Pakistan, 1976

Engineer In-Training certification

Experience:

Project Engineer: 1998- Present. Operations, MWRA

Manage multi-year Authority-wide equipment maintenance service contracts for various wastewater and water facilities, including passenger and freight elevators, heating systems, instrumentation, overhead cranes, fuel storage tank monitoring systems, hydraulic systems, compressed air systems, fire alarm and fire sprinkler systems, and emergency generators.

Prepare cost estimates, contract requisitions, technical specifications and biddable contract documents, conduct pre-bid meetings, and procure contracts through Procurement Department. Prepare contractor qualifications memos and award staff summaries, and conduct pre-service meetings with contractors and Authority staff from various departments. Schedule and coordinate contractors' work activities with wastewater and water facilities' managers to ensure work is performed in a timely manner. Prepare project budget related information for the budget department.

Provide supervision and guidance for various departments' staff to ensure contractors' work performance meets specification requirements. Conduct project progress meetings as necessary with various contractors to resolve project related issues. Work with contract administration for the review and approval of the contractors' payment invoices and resolve any payment related issues. Prepare change orders, staff summaries and provide required information to the operations manager for staff summary approvals. Also, responsible for contract closeout process, that includes balancing change order, DCAM evaluation, and release of retainage.

Managed various task order consultant contracts for the preparation of technical specifications, inspection reports and system evaluations for various wastewater facilities equipment including, fuel storage tank replacements and system upgradesheadworks screen evaluation and inspection, Prison Point fuel oil supply system evaluation, Cottage Farm CSO and Prison Point CSO fire alarm system evaluation and Nut Island Damper replacement specifications.

Project Engineer, 1985-1998, ECD, MWRA

Scoped and compiled contract documents for various rehab and service projects including chemical purchase contracts. Rehab projects included replacement of sewer pipes in Medford, West Roxbury, and Arlington, requiring meetings with local conservation commissions and submission of permit applications to concerned public agencies including DCR.

Also, managed consultant contracts, including procurement and construction phases for the East Boston PS Pier Demolition, Headworks Elevators rehab project, Cottage Farm CSO Electrical Renovations, and Alewife Brook PS Switchgear replacement.

Junior Civil Engineer, 1983-1985, Water Division, MDC/MWRA

Assistance was provided to the Project Manager on various water facilities' projects. Assistance was provided to the site engineer for the Rutland/Holden sewer rehab project with day to day project activities.

Shift Manager, 1982-1983, Burger King, Tremont Street, Boston

Supervised overall store shift operation, prepared employee work schedules, prepared weekly payroll and conducted daily, weekly, and monthly inventory.

Co-Op Program (Northeastern University) Assignments, 1978-1982

Beaver Builders, West Newton, MA

Boston Water and Sewer Commission, Boston, MA

**MWRA
POSITION DESCRIPTION**

POSITION: Project Manager, Service Contracts

PCR#:

DIVISION: Operations

DEPARTMENT: Maintenance

BASIC PURPOSE:

Provides technical assistance in support of the overall maintenance program, civil design services and field-inspection services for various Operations construction and maintenance projects. Manages service contracts including oversight, development, procurement, implementation and administration for metropolitan Boston and Authority wide facilities, equipment, systems and property.

SUPERVISION RECEIVED:

Works under the general supervision of a Program Manager and Sr. Program Manager Maintenance

SUPERVISION EXERCISED:

Exercises close supervision of assigned staff.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Solicits input from stakeholders and develops new and modified service contracts as assigned in a timely fashion to ensure contract continuity.
- Manages assigned staff in support of service contracts and other maintenance activities.
- Prepares required documentation to procure service contracts including but not limited to: cost estimates, contract requisition, contract bid packages, prevailing wage rates, responses to bidders, bid evaluations, and staff summaries. Works with procurement staff and managers to finalize all required contract and award documentation.
- Administers assigned service contracts, including but not limited to scheduling, documenting, and tracking preventative, corrective & emergency services; documenting and tracking certificate/permit needs; and tracking project budgets.
- Analyzes Maximo data for assigned assets to evaluate equipment maintenance effectiveness

and to make improvement recommendations. Works with maintenance and work coordination managers to ensure documentation is being recorded in the maintenance management system (MAXIMO) for all assigned service contracts.

- Performs periodic site assessments/audits/inspections of work performed on assigned service contracts to ensure contract compliance. Reviews and approves invoices after confirmation that it corresponds with the work performed.
- Tracks all Operations Division service contracts to provide reports on budget and schedule updates to managers and financial staff upon request.
- Identifies the need for change orders and prepares change order documentation (PCO, Staff Summaries, CO, etc.) to meet financial shortfalls, and closes out assigned service contracts.
- Develops and administers warranty program for assigned assets.
- Defines, develops, administers and refines programs to support a pro-active maintenance environment. Guides efforts to ensure reliability and maintainability of equipment, processes, utilities, facilities and safety systems.
- Responsible for annual condition assessment and development of asset replacement strategy for assigned assets.
- Coordinates project and service contract activities with engineering consultants, contractors, manufacturers, and operations and maintenance staff as required.
- Develops conceptual sketches, field measurements and reviews manufacturer product data. Compiles designs and drawings, provides first draft layouts, and details options for review. Incorporates review comments into a final version with minimal technical guidance, supervision and direction.
- Oversees modifications to operation and maintenance documentation with respect to facility design modification and upgrades.
- Develops and maintains files and familiarity with all applicable codes, code addenda, code cases and industry standards applicable to facility equipment, buildings and grounds. Ensure that service contract documents comply.
- Provides oral and written reports detailing results of problem investigations and economic justification for proposed changes.

SECONDARY DUTIES:

- Performs related duties as required.

