



# MASSACHUSETTS WATER RESOURCES AUTHORITY

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

Frederick A. Laskey  
Executive Director

Telephone: (617) 242-6000  
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## **ADMINISTRATION, FINANCE & AUDIT COMMITTEE MEETING**

*Chair:* A. Pappastergion

*Vice-Chair:* M. Gove

*Committee Members:*

J. Barrera

J. Carroll

K. Cotter

J. Foti

J. Hunt

V. Mannering

to be held on

Wednesday, January 18, 2012

Location: \*MWRA Chelsea Facility\*  
2 Griffin Way – Muster Room  
Chelsea, MA

Time: 10:00 a.m.

### **AGENDA**

#### **A. Information**

1. Delegated Authority Report – December 2011
2. Proposed Purchase of GPS Automatic Vehicle Location Devices and Services
3. MWRA Energy Efforts & Savings – FY02 to FY11 Ten Year Summary Report
4. FY12 Financial Update and Summary as of December 2011

#### **B. Approvals**

1. Fiscal Year 2012 Defeasance Account

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**\*NOTE DIFFERENT MEETING LOCATION; DIRECTIONS FOLLOW AFTER BOARD AGENDA.**

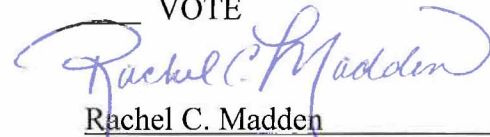
**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Delegated Authority Report – December 2011



COMMITTEE: Administration, Finance & Audit

X INFORMATION  
VOTE



Rachel C. Madden  
Director, Administration & Finance

Barbie Aylward, Administrator  
Frank Renda, Data & Information Coordinator  
Preparer/Title



Michele Gillen  
Deputy Director, Administration & Finance

**RECOMMENDATION:**

For information only. Attached is a listing of actions taken by the Executive Director under delegated authority for the period December 1, 2011 through December 31, 2011.

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 DECEMBER 1 - 31, 2011

DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT	AMENDMENT/CO	COMPANY	FINANCIAL IMPACT
12/02/11	<b>REHABILITATION OF SECTION 624</b> DELETE REQUIREMENT TO REMOVE, TEST, TRANSPORT AND DISPOSE OF 40 TONS OF GROUP III SEDIMENTS FROM SEWER CLEANING; DECREASE ALLOWANCE FOR ADDITIONAL TRAFFIC CONTROL; DECREASE ALLOWANCE FOR FIRE DEPARTMENT SERVICES	5310	3	SPINIELLO COMPANIES	(\$46,529.50)
12/07/11	<b>CHELSEA FACILITY ENERGY MANAGEMENT SYSTEM</b> AWARD OF CONTRACT TO LOWEST RESPONSIVE BIDDER FOR THE INSTALLATION OF AN ENERGY MANAGEMENT SYSTEM FOR THE CHELSEA ADMINISTRATION BUILDING FOR A TERM OF 1,674 DAYS	OP-168	AWARD	TRANE U.S., INC.	\$372,690.00
12/08/11	<b>INSTRUMENTATION MAINTENANCE SERVICES</b> INCREASE NON-EMERGENCY AND EMERGENCY ON-CALL SERVICES HOURS FROM 400 HOURS TO 1,450 HOURS; INCREASE ESTIMATED REPLACEMENT PARTS ALLOWANCE AND MARK-UP	OP-140	1	NEW ENGLAND CONTROLS, INC.	\$94,890.00
12/08/11	<b>DIESEL GENERATOR MAINTENANCE</b> AWARD OF CONTRACT TO LOWEST RESPONSIVE BIDDER FOR DIESEL GENERATOR MAINTENANCE AT THE JOHN J. CARROLL WATER TREATMENT PLANT FOR A TERM OF 730 CALENDAR DAYS	OP-171	AWARD	AUTHORIZED SERVICES OF NEW ENGLAND, LLC	\$216,730.00
12/13/11	<b>SOUTHERN SPINE DISTRIBUTION MAINS SECTION 107 - PHASE 2</b> CONSTRUCT A TRAFFIC ISLAND ON ADAMS STREET	7099	15	RJV CONSTRUCTION CORPORATION, INC.	\$33,373.87
12/13/11	<b>NORTH DORCHESTER BAY VENTILATION BUILDING</b> FURNISH AND INSTALL ALTERNATE PLANTINGS AND FURNISH AND INSTALL A SMOOTH FIBERGLASS-PAINTED OVERLAY ON THE ODOR CONTROL CONDUIT; MILL AND OVERLAY WILLIAM J. DAY BOULEVARD AND MOUNT VERNON STREET; FURNISH AND INSTALL AN ODOR CONTROL CONDUIT TRANSITION ADAPTOR; REMOVE DRAIN PIPE PRIOR TO DRIVING THE WATERTIGHT STEEL COFFERDAM EARTH SUPPORT SYSTEM AND REINSTALL AT COMPLETION OF SUBGRADE WORK; FURNISH AND INSTALL A MONITORING SYSTEM FOR THE BOSTON FIRE DEPARTMENT RADIO; FURNISH AND INSTALL A UNIT HEATER, HEAT TRACING AND INSULATION ON THE FIRE PROTECTION PIPING BELOW THE AIR INTAKE SHAFT OUTLET IN THE MECHANICAL ROOM; REPLACE FOUR REMOTE ODOR CONTROL DAMPER SWITCHES ON SCADA CONTROL PANEL 31 WITH SPRING-LOADED MOMENTARY SWITCHES; FURNISH AND INSTALL A PNEUMACTIC LOCKING DOOR STRIKE ON BLOWER ROOM DOOR 2 IN LIEU OF SPECIFIED ELECTRIC DOOR STRIKE; PREPARE, PRIME AND PAINT THE INTERIOR OF THE ODOR ABATEMENT STEEL STACKS; FURNISH AND INSTALL A FIRE ALARM STROBE IN THE BATHROOM; FURNISH AND INSTALL MOTION DETECTORS IN STAIRWELLS; MODIFICATIONS TO BLOWER MOTOR CONTROLS; FURNISH AND INSTALL TWO FIRE PROTECTION SPRINKLER HEADS AND PIPING; MODIFICATIONS DELUGE CONTROL PANEL; FURNISH AND INSTALL ANTENNA RISER POLE, ANTENNA AND WIRING FOR SCADA RADIO ANTENNA; REPLACE SPECIFIED PLC ALLEN-BRADLEY COMMUNICATION CARD; FURNISH AND INSTALL 42-INCH HANDRAILS IN LIEU OF CONTRACT-SPECIFIED 34-INCH HANDRAILS; REMOVE AND REINSTALL BACKFLOW PREVENTER AND ASSOCIATED PIPING; FURNISH AND INSTALL CONDUIT AND WIRES TO CONNECT BACKDRAFT DAMPER TO SCADA CONTROL PANEL 31	7259	2	P. GIOIOSO & SONS, INC.	\$222,393.00
12/22/11	<b>WORKERS' COMPENSATION LEGAL SERVICES</b> AWARD OF CONTRACT FOR WORKERS' COMPENSATION LEGAL SERVICES FOR THE PERIOD OF JANUARY 1, 2012 TO DECEMBER 31, 2012	A573	AWARD	TENTINDO KENDALL CANNIFF & KEEFE, LLP	\$62,000.00
12/22/11	<b>PCB ABATEMENT AT CVA INTAKE, BELCHERTOWN</b> AWARD OF CONTRACT TO LOWEST RESPONSIVE BIDDER FOR PCB ABATEMENT AT CHICOPEE VALLEY AQUEDUCT INTAKE (CVA), ADJACENT TO WINSOR DAM AT THE QUABBIN RESERVOIR, BELCHERTOWN, MA, FOR A TERM OF 270 CALENDAR DAYS	OP-157	AWARD	CHAPMAN WATERPROOFING COMPANY, INC.	\$87,000.00

## PURCHASING DELEGATED AUTHORITY ITEMS - DECEMBER 1 - 31, 2011

DATE OF AWARD	TITLE AND EXPLANATION	CONTRACT #	AMENDMENT	COMPANY	FINANCIAL IMPACT
12/08/11	<b>NINETEEN NEW REPLACEMENT VEHICLES</b> AWARD OF TWO SEPARATE PURCHASE ORDERS, TO THE LOWEST RESPONSIVE BIDDERS, FOR 19 NEW VEHICLES, REPLACING EXISTING VEHICLES	<b>WRA-3370</b>		<b>LIBERTY CHEVROLET MHQ MUNICIPAL VEHICLES</b>	\$592,575.00 \$62,593.00
12/13/11	<b>PREVENTIVE MAINTENANCE FOR LAB INSTRUMENTATION</b> AWARD OF A PURCHASE ORDER, TO THE LOWEST REPONSIVE BIDDER, FOR PREVENTIVE MAINTENANCE, FOR A ONE YEAR PERIOD, ON METALS INSTRUMENTS AT THE CENTRAL LABORATORY AT THE DEER ISLAND TREATMENT PLANT	<b>WRA-3354</b>		<b>PERKIN ELMER, INC</b>	\$44,647.20
12/13/11	<b>ONE NEW FREIGHTLINER TRUCK</b> AWARD OF A PURCHASE ORDER, TO THE LOWEST REPONSIVE BIDDER, FOR A NEW FREIGHTLINER TRUCK, WITH ON-BOARD SYTEMS, FOR USE BY THE WATER PIPELINE MAINTENANCE UNIT, REPLACING AN EXISTING UNIT	<b>WRA-3361</b>		<b>BOSTON FREIGHTLINER</b>	\$143,703.00
12/14/11	<b>KNIFE GATE VALVES</b> AWARD OF A PURCHASE ORDER, TO THE LOWEST REPONSIVE BIDDER, FOR FIVE 8-INCH KNIFE GATE VALVES, FOR USE IN THE SODA ASH SILOS AT THE CARROLL WATER TREATMENT PLANT, REPLACING EXISTING UNITS	<b>WRA-3374</b>		<b>TIERNEY &amp; DALTON ASSOCIATES, INC</b>	\$84,285.00
12/14/11	<b>ONE NEW DIESEL DUMP TRUCK</b> AWARD OF A PURCHASE ORDER, TO THE LOWEST REPONSIVE BIDDER, FOR A NEW DIESEL TEN-WHEEL DUMP TRUCK, FOR USE BY THE WATER PIPELINE MAINTENANCE UNIT, REPLACING AN EXISTING TRUCK	<b>WRA-3362</b>		<b>BOSTON FREIGHTLINER</b>	\$120,958.00
12/14/11	<b>PROGRAMMABLE LOGIC CONTROLLER HARDWARE</b> AWARD OF A SOLE SOURCE PURCHASE ORDER FOR ALLEN BRADLEY PROGRAMMABLE HARDWARE, FOR USE IN MWRA'S SCADA SYSTEM			<b>NORTHEAST ELECTRICAL DISTRIBUTORS</b>	\$121,052.00
12/22/11	<b>AUTOCAD SOFTWARE ANNUAL MAINTENANCE</b> AWARD OF A SOLE SOURCE PURCHASE ORDER FOR THE RENEWAL OF THE ANNUAL MAINTENANCE AGREEMENT FOR AUTOCAD SOFTWARE UNDER THE GSA'S MASTER GOVERNMENT PARTNER PROGRAM, FOR THE PERIOD DECEMBER 13, 2011 THROUGH DECEMBER 12, 2012	<b>GSA CONTRACT # GS-35F-4543G</b>		<b>DLT SOLUTIONS INC</b>	\$26,258.95
12/22/11	<b>REPLACEMENT PARTS FOR AUTOANALYZER SYSTEM</b> AWARD OF A SOLE SOURCE PURCHASE ORDER FOR REPLACEMENT COMPONENTS FOR THE DEPARTMENT OF LABORATORY SERVICES AUTOANALYZER SYSTEM AT THE CENTRAL LAB ON DEER ISLAND			<b>SKALAR, INC</b>	\$35,195.00
12/22/11	<b>REBUILDING MUFFIN MONSTER GRINDERS</b> AWARD OF A SOLE SOURCE PURCHASE ORDER TO REBUILD SIX MUFFIN MONSTER SEWAGE GRINDERS IN THE RESIDUALS COMPLEX AT THE DEER ISLAND TREATMENT PLANT			<b>JWC ENVIRONMENTAL</b>	\$41,341.80
12/22/11	<b>HORIZONTAL GATE VALVES</b> AWARD OF A PURCHASE ORDER, TO THE LOWEST REPONSIVE BIDDER, FOR THREE 36-INCH HORIZONTAL GATE VALVES, TO REPLENISH INVENTORY	<b>WRA-3364</b>		<b>EVERETT J PRESCOTT COMPANY</b>	\$86,685.00
12/22/11	<b>SUPPLY AND DELIVERY OF FERRIC CHLORIDE - DEER ISLAND AND CLINTON</b> AWARD OF A ONE-YEAR PURCHASE ORDER CONTRACT, TO THE LOWEST REPONSIVE BIDDER, FOR THE SUPPLY AND DELIVERY OF FERRIC CHLORIDE TO THE DEER ISLAND TREATMENT PLANT AND THE CLINTON WASTEWATER TREATMENT PLANT, FOR THE PERIOD JANUARY 1, 2012 TO DECEMBER 31, 2012	<b>WRA-3366</b>		<b>KEMIRA WATER SOLUTIONS, INC,LLC</b>	\$720,000.00