DESIRED MINIMUM QUALIFICATIONS:

Education and Experience:

- A. A four (4) year college degree or Bachelor of Science in civil, mechanical or facilities engineering or a related field; and
- B. A thorough knowledge of the operation and maintenance of large Municipal Water & Sewerage systems, facilities and equipment as normally attained through five (5) to seven (7) years of experience; or
- C. Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- A. Demonstrated knowledge of building, equipment and grounds maintenance, including general and specific knowledge of installation and maintenance principles and practices.
- B. Knowledge of Massachusetts bidding laws including M.G.L., Chapter 30 and Chapter 149 construction bidding regulations.
- C. Demonstrated ability to procure and administer contracts used to inspect, service, and repair facilities and facility components of similar magnitude and complexity to those under MWRA responsibility.
- D. Demonstrated abilities to work as part of a project team, to develop and maintain productive working relationships with external parties, and to function independently with minimal supervision.
- E. Familiarity with state-of-the-art asset management strategies including reliability centered maintenance, and preventative and predictive maintenance programs.
- F. Proficiency with personal computers, handheld computer devices, word processing, spreadsheets, CMMS and engineering applications software required.
- G. Ability to prepare applications and obtain occupancy permits, wetland permits and historic permits from relevant local, state and federal agencies.
- H. Excellent interpersonal, verbal and written communications skills required.

SPECIAL REQUIREMENTS:

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

Registered Professional Engineers license preferred.

A valid Grade II Water Treatment Operators License or Grade II Distribution Operators License, or Grade 2 Wastewater Operator's license preferred.

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, 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 required to stand, walk, climb or balance, stoop, kneel, crouch or crawl, and smell.

The employee must frequently lift and/or move up to 20 pounds. Specific vision abilities required by this job include close vision, distance vision, color vision, depth perception, peripheral vision and the ability to adjust focus.

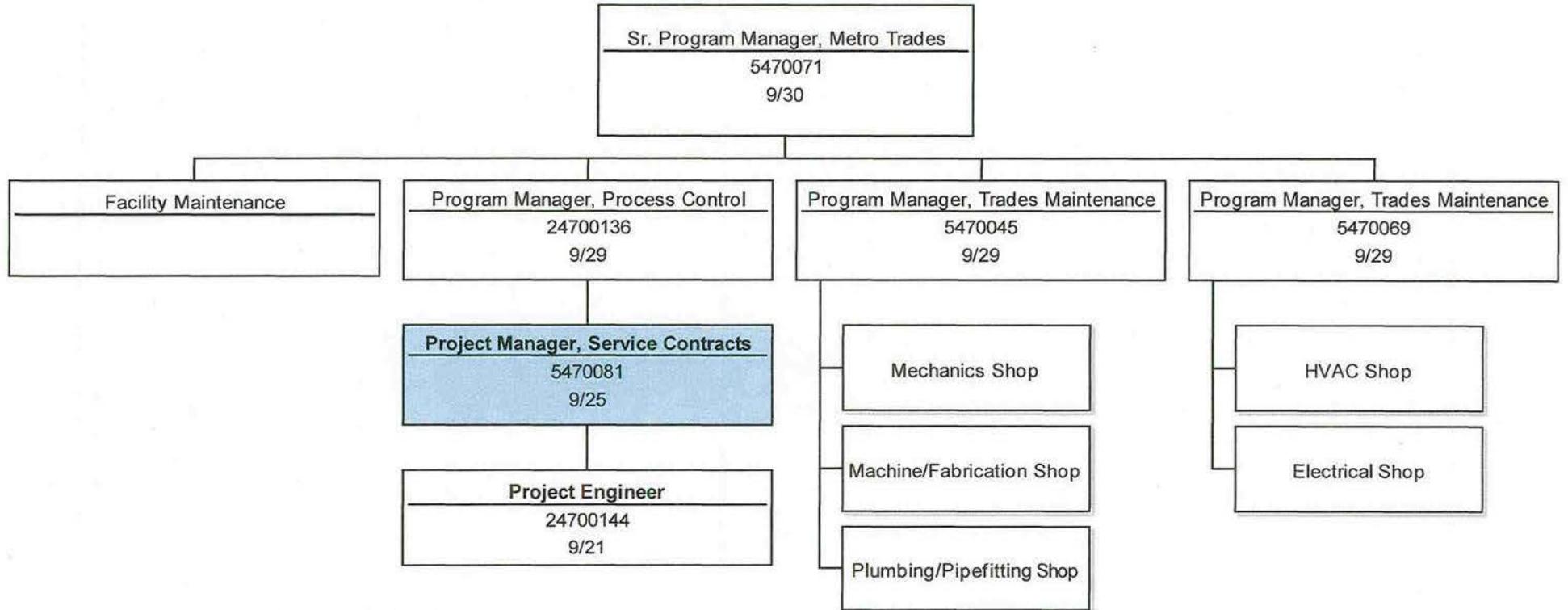
WORK ENVIRONMENT:

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 employee occasionally works near moving mechanical parts, and is occasionally exposed to outdoor weather conditions.

The noise level in the work environment is usually moderately quiet in an office setting.

Operations Division
Metro Equipment/Facilities Maintenance
September 2017



STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Senior Medium Voltage Specialist, Western Maintenance

COMMITTEE: Personnel & Compensation

Karen Gay-Valente, Director, Human Resources
John P. Vetere, Deputy Chief Operating Officer
David Coppes, Director Waterworks
Preparer/Title

 INFORMATION
 X VOTE


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Robert Bonfiglio to the position of Senior Medium Voltage Specialist (Unit 3, Grade 20) in the Southborough Equipment Maintenance Section at an annual salary of \$86,149.56, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Senior Medium Voltage Specialist, Western Maintenance became vacant in August 2017 with the retirement of the incumbent. Medium voltage electrical gear consists of equipment that operates at greater than 480 Volts. The Oakdale Power Generation Station, Cosgrove Intake and John J. Carroll Water Treatment Plant all operate with critical medium voltage electrical components.

The Senior Medium Voltage Specialist works with and assists the Senior Medium Voltage Electrical Operations Supervisor in the daily operations of MWRA's medium voltage electrical maintenance staff and performs medium voltage switching, trains staff in safety procedures, troubleshoots medium voltage equipment, performs medium voltage phase and acceptance testing, and obtains electrical maintenance and installation permits.

Selection Process

This position was posted internally. Two candidates applied for the position. The Maintenance Manager, Western Operations, the Senior Program Manager, Western Maintenance, and the Assistant Manager of Employment interviewed both candidates. Mr. Robert Bonfiglio was identified as the most qualified candidate for the position based upon his education, experience, and knowledge of the requirements of the position.

Mr. Bonfiglio began working at the MWRA in 2011 and for the past three and half years worked as a Medium Voltage Specialist. Mr. Bonfiglio has successfully acted in the Senior Medium Voltage Specialist position for the past year. Prior to the MWRA, Mr. Bonfiglio worked for National Grid as an electrician for ten years, two of which he performed medium voltage underground splicing. His experience also includes ten years of electrical experience with the US Postal Service.

Mr. Bonfiglio has both a Master and Journeyman Electrician's license and attended Wentworth Institute for his journeyman training. Mr. Bonfiglio is a US Navy Veteran and holds a Journeyman Gas Fitters license as well a Sheet Metal license and a CDL Drivers' license.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget to fund this position.

ATTACHMENTS:

Resume of Robert Bonfiglio
Position Description
Organizational Chart

BONFIGLIO ROBERT

SUMMARY

I am a Licensed Master Electrician with extensive experience in Medium Voltage, Industrial and Commercial work with strong Troubleshooting Skills. I also have H.V.A.C. Certification and hold a Gas Fitter License, Oil Burner Certification, and OSHA Certified with a strong safety background.

QUALIFICATIONS

Licensed Massachusetts Master & Journeyman Electrician

National Grid and MWRA Certified Bucket Truck Operator
Certified ACCA Type II Air Conditioning Technician
Licensed Massachusetts Journeyman Gas Fitter
Licensed Massachusetts Sheet Metal Worker
Licensed Massachusetts Class A. C.D.L.combo with airbrakes
OSHA Certified
Manhole Rescue & Confined Space Certified through National Grid & MWRA
Hoist & Lift Certified through National Grid

EDUCATION

Wentworth Institute: Journeyman Electrician I & II NEC Certified
Mass. Journeyman Electrician License
ATI – 2 year program HVAC/Electrical Technologies
ACCA40CFR Certified Type II A.C. Tech.
New England Fuel Institute: Oil Burner Technician Certification.
Gas Fitters Code Course
Various Equipment Schools for Trouble Shooting for the USPS
University of New Hampshire, N.A.S Brunswick Campus - Liberal Arts
Graduated Stoneham High School

EMPLOYMENT

Master Electrician, Medium Voltage Specialist for Massachusetts Water Authority.
Maintaining, repairing & installing various electrical systems from 69KV to 120 Volts

Journeyman Electrician, National Grid Energy Services

I served as underground splicer with medium & high voltage responsibilities with switching, and operating of 13800 volt equipment including Load Breaks & Tie Breakers.

Responsible for wiring new HVAC installations, Troubleshooting and repairing existing HVAC systems, Installing service equipment in residential, commercial, and industrial settings.

Mechanical Electrician, U.S. Postal Service

Responsible for providing installation and maintenance of electrical services on Various postal equipment and facilities. Troubleshooting and Repairing using Schematics and or blueprints and ladder diagrams

Aircrew Ordinance U, S, Navy Honorably Discharged

**MWRA
POSITION DESCRIPTION**

POSITION: Senior Medium Voltage Electrical Specialist

PCR#:

DIVISION: Operations

DEPARTMENT: Deer Island Maintenance / FOD

BASIC PURPOSE:

Performs highly complex electrical maintenance and installation tasks. Responsible for a range of duties, but will not necessarily perform all of the duties listed below. Incumbent employees will be part of a rotating 24 hour stand by team.

SUPERVISION RECEIVED:

Employees will be expected to work under both general and direct supervision and employees will be expected to work independently.

SUPERVISION EXERCISED:

Supervise and direct other electricians including the Medium Voltage Electrical Specialists.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Leads assigned team in hands-on training exercises and drills.
- Works with Management and the Training Group in the training and competency testing of electricians training for future advancement to Medium Voltage Electrical Specialists.
- Responsible for contacting and coordinating the team during emergency call-ins.
- Works with supervisor, planner/scheduler and electrical engineering group to identify deficiencies in medium voltage system components and takes the lead to insure the proper corrective action is performed in a timely manner.
- Installs, modifies, troubleshoots, repairs, and tests new and existing electrical substations transformers, bus ducts, cable bus, relays, circuits, VFDs, power meters, UPS, systems, fixtures, associated equipment and controls for utility and industrial use, and other equipment/systems as required and/or assigned.
- Assesses and initiates corrective action of complex electrical medium and low voltage distribution systems with multiple sources of power.
- Performs medium voltage substation switching while synchronizing multiple sources of power.
- Assists vendors in the maintenance and repair of MWRA electrical equipment.
- Conducts medium voltage phase testing in accordance with NETA, OSHA and NEC guidelines

- Assesses and initiates corrective action for abnormal switching problems
- Pulls all necessary permits as required.
- Performs electrically related activities specified by work order.
- Inspects and troubleshoots electrical systems, equipment and fixtures using testing equipment including Hi-pot, power factor test sets, relay test sets and meggers.
- Performs preventive, predictive and corrective maintenance on electrical systems, equipment and fixtures according to vendor specifications.
- Installs new or replacement electrical systems, equipment and fixtures.
- Selects and obtains appropriate stock or materials per established procedures, and tools or machines for the job.
- Performs work in conformance with relevant building and electrical codes and in a safe and professional manner.
- Follows established safety, operating, and emergency response procedures and policies established by MWRA.
- Operates motor vehicles and light equipment that does not require a special license, such as vans and pickup trucks. Picks up and delivers supplies and equipment to work sites.
- Prepares documents and reports results in the Maximo, Lawson or other appropriate Database of inspections and work performed.
- Assists other trades in the performance of their work, as required or assigned.
- Performs maintenance independently or as part of a team. Light maintenance shall include but not limited to:
 - ❖ Performs routine testing, lockout/tag out, operation (startup/shutdown) and adjustment of process equipment.
 - ❖ Installs and retrofits new equipment related to plant systems.
 - ❖ 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 to prepare work area for access.
 - ❖ Opens hatches.
 - ❖ Installs safety rails.
 - ❖ Removes snow from immediate work area in order to perform tasks.