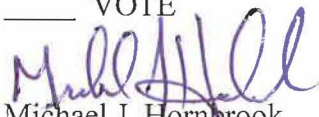
**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** Proposed Purchase of GPS Automatic Vehicle Location Devices and Services

COMMITTEE: Administration, Finance & Audit

INFORMATION  
 VOTE

Richard P. Trubiano, Deputy Chief Operating Officer  
Susan McAree, Manager, Policy & Planning  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

**RECOMMENDATION:**

For information only.

**DISCUSSION:**

Staff are developing a procurement for a Global Positioning System - Automatic Vehicle Location (GPS/AVL) contract to track MWRA vehicles. The system will provide real-time transmission alerts utilizing a cell phone/satellite communication system and a web-based mapping system for MWRA's service area that extends south to Hingham, north to Lynn, west to Ludlow/Ware, and east to the Deer Island Treatment Plant. The system will be used by MWRA managers and supervisors to track approximately 350 MWRA vehicles and operator-driven pieces of equipment.

Implementing a GPS/AVL system will better enable MWRA to:

- respond more quickly to emergencies;
- enhance driver and vehicle safety;
- reduce fuel costs;
- track mileage electronically;
- monitor unauthorized vehicle usage; and
- improve efficiency and employee accountability.

In the process of evaluating GPS/AVL systems, MWRA staff met with staff from Boston Water & Sewer Commission (BWSC), Brookline DPW, the City of Boston, and a for-profit heating services company to review their GPS/AVL systems. Staff also spoke with and observed system demonstrations from several vendors. Based on these meetings, it appears that the state-of-the-art direction for GPS/AVL systems involves satellite and cell phone communication to collect and transmit vehicle location data, and web-based software and mapping systems, to display the data and provide reports and alerts.

Based on these meetings and discussions, both internally and with other agencies, in addition to vendor demonstrations, staff have identified features and capabilities that would best meet MWRA's objectives. These features would include the ability to:

- locate any MWRA vehicle at any time;
- plot a vehicle's route on a map to see at a glance where it is or where it has been;
- enter an address requiring an immediate response or action and find the closest vehicle to that address based on a specified search radius;
- see all vehicles in a particular defined area;
- replay vehicle activity for given time frames and locations;
- add many landmarks (e.g., MWRA facilities) and "geo-fences" (geographically restricted areas);
- provide alerts that can be sent via e-mail or mobile phone to selected users (sample alerts would include entering or exiting geo-fenced areas, excessive speeds, extended idling time, lengthy stops, etc.); and
- provide a variety of daily, weekly, and monthly reports as needed to synthesize and summarize vehicle data.

A GPS/AVL system is intended to be used by supervisors to track the location and route of vehicles in their respective units, and access available reports on vehicle status. The system will provide the capability of showing and recording the exact location of each vehicle and whether or not the vehicle is in moving, idling, or stopped status. It will also record if a vehicle has been speeding. Supervisors will be able to easily locate and dispatch the closest vehicle to any job site as needed. A GPS/AVL system will help enforce existing driving policies and lead to reduced fuel consumption.

Staff anticipate procuring the system as a three-year, low-bid lease agreement with business capacity, insurance, data privacy, and security threshold requirements. The system will be hosted by the GPS/AVL vendor and will not require customization (beyond input of service area facility location information). Based upon staff research, these systems and services typically are provided on a monthly-fee-per-vehicle basis (sometimes with up-front costs for providing and installing vehicle hardware). Based upon vendor-provided information, staff estimate that monthly per-vehicle fees will range from \$40 to \$60.

For this fee, the selected GPS/AVL vendor will be required to provide:

- web-based access to program software;
- vehicle hardware, installation, and warranty;
- staff training and on-going technical support;
- software upgrades (as produced); and
- secure storage and monthly delivery of all data collected by the system.

The successful vendor will be required to have been regularly and continuously engaged in providing fleet management tracking services for at least three years and will have successfully performed services during such time period under at least two contracts of similar size, scope, nature, and level of complexity as MWRA's contract.

With the tracking of approximately 350 vehicles used by an estimated number of more than 500 staff, even a small increase in efficiency and reduced vehicle costs should result in the system paying for itself.


Staff expect that part of the ongoing process will involve discussions with MWRA's unions. In speaking with vendors and other user agencies, staff have learned that a variety of methods exist through which these systems may be used for field operations and personnel actions. At the appropriate time, MWRA will provide formal notice to the Union's representing MWRA employees and discuss any matters that may be raised by the Unions.

**BUDGET/FISCAL IMPACT:**

The estimated annual cost range (based on preliminary verbal quotes) is between \$150,000 and \$250,000 (including hardware, installation, and maintenance). There are sufficient funds in the MIS Department's FY12 Current Expense Budget and adequate funds will be included in the Proposed FY13 Current Expense Budget to cover this contract.




**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** MWRA Energy Efforts & Savings – FY02 to FY11 Ten Year Summary Report

COMMITTEE: Administration, Finance & Audit Committee

INFORMATION  
 VOTE

Kristen A. Patneau, Program Manager, Energy  
Richard P. Trubiano, Deputy Chief Operating Officer  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

**RECOMMENDATION:** For information only. This staff summary provides a review of the savings and revenue impacts of MWRA’s successful and award-winning energy program during the past decade and includes an overview of currently ongoing and planned initiatives.

- Energy savings and revenue total approximately \$177 million during the FY02 to FY11 period with annual savings and revenue of about \$24 million in FY11.
- Annual energy savings and revenues have increased steadily from about \$6 million in FY02 to nearly \$24 million in FY11 (which reflects the addition of new energy generating equipment and facilities, additional revenues, and reduced energy use).
- Almost half of MWRA’s total energy cost profile is derived from renewable sources (demand response, STG/methane, wind, hydro, solar, RPS credits).
- MWRA has completed energy audits at 28 of its 36 major facilities. Implementation of audit recommendations and other process optimization efforts is estimated to save almost \$2 million annually.
- As a result of aggressively pursuing opportunities for grants and rebates, MWRA was awarded over \$12 million for funding of renewable energy and energy efficiency related projects (wind, solar, hydro).
- From 2005 to 2011, MWRA has received eight regional and national awards (most recently a 2011 Massachusetts State Leading by Example Award) for energy program leadership and project completion (see Attachment 4).
- MWRA energy efficiency program efforts are continuing in the areas of renewable energy and demand management related to wind, solar and hydro projects as well as implementation of facility audit recommendations.

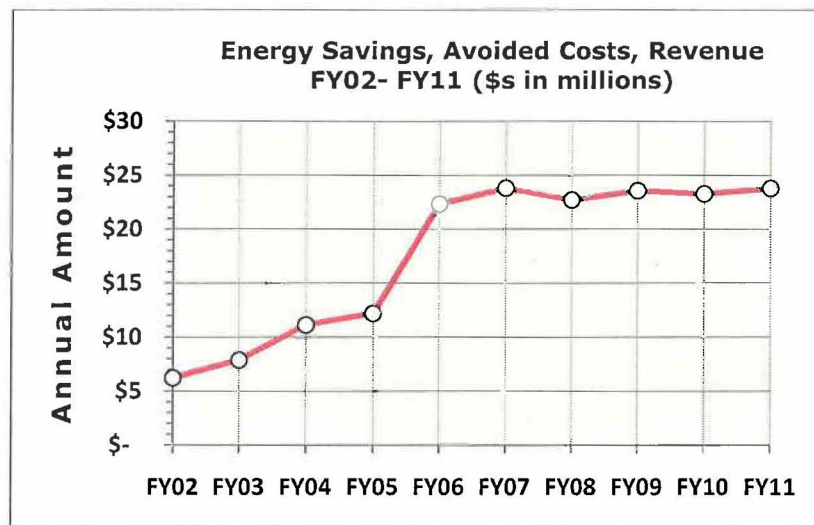
**DISCUSSION:**

Over the past decade, MWRA has implemented a system-wide program to reduce energy costs, increase energy revenue, and improve our carbon footprint. These initiatives have been launched and completed without compromising MWRA’s core mission of providing reliable and high

quality water and sewer services. MWRA's broad energy savings and revenue initiatives have primarily focused on:

- Optimization of self-generation/renewable energy assets such as the Deer Island Steam Turbine Generator and introducing new energy sources based on wind, hydroelectric and solar power. Consistent with Executive Order 484 issued by Governor Patrick, MWRA has made a priority of siting new renewable energy projects at as many facilities as economically feasible and continues to aggressively seek out any available grant and loan funds to improve project paybacks.
- Demand-side management including conservation, facility energy audits, energy-focused new facility design, participation in demand response programs and receiving Renewable Portfolio Standard credits;
- Supply-side management (used competitive bidding for power supply); and
- Use of green technologies (power purchases, vehicles, computing).

The graph below indicates the savings over the past 10 years. These continuing increases in savings/revenues are the result of expanded energy program efforts related to renewable energy (wind, solar, hydro), improved use of methane at Deer Island, implementation of energy audit recommendations, peak shaving and competitive energy procurements.



As summarized in the table below, the total cumulative CEB impact of energy initiatives is about \$177 million over the past decade. Of the total savings, approximately \$55 million is the result of new and/or expanded initiatives within the past decade to competitively purchase power, avoid capacity charges, reduce energy use at facilities, participate in energy revenue programs, and increase generation capacity by adding wind turbines, solar panels, and hydroelectric generators at key facilities. Additionally, MWRA increased the CEB impact of baseline energy assets through modification of the Oakdale and Cosgrove hydro facilities and Deer Island's steam turbine generator and digester gas recovery system. Attachment 1 provides additional detail on energy savings and revenues for these initiatives.