SECONDARY DUTIES:

- Promotes and participates in the cross-functional work practices.

- Trains peers and subordinates as requested.
- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) A high school education or the equivalent; and
- (B) Satisfactory completion of a certified journey level electrician apprenticeship training program, or a similar formal training program; or
- (C) Any equivalent combination of education and/or experience.

Necessary Knowledge, Skills and Abilities:

- (A) Basic reading, writing, mathematical, scientific and oral communication skills.
- (B) Knowledge of Massachusetts electrical and other applicable codes.
- (C) Thorough knowledge of pumps, compressors, generators, switchgear, relaying systems Variable Frequency Drives and other related electrical equipment, including polyphase circuits and motors and associated controls.
- (D) Thorough knowledge of the standard practices, materials, tools, occupational hazards and safety practices common to the trade as well as the completion of MWRA safety training including all requirements in NFPA 70E.
- (E) Ability to diagnose problems and recommend repair or replacement.
- (F) Ability to work with tools and equipment of the electric trade. Ability to work safely with hazardous chemicals and in adverse weather conditions.
- (G) Ability to read and interpret wiring diagrams, sketches, blue prints, and vendor instructions to plan and set up work for the complete installation, modification, maintenance and repair of a wide variety of industrial electrical systems.
- (H) Ability to attain knowledge and work processes required to perform maintenance tasks required by Reliability Centered Maintenance or similar Maintenance Management Program.
- (I) Computer skills necessary to access and use the Maximo & Lawson Database.
- (J) 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
- (K) 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.
- (L) Excellent interpersonal, oral and written communication skills.

SPECIAL REQUIREMENTS:

- A valid Massachusetts Master Electrician's license required.
- Site specific F1 Certification with demonstrated knowledge of facility specific Fire Alarm Systems within 6 months.
- A valid Massachusetts Class D Motor Vehicle Operators License or equivalent.
- Certification in the installation, testing, and troubleshooting of Medium Voltage electrical equipment within one year.
- Demonstrated knowledge and prior experience with handling of medium and high voltage systems is required.

TOOLS AND EQUIPMENT USED:

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

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 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:

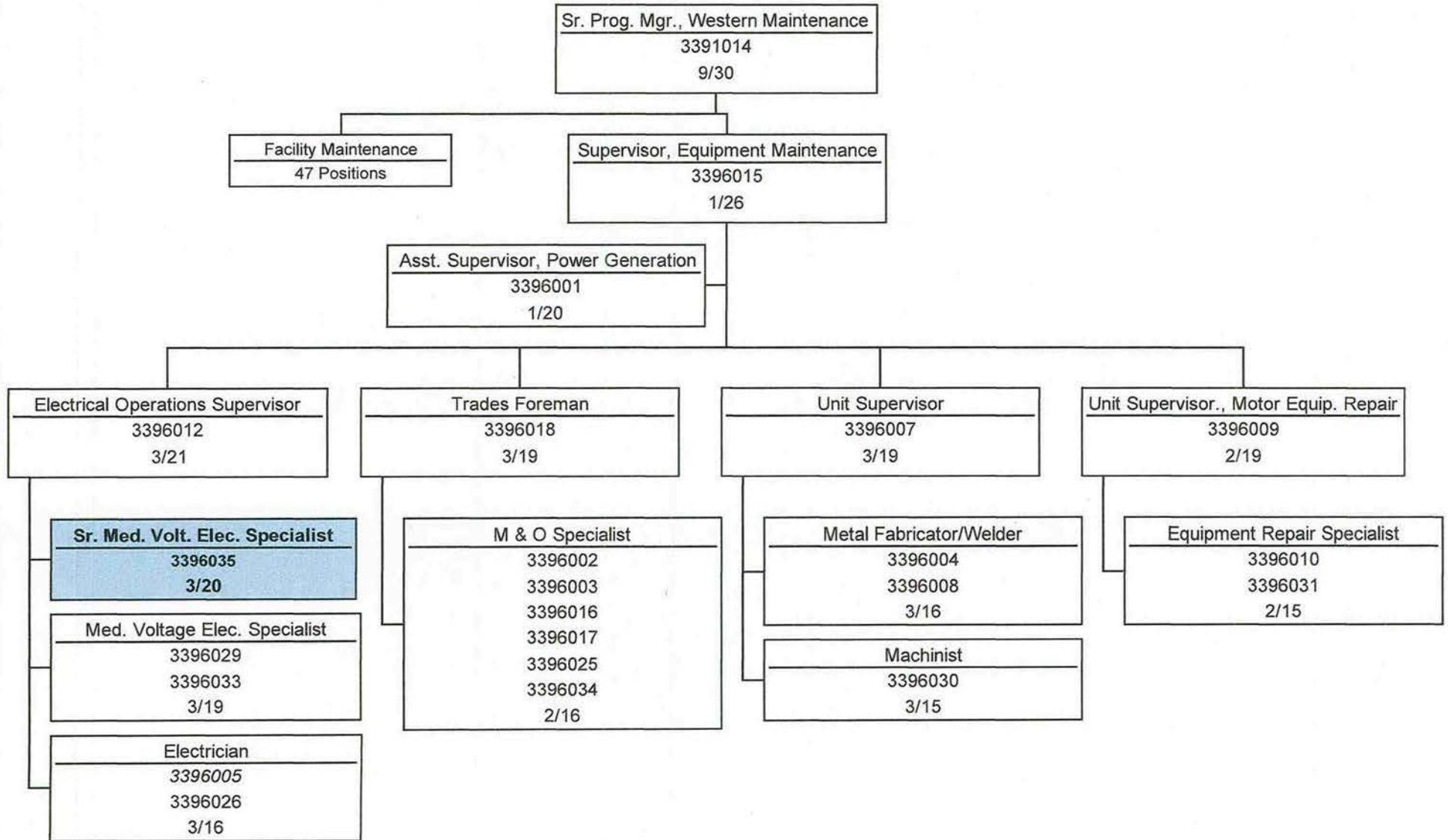
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job.

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.

February 2008

Operations-Western Water O&M
Equipment Maintenance
 September 2017



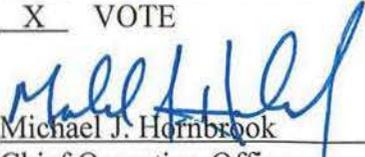
STAFF SUMMARY

TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director 
DATE: September 20, 2017
SUBJECT: Appointment of Supervisor, Treatment and Transmission Operations
John J. Carroll Water Treatment Plant

COMMITTEE: Personnel & Compensation

Karen Gay-Valente, Director, Human Resources
John P. Vetere, Deputy Chief Operating Officer
David Coppes, Director Waterworks
Preparer/Title

INFORMATION
 VOTE


Michael J. Hornbrook
Chief Operating Officer

RECOMMENDATION:

To approve the appointment of Mr. Thomas Patriarca to the position of Supervisor, Treatment and Transmission Operations (Unit 1, Grade 26) at the John J. Carroll Water Treatment Plant at an annual salary of \$86,746.65, commencing on a date to be determined by the Executive Director.

DISCUSSION:

The position of Supervisor, Treatment and Transmission (T&T) Operations became vacant in July, 2017, with the retirement of the incumbent. The Supervisor, T & T Operations reports to the Senior Program Manager, T&T Operations at the John J. Carroll Water Treatment Plant.

This position is responsible for the supervision of operational staff within Western Operations treatment facilities, including direct supervision of Senior Transmission/Treatment Operators, to ensure proper hydraulic control, water treatment, and hydroelectric operations to meet MWRA and regulatory requirements. Other duties include overseeing operational maintenance, ensuring that an adequate inventory and quality of treatment chemicals are available, coordinating shutdowns to support maintenance, and troubleshooting process control issues. In addition, this position supervises the application of algaecides on open reservoirs when required.

Selection Process

This position was posted internally. Ten candidates applied for this position. The Director of Western Operations, the Manager, Transmission & Treatment, and the Manager of Operations Support, representing Human Resources, interviewed the candidates. Upon completion of the interviews, Mr. Patriarca was identified as the most qualified candidate based upon his education, experience, and knowledge of the requirements of the position.

Mr. Patriarca has 29 years of experience working at the MWRA, with 18 years of experience working as a Senior Transmission and Treatment Operator. He has been a Senior Transmission and Treatment Operator at the John J. Carroll Water Treatment Plant since the plant went online in 2005. His duties as a Senior Transmission and Treatment Operator include supervision of staff, monitoring plant processes through SCADA, operational maintenance, receiving chemical deliveries, lab analysis of water parameters and hydro-electric operations. His previous experience at the MWRA was as a Junior Engineering Aide. In this position, he was involved with sampling, flood control operations, and monitoring of aqueduct leaks.

Mr. Patriarca has Bachelor of Science Degree in Resource Development from the University of Rhode Island and a Master of Arts Degree in Business Administration from Framingham State College. He holds a Water Treatment Operators Grade 2 Full License, a Water Treatment Operators Grade 4 in Training, a Water Distribution Grade 4 Full License, and also a Pesticide Applicators License.

BUDGET/FISCAL IMPACT:

There are sufficient funds in the FY18 Current Expense Budget for this position.

ATTACHMENTS:

Resume of Thomas Patriarca
Position Description
Organizational Chart

Patriarca, Thomas

Education/ Licenses

B.S. Resource Development, University of Rhode Island

M.A.B.A. Framingham State College

Grade 4 Water Distribution Operator in Full

Grade 4 Water Treatment Operator in Training

Mass Pesticide license

Grade 5c Wastewater Operator in Training

Experience

Massachusetts Water Resources Authority

Senior Transmission and Treatment Operator, 1999-present

John J. Carroll Water Treatment Facility 88 DeAngelo Drive Marlboro Ma

Operated water treatment plant with max. 400 mgd capacity serving 2.5 million people. Job duties includes performing duties essential to the Water Treatment and Distribution system. Acted as lead operator on shift, Supervising as many as 4 Treatment Operators and worked with Plant Maintenance in the fixing and adjustment of plant equipment. adjusted flows and chemical dosages and monitoring of residuals and processes through SCADA and in Plant, to maintain quality standards. Gathering samples for the testing of pH, free and total chlorine, fluoride, turbidity, alkalinity, ozone residual and UV. Receiving deliveries and testing product for acceptable ranges for chlorine, soda ash, fluoride, liquid oxygen, carbon dioxide, diesel, ammonia, sodium bisulfite, propane and urea. Operating and maintaining lab equipment for the analysis for chlorine, fluoride and ozone residuals, pH, turbidity, alkalinity and uvt Operated 3 turbines 1400-3000 kw each, under PLC control, local start through SCADA. Monitored and ensured proper workings of governors, wicket gates, cooling water pumps, kvars, compressed air systems, brushes, battery and excitation systems . Monitored approx 50 sites through SCADA and Telog, with a total of +/-1500 alarms and responding as needed.

Massachusetts Water Resources Authority

Jr.Engineering Aide 1988-1999

Engineering support, Cataloging and maintaining plan room. Calculated releases for flood control on Reservoirs. Worked with leak detection crew and leak monitoring of several Aqueducts. Worked with water quality section as needed sampling at testing at remote sites gathering bacterial samples.