### MWRA's Energy Initiatives – 10 Year CEB Impact

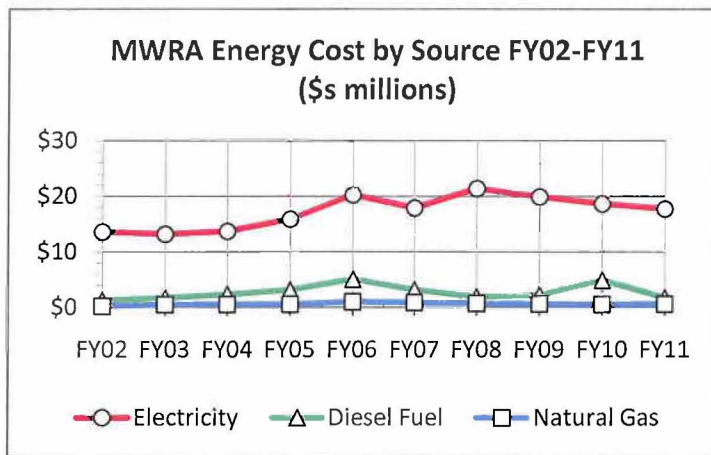
Source (\$'s in Millions)	FY02-FY11
<b>Savings and Avoided Costs:</b>	
Avoided Fuel (DI Digas)	\$ 82 million
Competitive Bidding vs Basic Service	\$ 34
DI Steam Turbine Generator	\$ 24
Audits/Efficiency	\$ 6.5
Hydropower	\$ 4.4
Avoided Capacity Charges	\$ 2.5
Wind	\$ 0.4
Solar	\$ 0.1
<b>Total Savings/Avoided Costs</b>	<b>\$ 154 million</b>
 <b>Revenue:</b>	
RPS Credits	\$ 8.0 million
Load Reduction	\$ 6.8
Generation Sales to Grid	\$ 7.8
Utility Rebates/Other	\$ 0.7
<b>Total Revenue</b>	<b>\$ 23 million</b>
<b>TOTAL CEB IMPACT</b>	<b>\$ 177 million</b>

MWRA inherited renewable energy generation at Oakdale and Cosgrove (which have been generating hydropower for more than fifty years) and methane generation from the old Deer Island primary plant. MWRA's early energy management efforts concentrated on the Deer Island Treatment Plant as that facility typically accounts for 55-65% of MWRA's annual energy costs. The new Deer Island had self-generation facilities incorporated into the design of the Plant and work has continued to optimize methane gas generation and use (now up to 98%), both of which provided opportunities to both reduce costs and increase revenue. MWRA then focused on considering energy efficiency and/or self-generation capacity in major new and rehabilitated facilities, including the Carroll Water Treatment Plant, the Five Water Pump Station Rehabilitation Project and the Braintree-Weymouth Intermediate Pump Station. At the Carroll Plant the emergency generators were designed and permitted for non emergency use allowing for participation in energy revenue and capacity charge avoidance programs. Many new MWRA facilities like the Union Park CSO, South Boston CSO and Blue Hills Covered Storage Facilities are inherently low energy use facilities since they operate only intermittently (as in wet weather) and/or are infrequently occupied thanks in part to remote operation by SCADA.

MWRA has also taken advantage of various state and federal energy related grants and rebates offered by utilities for demand management and renewable energy projects. Almost \$2.3 million has been awarded to MWRA for energy projects and the utilities have provided about \$680,000 in energy efficiency project rebates. In addition, the American Recovery and Reinvestment Act of 2009 (ARRA) funding provided \$9.2 million in principal forgiveness loans for the following renewable energy related projects: Carroll and Deer Island photovoltaic, Loring Road Hydroelectric, and Charlestown Wind.

## Energy Costs and Budget

MWRA's costs for electricity, diesel fuel and natural gas are a significant portion of direct expenses. Energy costs ranged from \$15 million (8.4% of total direct expenses) in FY02 to \$20 million (9.9% of budget) in FY11 (due in part to the addition of major new facilities like the Carroll Plant and to the varying price of energy). Spending temporarily escalated to \$26 million (13.8% of directs) in FY06 from the spike in energy costs subsequent to Hurricane Katrina. This event highlighted the volatility of energy prices and reinforced MWRA's efforts to manage energy usage and costs.



Notes:

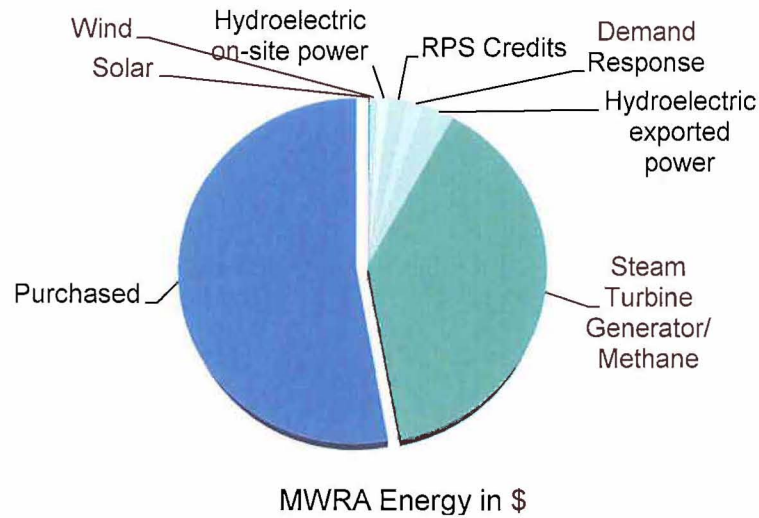
- Significant increases in diesel fuel and electricity prices in FY06 due to Hurricane Katrina.
- Significant increases in electricity prices again in FY08-FY10 due to market. Offset by declining purchases due to self-generation and energy-efficiency projects.
- Diesel fuel purchases increased in FY10 due to extensive CTG use during spring storms.

MWRA's energy initiatives have focused on all energy utilities but the major emphasis has been on reducing costs for electricity since it accounts for the majority of the energy spending.

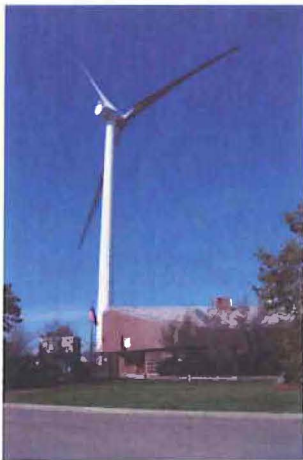
## Areas of Energy Savings and Revenues

A summary of renewable energy, demand side management, supply side management and green power programs, savings and revenues is provided below.

**Renewable Energy** - Consistent with Executive Order 484 issued by Governor Patrick in 2007, MWRA has made a priority of siting new renewable energy projects at as many facilities as economically feasible and continues to aggressively seek out any available grant and loan funds to improve project paybacks. Each renewable project is reviewed on a case by case basis to evaluate the reasonableness of payback periods (including the impact of grants and rebates). As shown below, almost half of MWRA's total energy cost profile is derived from renewable sources.



Wind - The four currently operating MWRA wind turbines (two 600kW turbines and the 100kW capacity engineering prototype FloDesign Wind turbine at Deer Island and the 1.5 MW capacity Charlestown Pump Station turbine) will generate over 5 million kWh per year and provide a projected annual savings in electrical costs and revenue of about \$580,000. Active future wind project considerations include a fourth wind turbine at Deer Island, adjacent to the pier.



1.5 MW Turbine in Charlestown



476 kW photovoltaic system at Carroll

Solar – Solar photovoltaic systems are currently installed at Deer Island on the roofs of the Residuals/Odor Control, Maintenance/Warehouse and Grit Buildings and on the ground in the south parking lot. A system is also located on the grounds at the Carroll Water Treatment Plant. The systems represent over 1.2 MW of capacity and will produce over 1.4 million kWh per year of electricity and provide projected annual electrical cost savings and revenue of approximately \$240,000.

Hydroelectric - MWRA has a long history of using hydroelectric energy and continues to look for opportunities to capture the potential energy of water as it moves from higher to lower elevations. Hydroelectric facilities are currently located at Deer Island, Oakdale, Cosgrove and the recently activated turbine at Loring Road. These facilities represent over 8 MW of capacity and will produce about 23 million kWh of electricity per year with projected annual savings and revenues of over \$1,800,000.

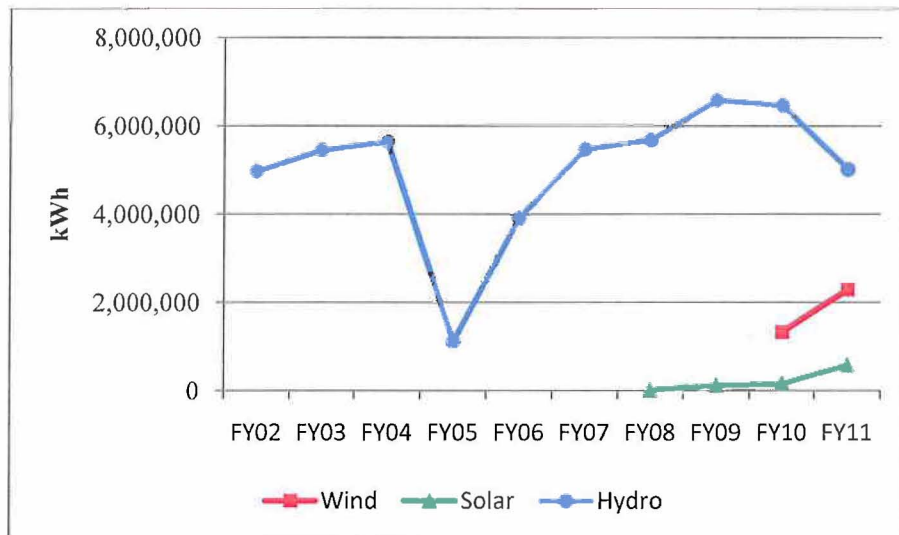


Hydro Turbine at Loring Road



Hydro Turbine at Oakdale

The graph below indicates the increasing production of wind and solar power at MWRA beginning in FY08. This will continue to increase as new solar and wind facilities are added (such as the Charlestown turbine and Carroll solar which started in FY12). The hydropower generation fluctuates year to year based on water transfer needs (and was particularly low in FY05 and 06 during start-up of the CWTP as the Cosgrove generator was offline and due to major maintenance of the Deer Island hydro turbine).



Methane - The capture of methane from the digesters was included in the original design contract of the Deer Island Treatment Plant. Co-generation at the Deer Island Thermal Power Plant (capacity of over 6 MW) using the methane saves MWRA approximately 5 million gallons per year in annual fuel oil purchases (to heat the digesters and Deer Island buildings). Use of the Power Plant Steam Turbine Generator at Deer Island allows MWRA to use steam from the methane powered boilers to produce electricity (valued at about \$2.3 million in FY11). Ongoing optimization upgrades at the thermal power plant/steam turbine generator are expected to result in a total additional annual electrical savings and revenue of about \$700,000. In addition, methane is a potent green house gas and so its capture and use significantly reduces MWRA's carbon footprint.

Massachusetts Renewable Energy Portfolio Standard (RPS) – Retail electricity suppliers are required by Massachusetts regulation to provide a portion of their power from renewable energy sources. Renewable energy generators (like MWRA) can sell credits to electricity suppliers to help them meet the regulatory requirements. Since December 2002, MWRA has been selling its renewable energy credits through a competitive bid process. MWRA RPS eligible facilities have increased in recent years due to both new facilities being brought on line, as well as the Green Communities Act regulations that made hydropower eligible in 2009. MWRA has received about \$8 million in RPS revenue to date.

Regional Greenhouse Gas Initiative (RGGI) - Ten Northeast and Mid-Atlantic States participating in the Regional Greenhouse Gas Initiative have designed and initiated the first market-based, mandatory cap and trade program in the United States to reduce greenhouse gas emissions. The states sell emission allowances through auctions and invest proceeds in consumer benefits: energy efficiency, renewable energy, and other clean energy technologies. The Deer Island combustion turbine generators (CTGs) are subject to the Massachusetts CO<sub>2</sub> Budget Trading Program, which implements the RGGI program in Massachusetts. MWRA must hold CO<sub>2</sub> allowances equal to CTG CO<sub>2</sub> emissions as of the end of each three year control period, the first of which ended December 31, 2011. To date, MWRA has purchased 23,000 CO<sub>2</sub> allowances (tons) at a cost of \$51,900.