Upper Blackstone Water Pollution Control District 1987-1988

Operator

Gained experience in the working of a wastewater treatment plant, preliminary treatment, belt feeder presses and multi hearth furnaces for sludge combustion.

**MWRA
POSITION DESCRIPTION**

POSITION: Supervisor, T&T Operations

PCR#:

DIVISION: Operations

DEPARTMENT: Western Operations & Maintenance

BASIC PURPOSE:

Oversees the assigned operational staff within the John J. Carroll Water Treatment Plant to ensure proper hydraulic control, water treatment, and hydroelectric operations to meet MWRA and regulatory guidelines.

SUPERVISION RECEIVED:

Works under the general supervision of the Manager, Transmission and Treatment; Senior Program Manager, Transmission and Treatment Operations or the Senior Program Manager, Process Engineering.

SUPERVISION EXERCISED:

Exercises close supervision of the Senior T & T Operators and the T & T Operators.

ESSENTIAL DUTIES AND RESPONSIBILITIES:

- Manages the John J. Carroll Water Treatment Plant to ensure efficient operations to meet hydraulic, water treatment and hydroelectric goals.
- Oversees the proper operation of ozonation, corrosion control, ultraviolet disinfection and post-treatment systems
- Oversees the maintenance of the plant equipment with in-house staff and outside vendors.
- Oversees the operation of the plant process control system and the SCADA systems.
- Oversees the input of data and data collection for proper reporting. Oversees the input of data into the MAXIMO system.
- Performs administrative duties related to plant operations and plant personnel.
- Reviews and evaluates employee performance according to MWRA procedures.

- Performs staff training and assembles SOP's, facilities handbooks, and other operating procedures.
- Provides daily communication to the Senior Program Managers on all aspects of plant operations and maintenance.
- Provides a safe working environment for the plant staff.
- Maintains adequate inventories of chemicals, spare parts and other essential materials.

SECONDARY DUTIES:

- Performs related duties as required.

MINIMUM QUALIFICATIONS:

Education and Experience:

- (A) Completion of a two-year degree program in Environmental or Civil Engineering or related field; and
- (B) Five (5) to seven (7) years experience in water treatment with a minimum of three (3) years in a supervisory capacity; or
- (C) Any equivalent combination of education and experience.

Necessary Knowledge, Skills and Abilities:

- (A) Working knowledge of water treatment processes and equipment.
- (B) Knowledge of hydraulic operations and the basic principles of hydro-generation.
- (C) Basic knowledge of computer systems with a demonstrated knowledge of personal computers, SCADA and TELOG systems and CMMS systems such as Maximo.
- (D) Demonstrated ability to plan, organize, and direct staff in the operation of the plant.
- (E) Excellent analytical, written and communication skills.

SPECIAL REQUIREMENTS:

A valid Massachusetts Class D Motor Vehicle Operators License.

Valid Operator of Drinking Water Supply Grade 3D and Grade 2T Licenses within six months.

A Valid Pesticide Applicator's License within twelve months.

TOOLS AND EQUIPMENT USED:

Power and hand tools, mobile radio, 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 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 100 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 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.

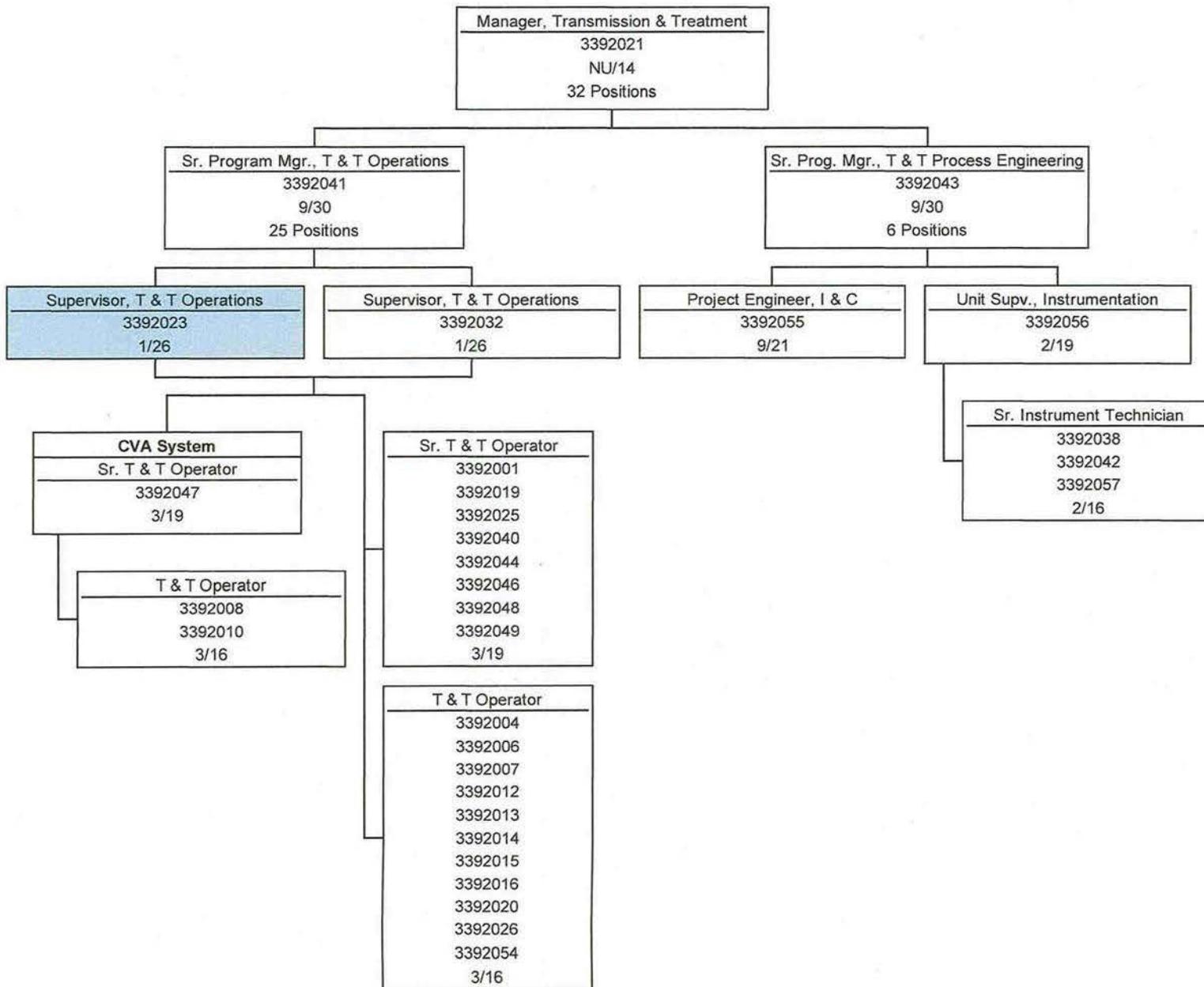
The noise level in the work environment is usually loud in field settings, and moderately quiet in office settings.

September 2017

Operations-Western Water O&M

Transmission & Treatment

September 2017





MASSACHUSETTS WATER RESOURCES AUTHORITY

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

Frederick A. Laskey
Executive Director

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Chair: M. Beaton
Vice-Chair: J. Carroll
Secretary: A. Pappastergion
Board Members:
A. Blackmon
K. Cotter
P. Flanagan
J. Foti
B. Peña
H. Vitale
J. Walsh
J. Wolowicz

BOARD OF DIRECTORS' MEETING

to be held on

Wednesday, September 20, 2017

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**
- III. **REPORT OF THE EXECUTIVE DIRECTOR**
- IV. **BOARD ACTIONS**
 - A. **Approvals**
 1. Bond Defeasance of Future Debt Service (ref. AF&A B.1)
 2. PCR Amendment – September 2017 (ref. P&C A.1)
 3. Appointment of Chemist III, Laboratory Services (ref. P&C A.2)
 4. Appointment of Chemist III, Laboratory Services (ref. P&C A.3)
 5. Appointment of Regional Manager, Toxic Reduction and Control (ref. P&C A.4)
 6. Appointment of Manager, Energy, Operations Division (ref. P&C A.5)
 7. Appointment of Program Manager, Energy Management, Operations Division (ref. P&C A.6)

A. Approvals (cont'd.)

8. Appointment of Manager, Metering and Monitoring, Planning Department (ref. P&C A.7)
9. Appointment of Manager, SCADA and Process Control (ref. P&C A.8)
10. Appointment Project Manager, Service Contracts, Metro Maintenance (ref. P&C A.9)
11. Appointment of Senior Medium Voltage Electrical Specialist, Western Maintenance (ref. P&C A.10)
12. Appointment of Supervisor, Transmission and Treatment Operations, Carroll Water Treatment Plant (ref. P&C A.11)

B. Contract Awards

1. Supply and Delivery of Sodium Hypochlorite to the Deer Island Treatment Plant: Borden & Remington Corporation, Bid WRA-4413 (ref. WW B.1)

C. Contract Amendments/Change Orders

1. Alewife Brook Pump Station Rehabilitation: Barletta Engineering Corporation, Contract 6797, Change Order 2 (ref. WW C.1)
2. Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services: Stantec Consulting Services, Inc., Contract 7156, Amendment 4 (ref. W B.1)
3. Wachusett Aqueduct Pumping Station, BHD/BEC JV 2015, A Joint Venture: Contract 7157, Change Order 21 (ref. W B.2)

V. CORRESPONDENCE TO THE BOARD

VI. OTHER BUSINESS

VII. EXECUTIVE SESSION

A. Litigation

1. Summary of Litigation and Construction Claims

VIII. ADJOURNMENT

Meeting of the Board of Directors**July 19, 2017**

A meeting of the Board of Directors of the Massachusetts Water Resources Authority was held on July 19, 2017 at the Authority headquarters in Charlestown. Vice-Chair Carroll presided. Present from the Board were Messrs. Blackmon, Flanagan, Foti, Peña, Vitale and Walsh. Ms. Wolowicz and Messrs. Beaton, Cotter and Pappastergion were absent. Among those present from the Authority staff were Frederick Laskey, Executive Director, Steven Remsberg, General Counsel, Michael Hornbrook, Chief Operating Officer, Thomas Durkin, Director of Finance, Michele Gillen, Director of Administration, Carolyn Fiore, Deputy Chief Operating Officer, John Riccio, Director, TRAC, Denise Breiteneicher, Program Manager, Energy & Environment, Corinne Barrett, Director of Construction, Martin McGowan, Construction Coordinator, Elizabeth Reilley, Director of Environmental Quality, Anandan Navanandan, Chief Engineer, Paul Rullo, Program Manager, Vincent Spada, Construction Coordinator, Carl Leone, Senior Program Manager, Matthew Horan, Treasurer, Karen Gay-Valente, Director of Human Resources and Bonnie Hale, Assistant Secretary. The meeting was called to order at 1:00 p.m.

APPROVAL OF MINUTES

Upon a motion duly made and seconded, it was

Voted to approve the minutes of the June 28, 2017 Board of Directors' meeting, as presented and filed with the records of the meeting.

ADMINISTRATION, FINANCE & AUDIT COMMITTEE

INFORMATION

Delegated Authority Report – June 2017

There was question and answer on items contained in the report.

WASTEWATER POLICY & OVERSIGHT COMMITTEE

INFORMATION

Staff described the following two information items, and there was general discussion and question and answer:

- Clinton Local Discharge Limits Evaluation for Submittal to the U.S. Environmental Protection Agency under NPDES Permit #MA010040
- Revised Enforcement Response Plan for the Toxic Reduction and Control Program.