## **Demand Side Management**

MWRA demand side management efforts include:

- Improving equipment energy efficiencies at operating facilities (lighting, variable frequency drives, HVAC system updates, treatment process modifications);
- Establishing operating protocols to reduce monthly and annual peak energy demand charges; and
- Enrolling in demand response programs offered by regional grid operators.

## ***Facility Energy Audits***

Water and wastewater utilities are large energy users. The Governor's EO 484 and MA DEP and EPA efforts have focused on demand-side management in wastewater and water facilities. MWRA has put significant effort into energy conservation through implementation of energy

audits at 28 of its 36 major facilities, process optimization, and installation of energy efficient lighting and equipment, saving about 8 million kWh and \$1,700,000 in FY 11. Attachment 2 indicates facility audit locations and Attachment 3 provides additional details on audit implementation and savings. Engineering design reviews are undertaken by staff on all in-house projects for facility energy optimization (such as the proper selection of pumps, motors, lighting, etc.) to ensure that they are premium efficiency and eligible for utility rebates.

### ***Demand Response Programs***

The Carroll Water Treatment Plant and Deer Island participate in a demand, price, load response program run by ISO-New England that pays these facilities a monthly “capacity fee” for being available to go on back-up generation during periods of extremely high electricity demands. Deer Island began participating in 2001 and Carroll in 2008. The total revenue received under this program through FY11 was \$6.8 million.

Deer Island and Carroll have also avoided “peak capacity” charges by going off the grid during the ISO-NE peak operating hour. Monthly facility demand charges for the calendar year are set based on this peak hourly load. The total annual FY10 and FY11 savings by these two facilities by avoiding this charge ranges from about \$800,000 to \$1,000,000. Staff also modify facility operating practices to reduce energy use and/or costs such as tariff sensitive (off peak) timing of Chestnut Hill Underground Pump testing and shifting from pumping to gravity operation at the Fells tank in winter (low demand) months.

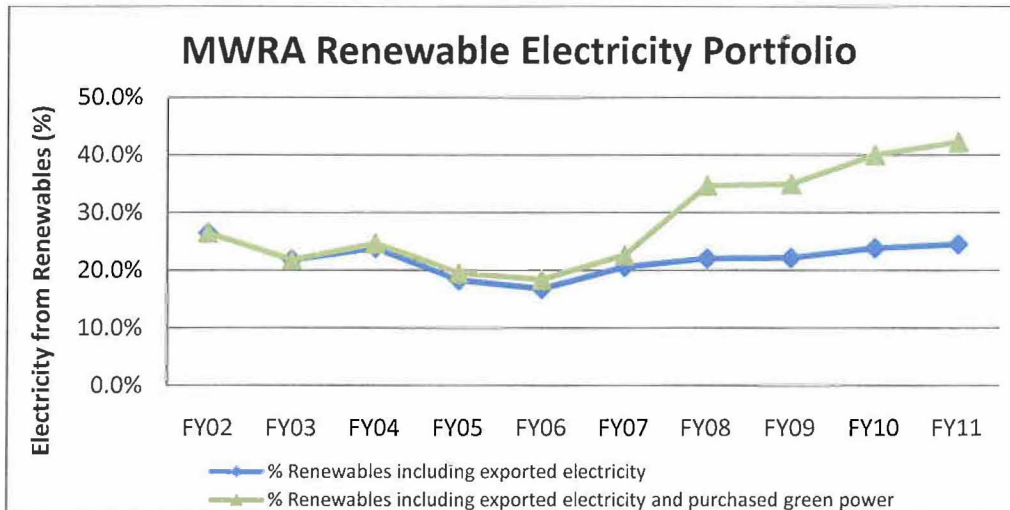
On a smaller scale, all new PCs and laptops are Energy Star-compliant and computer monitors have been replaced with energy-efficient flat panels.

**Supply Side Management** - Due to its large power purchasing, MWRA was an early entrant to the competitive electricity marketplace in 2001. The process has evolved into the creation of three distinct electricity supply contracts:

- Deer Island;
- The larger operations facilities including the Carroll Water Treatment Plant, Nut Island Headworks, Clinton Treatment Plant, and 22 other facilities); and
- The smaller accounts (e.g. CSO facilities, some pump stations).

MWRA maintains a balanced electricity portfolio by contracting for a base block of power at a fixed-price and purchasing the balance of the load on the open market at real-time clearing prices. Currently over 60% of MWRA power is purchased on the fixed market. Estimated savings over the last 10 years from MWRA purchasing power competitively versus buying directly from the utilities are over \$30 million.





**Green Power and Other Sustainable Efforts** - In addition to all the efforts discussed above in support of MWRA and Commonwealth shared goals to increase renewable energy purchases and reduce greenhouse gas emissions at state facilities, MWRA has undertaken additional efforts to directly use more green power by maximizing the use of alternative fuel vehicles (biodiesel, CNG, hybrid, propane, and flex-fuel) representing about 70% of the fleet, and procuring green power (“National Green-e power”) as a portion of our total electrical purchases. The figure above shows how the percentage of our total electrical power use that is produced or purchased from green sources has increased over time.

### Currently Ongoing and Planned Initiatives

**Hydropower** - Future hydropower efforts include the proposed development of a small hydroelectric facility associated with the CVA-Hatchery pipeline project. Staff also plan to explore alternative locations in the water transmission system which may provide hydropower development potential.

**Solar** - Staff are working with a solar energy consultant to conduct a comprehensive solar feasibility study will be conducted for all MWRA sites, to assess the solar capability, and technical and economical feasibility.

**Wind** - Staff are currently reviewing the technical and economic feasibility of a fourth wind turbine at Deer Island, adjacent to the pier. FAA approval for this turbine is expected at the beginning of 2012. Grant funding will be sought to help off-set design and construction costs.

**Demand Side Management:**

- Enroll the three headworks facilities in the demand response program.
- Install an energy management system (EMS) at the Chelsea and Southborough facilities to automatically control all HVAC equipment optimizing heating and cooling energy use.

- Complete and implement audits of the eight remaining major water and wastewater facilities.
- Add ventilation setbacks at four additional facilities.
- Consider expanding the use of SCADA from process control to include more energy management functions.

**ATTACHMENTS:**

1. MWRA Energy Savings and Revenue by Category for FY02 - FY11
2. Energy Conservation Projects Completed or Underway at MWRA Facilities
3. Summary of Facility Audit Implementation Activities
4. MWRA's Energy Awards 2005 to 2011

**ATTACHMENT 1**

**MWRA ENERGY SAVINGS AND REVENUE BY CATEGORY FOR FY02 - FY11 (\$ in Thousands)**

Notes	Source	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
		FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	10 Yr Total
<b>TOTAL CEB IMPACT</b>		<b>\$ 6,220</b>	<b>\$ 7,871</b>	<b>\$ 11,126</b>	<b>\$ 12,193</b>	<b>\$ 22,334</b>	<b>\$ 23,801</b>	<b>\$ 22,718</b>	<b>\$ 23,572</b>	<b>\$ 23,281</b>	<b>\$ 23,761</b>	<b>\$ 176,877</b>
<b>PART A - SAVINGS AND AVOIDED COSTS</b>												
1	Avoided Fuel (DI Digas)	\$ 2,950	\$ 4,450	\$ 5,187	\$ 5,589	\$ 10,089	\$ 10,035	\$ 10,000	\$ 8,787	\$ 11,731	\$ 13,300	\$ 82,119
2	Avoided Capacity Charges	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 650	\$ -	\$ 856	\$ 1,000	\$ 2,506
3	DI Steam Turbine Generator	\$ 2,125	\$ 1,875	\$ 1,996	\$ 2,110	\$ 2,687	\$ 2,438	\$ 2,940	\$ 2,787	\$ 2,704	\$ 2,329	\$ 23,991
4	Hydropower	\$ 348	\$ 365	\$ 406	\$ 96	\$ 379	\$ 476	\$ 600	\$ 651	\$ 640	\$ 466	\$ 4,427
5	Wind	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150	\$ 243	\$ 393
6	Solar	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2	\$ 12	\$ 15	\$ 60	\$ 88
7	Audits/Efficiency	\$ -	\$ 217	\$ 321	\$ 328	\$ 356	\$ 385	\$ 711	\$ 1,100	\$ 1,308	\$ 1,733	\$ 6,459
8	Competitive Power Purchases	\$ -	\$ -	\$ 1,500	\$ 1,700	\$ 5,400	\$ 7,900	\$ 4,000	\$ 7,500	\$ 3,300	\$ 2,300	\$ 33,600
	<b>Total Savings &amp; Avoided Costs</b>	<b>\$ 5,424</b>	<b>\$ 6,908</b>	<b>\$ 9,410</b>	<b>\$ 9,823</b>	<b>\$ 18,911</b>	<b>\$ 21,234</b>	<b>\$ 18,903</b>	<b>\$ 20,836</b>	<b>\$ 20,704</b>	<b>\$ 21,431</b>	<b>\$ 153,583</b>
<b>PART B - REVENUE</b>												
9	Renewable Portfolio Standard Certificates (RPS Credits)	\$ -	\$ 458	\$ 871	\$ 814	\$ 1,422	\$ 1,030	\$ 1,577	\$ 709	\$ 524	\$ 581	\$ 7,986
10	Load Reduction	\$ 163	\$ -	\$ 367	\$ 826	\$ 1,592	\$ 639	\$ 787	\$ 717	\$ 1,020	\$ 684	\$ 6,794
11	Generation Sales to Grid	\$ 634	\$ 506	\$ 478	\$ 594	\$ 408	\$ 898	\$ 1,242	\$ 1,011	\$ 1,025	\$ 1,039	\$ 7,835
12	Hydropower	\$ 634	\$ 506	\$ 478	\$ 594	\$ 408	\$ 898	\$ 1,242	\$ 1,011	\$ 1,025	\$ 1,039	\$ 7,835
13	Wind	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
14	Solar	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
15	Utility Rebates & Other	\$ -	\$ -	\$ -	\$ 136	\$ -	\$ -	\$ 209	\$ 298	\$ 9	\$ 26	\$ 678
	<b>Total Revenue</b>	<b>\$ 797</b>	<b>\$ 964</b>	<b>\$ 1,715</b>	<b>\$ 2,370</b>	<b>\$ 3,423</b>	<b>\$ 2,567</b>	<b>\$ 3,815</b>	<b>\$ 2,736</b>	<b>\$ 2,577</b>	<b>\$ 2,330</b>	<b>\$ 23,294</b>

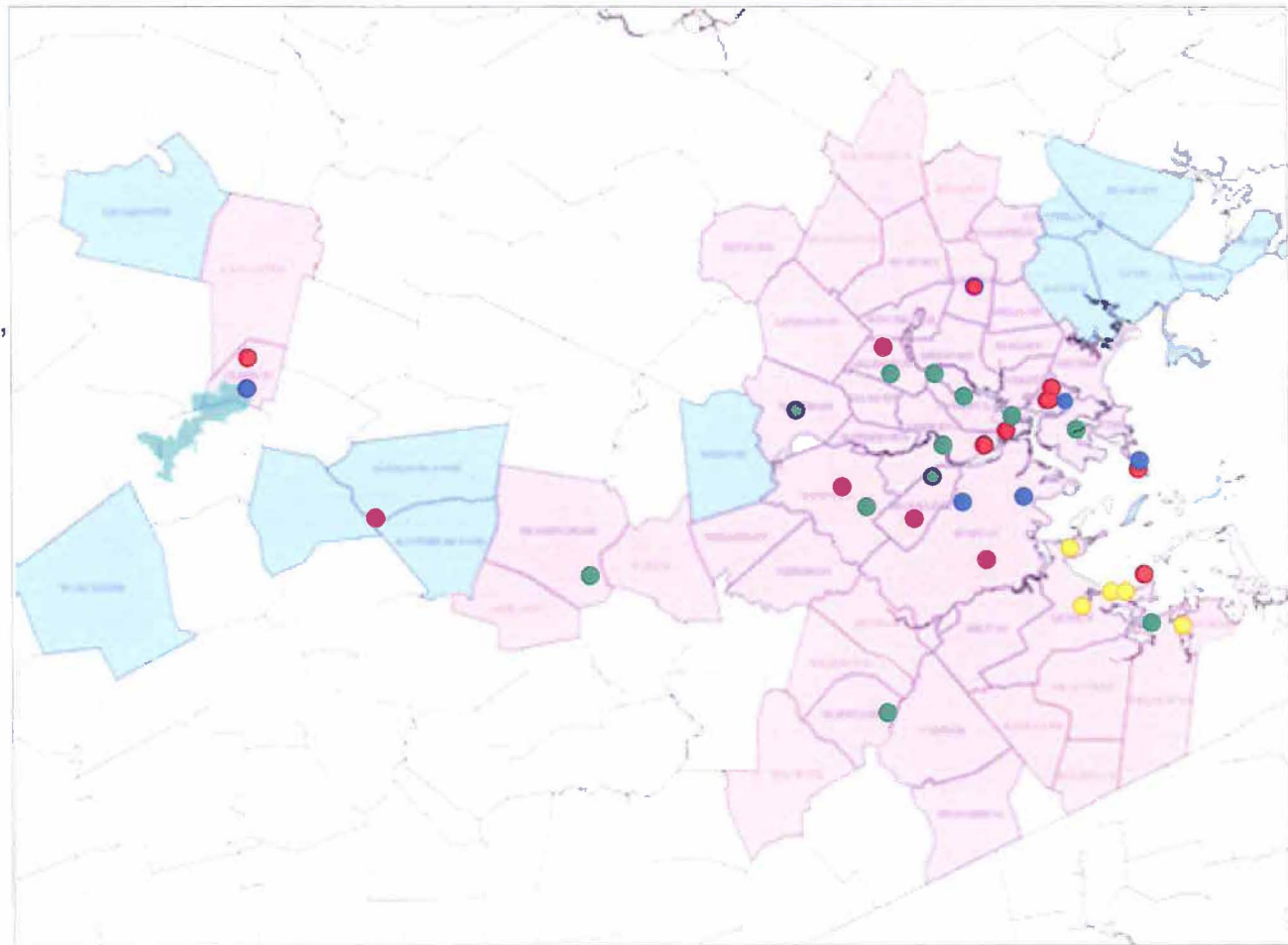
Notes:

1	DITP converts methane from the digesters into energy (co-generation) for use in plant and process heating.											
2	MWRA self-generates at DITP and CWTP on grid peak days to avoid annual electricity capacity charges of ~\$800k to \$1m per year.							9				Revenue from sales of Renewable Energy Certificates (RECs) per the MA Renewable Portfolio Standard Trading Program. MWRA earns credits for sale from numerous assets including hydropower, STG, solar panels, wind turbines.
3	Steam from DITP's boilers is sent through a steam turbine generator (STG), which produces an average of approximately 3 megawatts of electricity. DITP uses the electricity on-site to avoid purchasing power.								10			MWRA receives revenue for participation in ISO-NE's demand response programs. MWRA self-generates with its back-up generators on peak demand or pricing days at DITP and CWTP. Revenue varies due to market pricing.
4	Hydro includes DITP outfall (100% of generated power used on-site), Cosgrove water intake facility (5%-10% usage on-site) and the Loring Road water pump station (20% usage on-site).								11			MWRA sells power to utility grid and receives revenue per kWh for sale.
5	DITP has three wind turbines (including one prototype) with more planned for the future. The energy generated by the turbines supplies DITP with power.								12			Includes Cosgrove, Loring Road, and Oakdale hydropower revenue. Oakdale revenue is an offset to DCR Watershed Division's budget.
6	DITP has solar panels installed on several buildings and the ground and uses the power generated on-site.								13			The Charlestown Wind Turbine generates 3 million kWh/yr of electricity which is sold to the grid (with an estimated annual value of \$310,000). The turbine began operation in FY12.
7	Major projects include lighting retrofits, DITP shaft height adjustments, cessation of CWTP soda ash mixers.								14			The panels began revenue operation in FY12. Revenue will be for electricity generated and sold to the grid (estimated annually as 620,000 kWh and \$100,000) for CWTP ground-mounted solar array.
8	MWRA has been competitively purchasing power since FY02 (Nov 2001) for DITP and FY05 for other facilities. Amount is estimate of annual savings from competitive purchase vs buying directly from utilities (FY02 & 03 data unavailable).								15			MWRA receives rebates from utilities for selected energy-efficiency projects.



## Attachment 2 – Energy Conservation Projects Completed or Underway at MWRA Facilities

- Completed Projects
- Project Currently Underway
- Facilities Audited, Project Being Evaluated
- Facilities Scheduled to be Audited in FY12



**ATTACHMENT 3 - SUMMARY OF FACILITY AUDIT IMPLEMENTATION ACTIVITIES**

PROJECT NAME	TYPE OF ENERGY CONSERVATION MEASURE	EXPECTED ANNUAL COST SAVINGS	PROJECT COSTS (\$)			PROJECT STATUS
			TOTAL PROJECT COST	UTILITY INCENTIVE	TOTAL COST TO MWRA	
Gillis P.S. Lighting Upgrade	Lighting	\$14,700	\$27,100	\$25,100	\$2,000	Completed
Commonwealth Ave. P.S. Upgrade	Lighting	\$7,700	\$14,800	\$14,500	\$300	Completed
Newton Street P.S. Upgrade	Lighting	\$2,500	\$5,000	\$4,500	\$500	Completed
Chelsea Facility Lighting Upgrade	Lighting	\$26,000	\$134,600	\$50,000	\$84,600	Completed
Chelsea Energy Efficient Outdoor Lighting	Lighting	\$25,000	\$99,800	\$47,000	\$52,800.00	Completed
Carroll EE Lighting Upgrade	Lighting	\$57,000	\$107,200	\$30,000	\$77,200	Completed
Charlestown Navy Yard Lighting Upgrade	Lighting	\$13,600	\$77,300	\$24,500	\$52,800	Completed
Deer Island Multi-Phase Lighting Upgrade	Lighting	\$284,000	\$1,465,000	\$269,000	\$1,196,000	Completed
Carroll VFDs on Hot Water Pumps	Process	\$2,600	\$20,300	\$4,600	\$15,700	Completed
Carroll - Discontinued Use of Soda Ash Mixers	Process	\$200,000	\$0	\$0	\$0	Completed
HVAC Improvements & Ventilation Set-Backs at Chelsea Creek HW *	HVAC	\$138,600		\$31,000		Completed
DITP Operations - Adjusted Shaft Heights at Headworks and Tunnels	Process	\$447,000	\$0	\$0	\$0	Completed
DITP Operations - Shut Off Equivalent of 3 Mixers	Process	\$175,000	\$0	\$0	\$0	Completed
Install VFDs on Pumps at Water Pump Stations *	Process	\$197,500		\$190,000		Completed
Discontinued use of Service Water Pumps	Process	\$14,000	\$0	\$0	\$0	Completed
Southborough Energy Management System	EMS/HVAC	\$17,500	\$84,000	\$31,200	\$52,800	Pending
Prison Point VFDs on Chemical bldg. Ventilation Fan	HVAC	\$3,500	\$10,800	\$400	\$10,400	Pending
DITP Operations - Install VFDs at Both the North and South Main Pump Stations*	Process	\$44,000				SMPS Completed; NMPS Scheduled for FY12
Southborough Lighting Upgrades	Lighting	\$4,200	\$27,300	\$27,300	\$0	Underway
Prison Point Upgrade	Lighting	\$29,300	\$65,400	\$35,700	\$29,700	Underway
Cosgrove Lighting Upgrade	Lighting	\$4,200	\$7,600	\$5,300	\$1,900	Underway
Chelsea Energy Management System	EMS/HVAC	\$100,000	\$435,000	\$168,100	\$266,900	Underway
Chelsea Screen House VFDs on Exhaust & Supply Fans	HVAC	\$26,200	\$63,600	\$63,600	\$0	Underway
Ventilation Set-Backs at New Neponset P.S.	HVAC	\$48,000	\$0	\$0	\$0	Underway
DITP Operations - Installed DO Probes to Optimize Ops.	Process	\$144,000	\$105,000	\$0	\$105,000	Underway
Clinton WWTP - Enhanced Digester for More Efficient Mixing, Adjusted Lift Station Float Controller, Upgraded Secondary Reactors Aeration Efficiency and Power Factor**	Process					


\* These projects were done as part of larger capital projects, so there is no cost breakdown pertaining specifically to the energy upgrade equipment.

\*\* These projects at Clinton were completed, however, there is no final information at this time on total costs or savings.

**ATTACHMENT 4 - MWRA's Energy Awards 2005 to 2011**

Sponsor	Award	Date
Commonwealth of MA	State Agency Leading by Example Award	2011
US EPA	EPA New England Environmental Merit Award	2011
MA DEP/US EPA	Clean Water State Revolving Fund Pisces Award	2011
MA DEP/US EPA	Drinking Water State Revolving Fund Sustainable Public Health Protection Award	2011
MA Energy Consumers Alliance	Public Sector Leadership Award	2010
Commonwealth of MA	State Agency Leading by Example Award	2007
MA Clean Cities Coalition	AltWheels - MA Clean Cities Award for Renewable Fuel Use	2006
Association of Metropolitan Sewer Agencies (AMSA)	National Environmental Achievement Award for DITP Comprehensive Energy Cost Recovery Program	2005



### STAFF SUMMARY

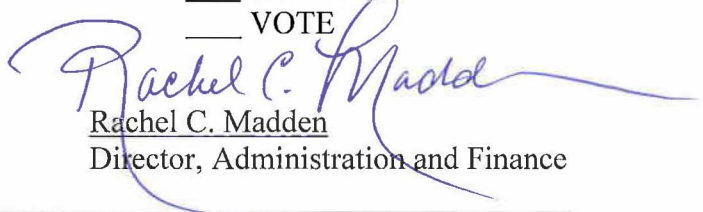
**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** FY12 Financial Update and Summary as of December 2011

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**COMMITTEE:** Administration, Finance & Audit

 INFORMATION  
 VOTE

Kathy Soni, Budget Director   
 David Whelan, Budget Manager   
 Preparer/Title

  
Rachel C. Madden  
 Director, Administration and Finance

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### RECOMMENDATION:

For information only. This staff summary provides a financial update and variance highlights through December 2011, comparing actual spending to the FY12 budget.