CONTRACT AMENDMENTS/CHANGE ORDERS

Chelsea Creek Headworks Upgrade, BHD/BEC JV 2015, A Joint Venture: Contract 7161, Change Order 3

Staff gave a presentation on this challenging rehabilitation of an older facility, and described the work to be performed under the change order.

Upon a motion duly made and seconded, it was

Voted to authorize the Executive Director, on behalf of the Authority, to approve Change Order 3 to increase the amount of Contract 7161 with BHD/BEC 2015, A Joint Venture, Chelsea Creek Headworks Upgrade, in an amount not to exceed \$1,129,740.20, with no increase in contract term; further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 7161 in amounts not to exceed the aggregate of \$250,000, in accordance with the Management Policies and Procedures of the Board of Directors.

WATER POLICY & OVERSIGHT COMMITTEE

CONTRACT AWARDS

Strategies to Minimize the Adverse Impacts of an Oil/Contaminant Spill in Wachusett Reservoir on MWRA's Finished Water: University of Massachusetts-Amherst, Contract W320

Staff described the work to be performed under this collaborative research contract.

Upon a motion duly made and seconded, it was

Voted to approve the award of a sole source collaborative research contract with the University of Massachusetts, Amherst titled "Strategies to Minimize the Adverse Impacts of an Oil Contaminant Spill in Wachusett Reservoir on MWRA's Finished Water," and to authorize the Executive Director, on behalf of the Authority, to execute Contract W320 in an amount not to exceed \$300,000 for a contract of thirty-six months from the Notice to Proceed.

Southern Extra High Pipeline - Section 111 (Dedham North): P. Gioioso and Sons, Inc., Contract 7504

Staff gave a presentation on the three contracts comprising the Southern Extra High Pipeline redundancy project, and discussed the details of the above contract.

Upon a motion duly made and seconded, it was

Voted to approve the award of Contract 7504, Southern Extra High Pipeline Section 111 (Dedham North) to the lowest responsible and eligible bidder, P. Gioioso and Sons, Inc., and to authorize the Executive Director, on behalf of the Authority, to execute and deliver said contract in the bid amount of \$17,226,350 for a term of 780 calendar days from the Notice to Proceed.

CONTRACT AMENDMENTS/CHANGE ORDERS

Southern Extra High Pipeline – Section 111 (Boston): P. Gioioso and Sons, Inc., Contract 6454, Change Order 1

Staff gave a presentation on the progress of the contract work and described the reason for the change order.

Upon a motion duly made and seconded, it was

Voted to authorize the Executive Director, on behalf of the Authority, to approve Change Order 1 to increase the amount of Contract 6454 with P. Gioioso and Sons, Inc., Southern Extra High Pipeline - Section 111 (Boston), in an amount not to exceed \$380,000, with no increase in contract term; further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 6454 in amounts not to exceed the aggregate of \$250,000, in accordance with the Management Policies and Procedures of the Board of Directors.

Wachusett Aqueduct Pumping Station, BHD/BEC JV 2015, A Joint Venture: Contract 7157, Change Order 18

Staff gave a presentation providing a construction update and a description of the work to be performed under Change Order 18.

Upon a motion duly made and seconded, it was

Voted to authorize the Executive Director, on behalf of the Authority, to approve Change Order 18 to increase the amount of Contract 7157 with BHD/BEC JV 2015, A Joint Venture, Wachusett Aqueduct Pumping Station, for a lump sum amount of \$608,007, with no increase in contract term; further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 7157 in amounts not to exceed the aggregate of \$250,000, in accordance with the Management Policies and Procedures of the Board of Directors.

APPROVALS

Local Water System Assistance Program – Approval of Water Loan Program Guidelines Revision for Town of Winthrop

There was question and answer on the financial impact of this action.

Upon a motion duly made and seconded, it was

Voted to approve a one-time exemption to the Program Guidelines for the Local Water System Assistance Program to waive the annual allocation restriction for the Town of Winthrop to allow the Town to borrow up to its entire \$4,119,000 water loan allocation contingent upon Winthrop Town Council bonding authorization to meet this request.

PERSONNEL & COMPENSATION COMMITTEE

APPROVALS

PCR Amendment – July 2017

Upon a motion duly made and seconded, it was

Voted to approve an amendment to the Position Control Register, as presented and filed with the records of the meeting.

Appointment of Lab Supervisor III

Upon a motion duly made and seconded, it was

Voted to approve the Executive Director's recommendation to appoint Mr. Charles Blodget to the position of Laboratory Supervisor III (Unit 9, Grade 25) at an annual salary of \$104,221.76, to be effective on the date designated by the Executive Director.

Appointment of Assistant Director, Engineering

Upon a motion duly made and seconded, it was

Voted to approve the Executive Director's recommendation to appoint Mr. Brian L. Kubaska to the position of Assistant Director, Engineering (Non-Union, Grade 14), in the Engineering & Construction Department, at an annual salary of \$134,769.58, to be effective on the date designated by the Executive Director.

Appointment of Materials Manager

Upon a motion duly made and seconded, it was

Voted to approve the Executive Director's recommendation to appoint Mr. Stephen Coffey to the position of Materials Manager, Administration Division (Unit 6, Grade 13), at an annual salary of \$109,341, to be effective on the date designated by the Executive Director.

EXECUTIVE SESSION

It was moved to enter executive session to discuss litigation and real estate.

Upon a motion duly made and seconded, it was, upon a roll call vote in which the members were recorded as follows:

<u>Yes</u>	<u>No</u>	<u>Abstain</u>
Blackmon		
Flanagan		
Foti		
Peña		
Vitale		
Walsh		
Carroll		

Voted to enter executive session for the purpose of discussing strategy with respect to litigation and to consider the purchase, exchange, lease or value of real property, in that such discussion in open session may have a detrimental effect on the litigating and negotiating positions of the Authority.

It was stated that the meeting would return to open session solely for consideration of adjournment.

* * * *

EXECUTIVE SESSION

* * * *

The meeting returned to open session at 2:10 p.m. and adjourned.