### DISCUSSION:

*Total December year-to-date expenses are lower than budget by \$7.7 million or 2.6% and total revenues are higher than budget by \$444,000 for a net variance of \$8.2 million.*

*The largest variance is due to lower debt service expenses of \$6.7 million as result of favorable variable rates and the delayed State Revolving Fund (SRF) borrowing. In addition, direct expenses are below budget by \$636,000, and indirect expenses are underspent by \$442,000.*

*Given the current favorable trends, during December staff began analyzing potential defeasance scenarios to assess the best use any year-end surplus fund for targeted rate relief in future years. As such, in a separate staff summary presented to the Board today, staff is seeking authorization to establish a defeasance account which will contain the funds resulting from Capital Finance underspending with the intent to use these funds for a June 2012 defeasance.*

*The FY13 Proposed Current Expense Budget, planned to be transmitted to the Advisory Board during the February Board meeting, will include the projected effect of the recommended FY12 defeasance.*

## Year-to-Date Variances

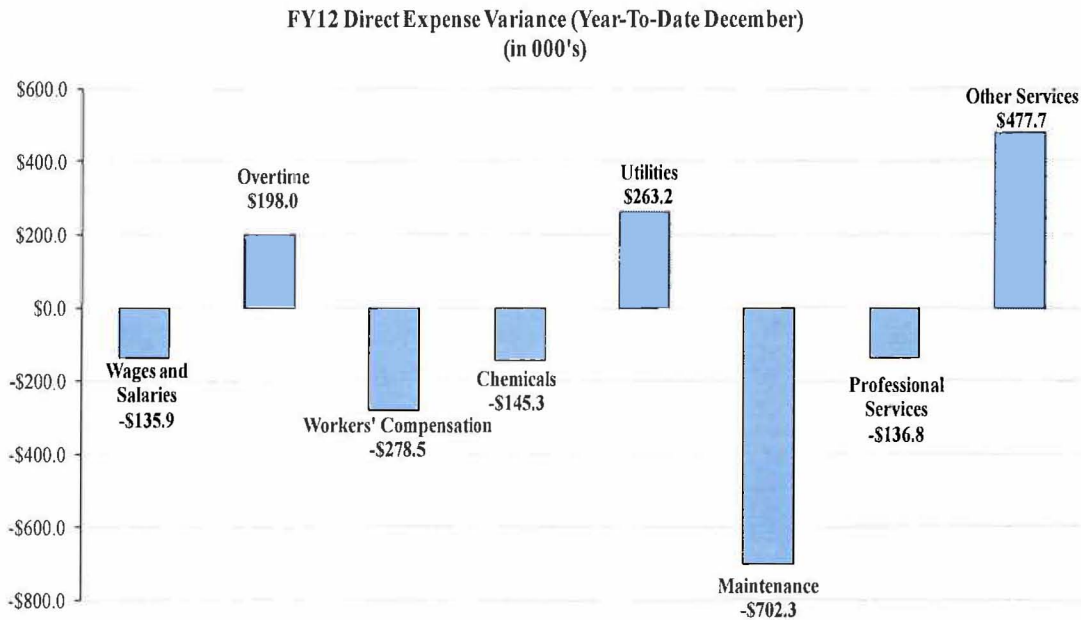
	FY12 Budget (Dec.)	FY12 Actual (Dec.)	\$ Variance	% Variance
Direct Expenses	\$98.1	\$97.5	-\$0.6	-0.6%
Indirect Expenses	\$22.2	\$21.7	-\$0.4	-2.0%
Debt Service	\$179.1	\$172.5	-\$6.7	-3.7%
<b>Total</b>	<b>\$299.4</b>	<b>\$291.7</b>	<b>-\$7.7</b>	<b>-2.6%</b>

Please refer to Attachments 1 and 2 for a more detailed comparison by line item.

### Direct Expenses

Direct expenses totaled \$97.5 million, \$636,000 or 0.6% less than budget.

The primary reasons for underspending on direct expenses is lower spending for maintenance, workers' compensation, chemicals, professional services, and wages and salaries offset by overspending for other services, utilities, and overtime.





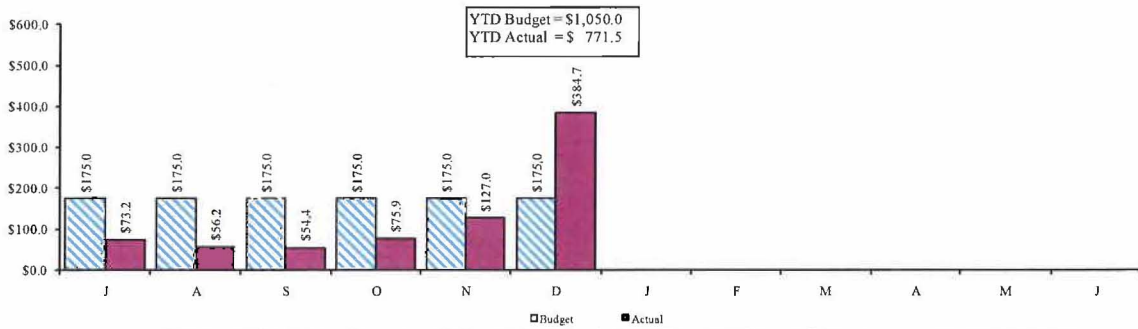
## Maintenance

Maintenance is underspent by \$702,000 or 5.2% year-to-date mostly related to services. Services are underspent by \$406,000 and materials are underspent by \$296,000. The year-to date underspending is mostly related to timing due to some project delays.

## Workers' Compensation

Workers' Compensation is lower than budget by \$279,000 or 26.5% year-to-date. This year, contrary to the experience of last year, both the reserves (\$177,000) and the actual payments (\$102,000) are trending below budget.

FY12 Workers' Compensation Spending (Year-To-Date December)  
(in thousands)

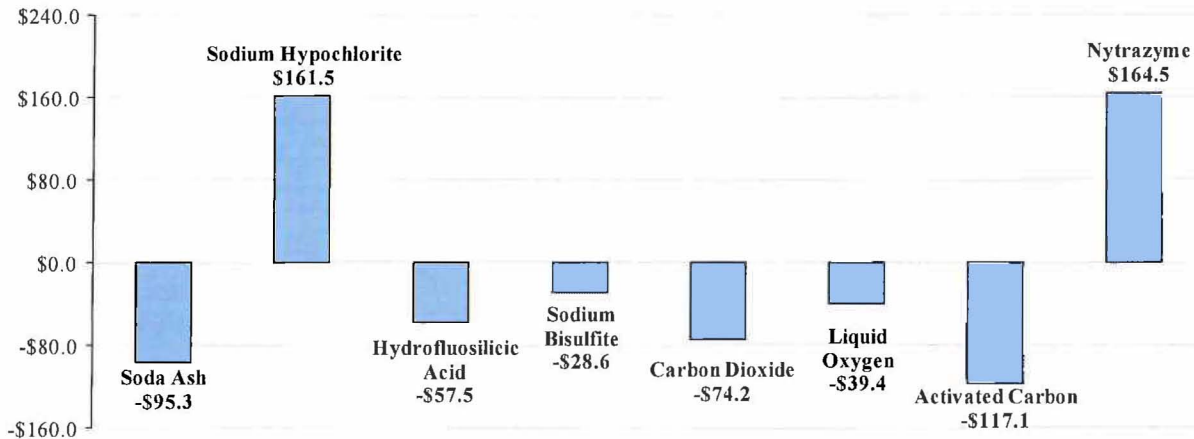


	J	A	S	O	N	D	J	F	M	A	M	J
# of Open Claims-Lost Time	43	40	41	42	44	51						
# of Open Claims-Medical Only	38	47	57	55	52	56						

## Chemicals

Chemicals are underspent by \$145,000 or 3.1% year-to-date mainly due to timing.

FY12 Chemical Expense Variances (Year-To-Date December)  
(in 000's)



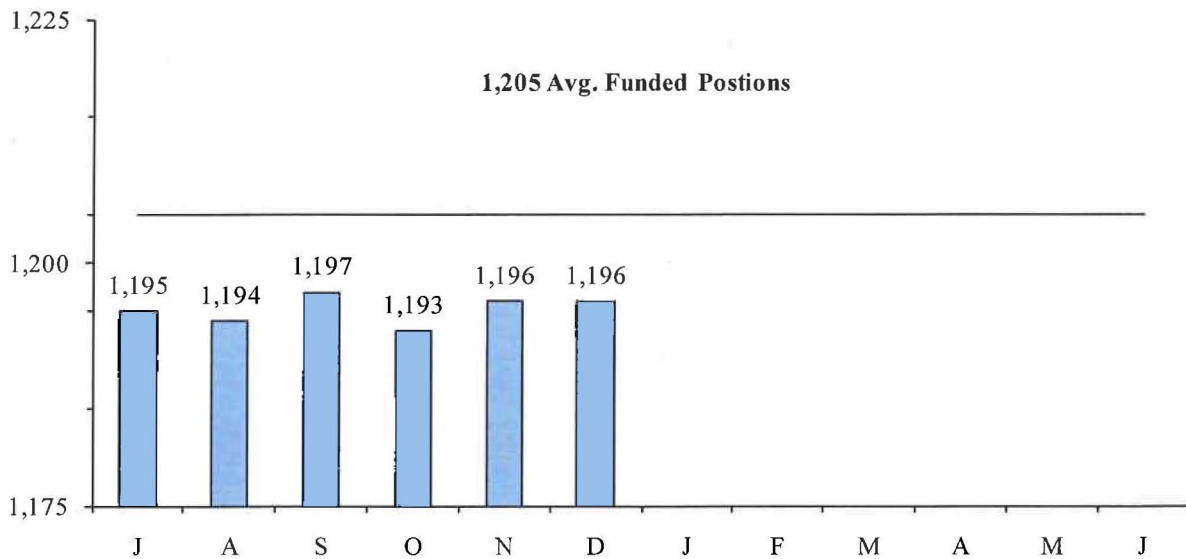
### Professional Services

Professional Services are underspent by \$137,000 or 5.0% mainly due to lower than projected Harbor Monitoring activities and as-needed engineering services.

### Wages and Salaries

Regular Pay is underspent by \$186,000 or 0.5% as a result of lower than budgeted filled positions and higher than budgeted leave balance accrual use offset by unbudgeted retroactive pay adjustments for non-union managers and recently settled contractual agreements for Units 1 and 6.

FY12 MWRA Headcount Trend



### Other Services

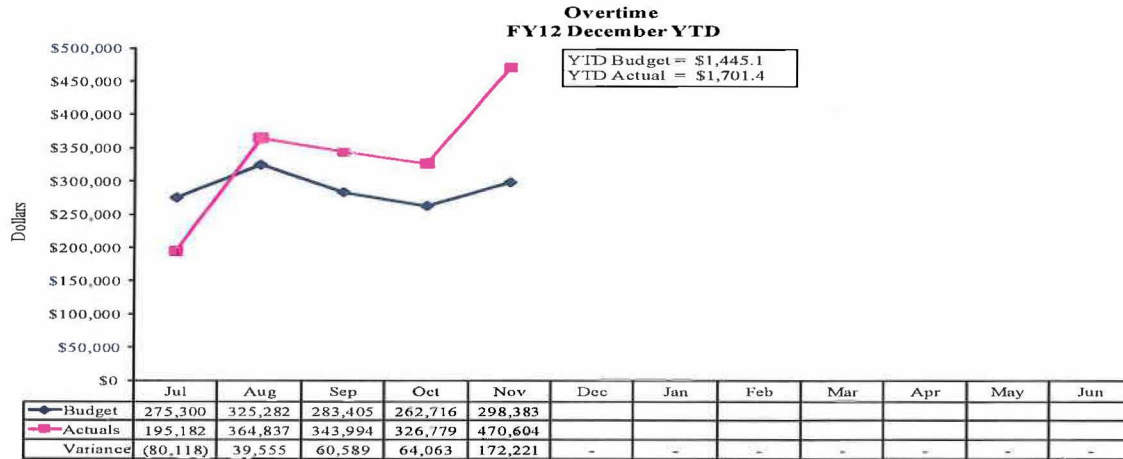
Other Services are higher than budget by \$478,000 or 4.2% mainly due to sludge pelletization expenses. Sludge quantities have been higher than budgeted due to digester maintenance work that has temporarily reduced storage capacity.

### Utilities

Utilities are higher than budget by \$263,000 or 2.4% mainly due to higher electricity pricing and the timing of diesel fuel delivery at Deer Island offset by lower spending for natural gas and diesel fuel in Field Operations.

## Overtime

Overtime spending is higher than budget by \$198,000 or 11.5% year-to-date mainly for wet weather response, Tropical Storm Irene, and clean-up associated with the October snow storm.



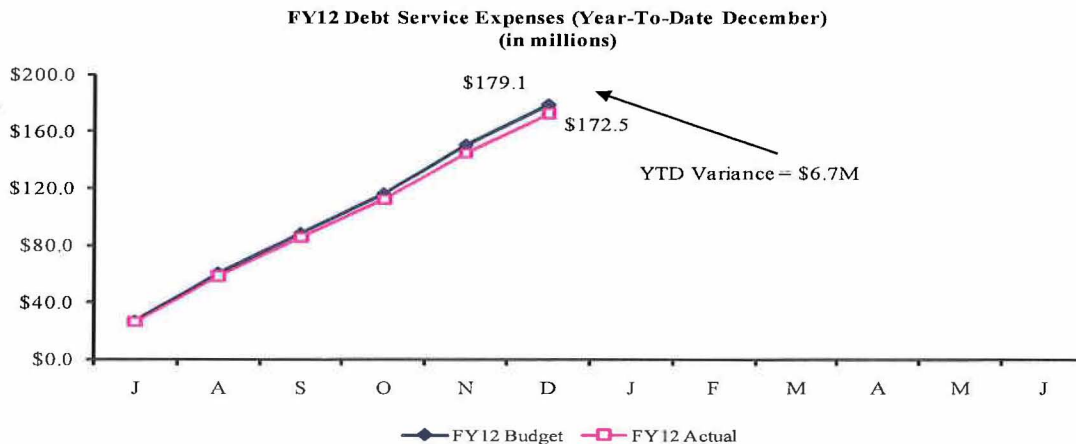
## Indirect Expenses

Indirect Expenses through December total \$21.7 million, \$442,000 or 2.0% less than budget.

The majority of the year-to-date underspending on Indirect Expenses is for Insurance of \$239,000 due to lower claims and Watershed Reimbursements of \$137,000 for an FY11 overaccrual.

## Debt Service Expenses

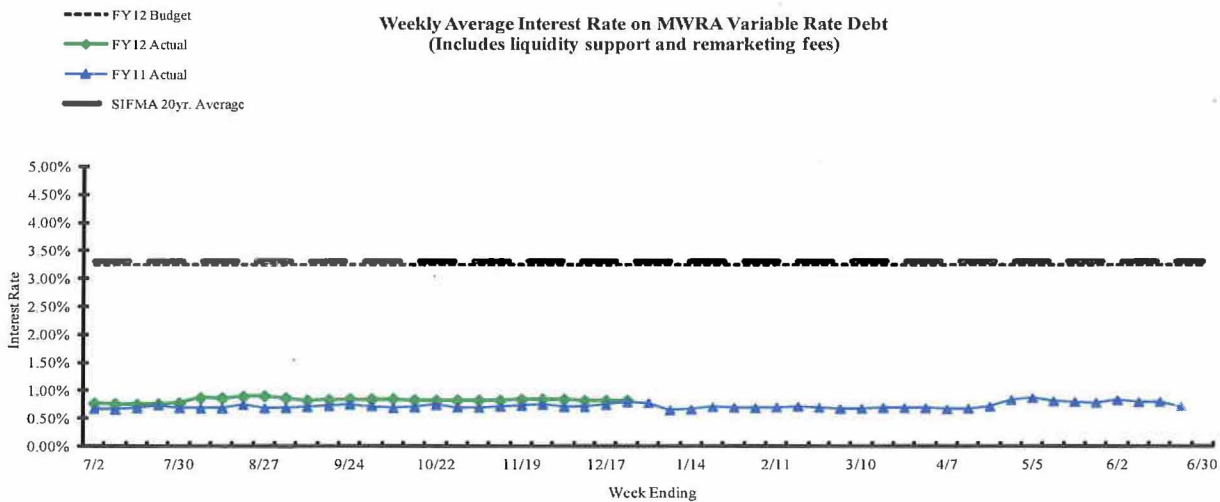
Total Debt Service Expenses through December total \$172.5 million, \$6.7 million or 3.7% lower than budget.



Debt Service expenses include the principal and interest payment for fixed debt, the variable subordinate debt, and the State Revolving Fund (SRF) obligation. Also, included are the commercial paper program for the local water pipeline projects, current revenue for capital, and the Chelsea facility lease payment.

The \$6.7 million in underspending is the result of lower than budgeted variable interest rates and delayed State Revolving Fund (SRF) borrowing. The variable rate budget was based on 3.25% versus a year-to-date actuals of close to 1%. Based on these favorable trends staff recommend allocating any surplus capital finance funds to targeted defeasance which will result in lower debt service and will provide rate relief in future years.

The graph below reflects the variable rate trend by month over the past year in comparison with FY10 and FY11 Actuals and the FY12 Budget for the same period.



## Revenue

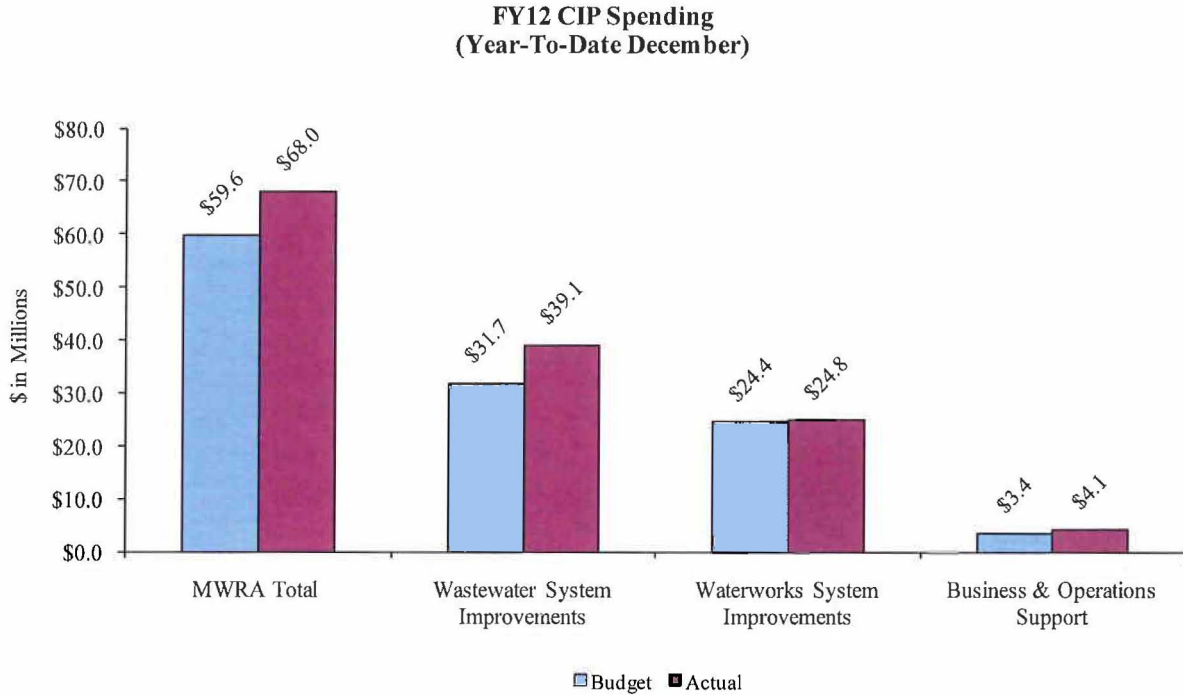
Total Revenue and Income through December is \$309.9 million, \$444,000 or 0.1% higher than budget and is mainly due to higher non-rate revenue of \$460,000 offset by lower investment income of \$16,000 which is driven by lower short term rates.

## FY12 Capital Improvement Program

Spending through December totaled \$68.0 million, \$8.4 million or 14.1% higher than budget.

Overspending was reported in all three programs: Wastewater of \$7.3 million, Waterworks of \$333,000, and Business and Operations Support of \$705,000.

CIP Spending By Program:



\$ in Millions	Budget	Actuals	\$ Var.	% Var.
<b>Wastewater System Improvements</b>				
Interception & Pumping	3.4	4.6	1.2	36.0%
Treatment	13.0	10.7	-2.4	-18.1%
Residuals	0.2	0.0	-0.2	-100.0%
CSO	13.4	20.7	7.3	54.7%
Other	1.7	3.1	1.4	81.9%
<b>Total Wastewater System Improvements</b>	<b>\$31.7</b>	<b>\$39.1</b>	<b>\$7.3</b>	<b>23.1%</b>
<b>Waterworks System Improvements</b>				
Drinking Water Quality Improvements	6.0	5.7	-0.3	-5.1%
Transmission	8.5	11.7	3.2	38.0%
Distribution & Pumping	6.1	8.4	2.3	38.3%
Other	3.9	-1.0	-4.9	-126.3%
<b>Total Waterworks System Improvements</b>	<b>\$24.4</b>	<b>\$24.8</b>	<b>\$0.3</b>	<b>1.4%</b>
<b>Business &amp; Operations Support</b>	<b>\$3.4</b>	<b>\$4.1</b>	<b>\$0.7</b>	<b>20.8%</b>
<b>Total MWRA</b>	<b>\$59.6</b>	<b>\$68.0</b>	<b>\$8.4</b>	<b>14.1%</b>

The main reasons for year-to-date overspending are:

1. Combined Sewer Overflow (CSO) program of \$7.3 million – mostly due to timing for Brookline Sewer Separation of \$7.6 million and North Dorchester Bay of \$1.2 million, and progress for Cambridge Sewer Separation of \$944,000 offset by Reserved Channel Sewer Separation of \$700,000.
2. Water Transmission program of \$3.2 million – mostly for Hultman Rehabilitation of \$2.5 million due to accelerated schedule and contractor progress, Dam Projects of \$1.0 million for accelerated progress for Weston and Foss Reservoir dam work, and timing of Watershed Land purchases of \$329,000 offset by underspending in Long Term Redundancy of \$427,000.
3. Water Distribution and Pumping program of \$2.3 million – mostly for progress of Northern Intermediate High – Reading/Stoneham Interconnections work of \$1.2 million and for the Lynnfield Pipeline of \$975,000.
4. Wastewater Interception and Pumping program of \$1.2 million – mostly for Section 156 Rehabilitation construction of \$1.8 million offset by Chelsea Creek Upgrade Design of \$237,000 and Braintree Weymouth Relief Facilities of \$222,000.
5. Business and Operations Support of \$705,000 – mainly for Alternative Energy of \$711,000 due to Charlestown Wind construction which was budgeted in FY11, completed in FY12. It is important to note that the Charlestown Wind Turbine was fully funded with stimulus funding.

The year-to-date overspending is offset by underspending of \$4.9 million in the Local Water Pipeline Assistance Program mainly due to lower than anticipated requests from communities for funding and underspending in Wastewater Treatment of \$2.4 million mainly due to project delays such as the Digester Mod 1 & 2 Pipe Replacement, As-needed Design Contracts, Transformer Replacement, and Process Information Control System Replacement.

### **Construction Fund Balance**

The construction fund balance stood at \$90 million as of December 2011. Commercial Paper availability stands at \$206 million to fund construction projects.

Attachment 1 – Variance Summary December 2011

Attachment 2 – Current Expense Variance Explanations

Attachment 3 – Capital Improvement Program Variance Explanations

ATTACHMENT 1

	December 2011 Year-to-Date					
	Period 6 YTD Budget	Period 6 YTD Actual	Period 6 YTD Variance	%	FY12 Approved	% Expended
<b>EXPENSES</b>						
WAGES AND SALARIES	\$ 41,802,057	\$ 41,666,203	\$ (135,855)	-0.3%	\$ 90,319,013	46.1%
OVERTIME	1,727,120	1,925,141	198,021	11.5%	3,508,630	54.9%
FRINGE BENEFITS	8,905,380	8,819,029	(86,351)	-1.0%	17,954,076	49.1%
WORKERS' COMPENSATION	1,050,000	771,462	(278,538)	-26.5%	2,100,000	36.7%
CHEMICALS	4,738,510	4,593,201	(145,309)	-3.1%	9,047,275	50.8%
ENERGY AND UTILITIES	10,771,255	11,034,487	263,232	2.4%	22,654,931	48.7%
MAINTENANCE	13,380,032	12,677,724	(702,308)	-5.2%	29,470,020	43.0%
TRAINING AND MEETINGS	97,911	67,950	(29,961)	-30.6%	251,550	27.0%
PROFESSIONAL SERVICES	2,737,485	2,600,673	(136,812)	-5.0%	5,892,441	44.1%
OTHER MATERIALS	1,615,307	1,555,074	(60,233)	-3.7%	4,765,483	32.6%
OTHER SERVICES	11,291,165	11,768,852	477,687	4.2%	23,323,074	50.5%
<b>TOTAL DIRECT EXPENSES</b>	<b>\$ 98,116,222</b>	<b>\$ 97,479,796</b>	<b>\$ (636,427)</b>	<b>-0.6%</b>	<b>\$ 209,286,493</b>	<b>46.6%</b>
INSURANCE	\$ 1,142,935	\$ 904,176	\$ (238,759)	-20.9%	\$ 2,285,870	39.6%
WATERSHED/PILOT	12,788,137	12,651,051	(137,086)	-1.1%	25,576,274	49.5%
BECo PAYMENT	1,882,002	1,810,090	(71,912)	-3.8%	3,965,500	45.6%
MITIGATION	764,350	747,290	(17,060)	-2.2%	1,528,700	48.9%
ADDITIONS TO RESERVES	97,733	97,733	-	0.0%	195,467	50.0%
RETIREMENT FUND	5,488,792	5,511,524	22,732	0.4%	7,340,438	75.1%
POST EMPLOYEE BENEFITS	-	-	-	---	-	---
<b>TOTAL INDIRECT EXPENSES</b>	<b>\$ 22,163,949</b>	<b>\$ 21,721,864</b>	<b>\$ (442,085)</b>	<b>-2.0%</b>	<b>\$ 40,892,249</b>	<b>53.1%</b>
DEBT SERVICE	\$ 179,322,329	\$ 172,662,640	\$ (6,659,689)	-3.7%	\$ 367,979,918	46.9%
DEBT SERVICE ASSISTANCE	(175,000)	(175,000)	-	0.0%	-	---
<b>TOTAL DEBT SERVICE</b>	<b>\$ 179,147,329</b>	<b>\$ 172,487,640</b>	<b>\$ (6,659,689)</b>	<b>-3.7%</b>	<b>\$ 367,979,918</b>	<b>46.9%</b>
<b>TOTAL EXPENSES</b>	<b>\$ 299,427,500</b>	<b>\$ 291,689,300</b>	<b>\$ (7,738,201)</b>	<b>-2.6%</b>	<b>\$ 618,158,660</b>	<b>47.2%</b>
<b>REVENUE &amp; INCOME</b>						
RATE REVENUE	\$ 294,850,000	\$ 294,850,000	\$ -	0.0%	\$ 589,700,000	50.0%
OTHER USER CHARGES	3,297,207	3,377,113	79,906	2.4%	7,142,495	47.3%
OTHER REVENUE	3,170,490	3,550,657	380,167	12.0%	4,872,342	72.9%
RATE STABILIZATION	545,890	545,890	-	0.0%	1,091,780	50.0%
INVESTMENT INCOME	7,589,330	7,572,846	(16,484)	-0.2%	15,352,043	49.3%
<b>TOTAL REVENUE &amp; INCOME</b>	<b>\$ 309,452,917</b>	<b>\$ 309,896,506</b>	<b>\$ 443,589</b>	<b>0.1%</b>	<b>\$ 618,158,660</b>	<b>50.1%</b>

**ATTACHMENT 2  
Current Expense Variance Explanations**

Total MWRA	FY12 Budget December YTD	FY12 Actuals December YTD	FY12 Actual vs. FY12 Budget		Explanations
			\$	%	
<b>Direct Expenses</b>					
Wages & Salaries	41,802,057	41,666,203	(135,854)	-0.3%	Underspending due to lower than budgeted filled positions and higher than budgeted leave balance accrual use offset by unbudgeted retroactive pay adjustments for non-union managers and recently settled contractual agreements for Units 1 and 6. As of December there were 1,196 filled positions which is 9 positions lower than the 1,205 funded positions.
Overtime	1,727,120	1,925,141	198,021	11.5%	Overspending mainly in FOD for wet weather, Tropical Storm Irene, and October snow storm.
Fringe Benefits	8,905,380	8,819,029	(86,351)	-1.0%	Lower spending for Health Insurance of \$69k, Unemployment Insurance of \$16k and Medicare of \$11k offset by higher Tuition Reimbursement of \$9k.
Worker's Compensation	1,050,000	771,462	(278,538)	-26.5%	Lower spending for reserve requirements of \$177k and compensation and medical payments of \$102k.
Chemicals	4,738,510	4,593,201	(145,309)	-3.1%	Lower Activated Carbon of \$117k, Soda Ash of \$95k, Carbon Dioxide of \$74k, Hydrofluosilicic Acid of \$57k, Liquid Oxygen of \$39k, and Sodium Hydroxide of \$35k, offset by higher Nitrazyme of \$165k for Framingham Extension Relief Sewer and Sodium Hypochlorite of \$162k. Majority of chemical variances are due to timing.
Utilities	10,771,255	11,034,487	263,232	2.4%	Higher spending for Electricity of \$222k, Water of \$143k and Diesel Fuel of \$36k, offset by lower spending for Natural Gas of \$111k.
Maintenance	13,380,032	12,677,724	(702,308)	-5.2%	Maintenance Services are underspent by \$406k and Materials are underspent by \$296k.
Training & Meetings	97,911	67,950	(29,961)	-30.6%	Underspending in most divisions due to timing.
Professional Services	2,737,485	2,600,673	(136,812)	-5.0%	Underspending for Lab & Testing of \$136k mainly for Enquad's Harbor Outfall Monitoring program, Engineering of \$91k, Security of \$35k. Offset by higher spending for Other category of \$158k mainly for timing of MIS Strategic Plan.
Other Materials	1,615,307	1,555,074	(60,233)	-3.7%	Lower spending for Other Materials of \$42k, Computer Hardware of \$39k, Vehicle Expense of \$13k, and Postage \$12k offset by higher spending for Lab and Testing Supplies of \$24k, Work Clothes of \$21k and Office Supplies of \$16k.



**ATTACHMENT 2**  
**Current Expense Variance Explanations**

Total MWRA	FY12 Budget December YTD	FY12 Actuals December YTD	FY12 Actual vs. FY12 Budget		Explanations
			\$	%	
Other Services	11,291,165	11,768,852	477,687	4.2%	Overspending for Pelletization expenses of \$380k due to higher sludge quantities, Other Services of \$62k for Reservoir operations work, Grit & Screenings Removal of \$58k, Police Details of \$49k, and Permit Fees of \$39k offset by lower spending for Health/Safety of \$39k, Space Lease/Rentals of \$35k for Navy Yard facility, and Telephones of \$24k.
<b>Total Direct Expenses</b>	<b>98,116,222</b>	<b>97,479,796</b>	<b>(636,426)</b>	<b>-0.6%</b>	
<b>Indirect Expenses</b>					
Insurance	1,142,935	904,176	(238,759)	-20.9%	Underspending for Payments/Claims of \$228k and Premiums of \$11k.
Watershed/PILOT	12,788,137	12,651,051	(137,086)	-1.1%	Lower Watershed Reimbursement due to FY11 overaccrual.
HEEC Payment	1,882,002	1,810,090	(71,912)	-3.8%	Lower spending for Special Projects of \$57k and Capacity Charges of \$15k.
Mitigation	764,350	747,290	(17,060)	-2.2%	
Addition to Reserves	97,733	97,733	-	0.0%	
Pension Expense	5,488,792	5,511,524	22,732	0.4%	
Post Employee Benefits	-	-	-		
<b>Total Indirect Expenses</b>	<b>22,163,949</b>	<b>21,721,864</b>	<b>(442,085)</b>	<b>-2.0%</b>	
<b>Debt Service</b>					
Debt Service	179,322,328	172,662,639	(6,659,689)	-3.7%	Lower variable rate debt and delayed SRF borrowing.
Debt Service Assistance	(175,000)	(175,000)	-	0.0%	
<b>Total Debt Service Expenses</b>	<b>179,147,328</b>	<b>172,487,639</b>	<b>(6,659,689)</b>	<b>-3.7%</b>	
<b>Total Expenses</b>					
<b>Total Expenses</b>	<b>299,427,499</b>	<b>291,689,300</b>	<b>(7,738,200)</b>	<b>-2.6%</b>	
<b>Revenue &amp; Income</b>					
Rate Revenue	294,850,000	294,850,000	-	0.0%	
Other User Charges	3,297,207	3,377,113	79,906	2.4%	Mostly due to higher D.I. Water usage of \$76k.
Other Revenue	3,170,490	3,550,657	380,167	12.0%	Higher Miscellaneous Revenue of \$314k mainly for past period Verizon credits and timing of Fore River Railroad Management fees and rent, Permit Fees of \$179k, and Equipment Disposal of \$73k, offset by lower Revenue-Energy of \$91k, Penalties of \$74k, and Hydro-power of \$30k.
Rate Stabilization	545,890	545,890	-	0.0%	
Investment Income	7,589,330	7,572,846	(16,484)	-0.2%	Lower Investment Income due to lower short term rates.
<b>Total Revenue</b>	<b>309,452,917</b>	<b>309,896,506</b>	<b>443,589</b>	<b>0.1%</b>	
<b>Net Revenue in Excess of Expenses</b>	<b>10,025,418</b>	<b>18,207,206</b>	<b>8,181,789</b>		

**ATTACHMENT 3**  
**Capital Improvement Program Variance Explanations**

	FY12 Budget YTD December	FY12 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
Interception & Pumping (I&P)	\$3,376,161	\$4,591,228	\$1,215,067	36.0%	Overspending due to contractor progress on Interception and Pumping Section 156 Rehabilitation Design/Build contract of \$1.8M. Offset by underspending for Chelsea Creek Upgrades Design/Construction Administration contract of \$237,000 and Braintree-Weymouth Relief Facilities Design 2/Construction Services/Resident Inspection contract of \$223,000.
Treatment	\$13,030,282	\$10,669,439	(\$2,360,842)	-18.1%	Underspending due to delays in Digester Modules 1 & 2 Pipe Replacement of \$886,000; As-needed Design contracts of \$625,000; Transformer Replacement of \$588,000; Process Information Control System (PICS) Replacement construction of \$493,000; Expansion Joint Repair - Construction 2 of \$208,000; and Metals Lab Fume Hood Replacement of \$197,000. Offset by overspending for Primary and Secondary Clarifier Rehabilitation of \$1.0M due to contractor progress and Digester Sludge Pump Replacement of \$168,000.
Residuals	\$238,191	\$0	(\$238,191)	-	Underspending due to delay in award of Residuals Technology contract.
CSO	\$13,389,153	\$20,711,761	\$7,322,608	54.7%	Overspending primarily due to Brookline Sewer Separation of \$7.6M and North Dorchester Bay of \$1.2M mainly due to timing; and contractor progress on Cambridge Sewer Separation of \$944,000. Offset by underspending in CSO Support of \$1.1M mainly for favorable renegotiation of the North Dorchester temporary easement and Reserved Channel of \$700,000 due to project delays.
Other Wastewater	\$1,716,038	\$3,121,374	\$1,405,336	81.9%	Overspending on Inflow and Infiltration (I/I) due to community requests for grants and loans being greater than budgeted.
<b>Total Wastewater</b>	<b>\$31,749,825</b>	<b>\$39,093,805</b>	<b>\$7,343,980</b>	<b>23.1%</b>	

**ATTACHMENT 3**  
**Capital Improvement Program Variance Explanations**

	FY12 Budget YTD December	FY12 Actuals YTD December	YTD Actuals vs. Budget		Explanations
			\$	%	
Drinking Water Quality Improvements	\$6,034,071	\$5,726,099	(\$307,971)	-5.1%	Underspending primarily due to Spot Pond Storage Facility Design/Build of \$1.0M due to delay in contract award. Offset by overspending at the Carroll Water Treatment Plant of \$461,000 mainly due to contractor progress for Ancillary Modifications Construction 2 of \$558,000 and Spot Pond Storage Facility Early Construction Water Connection contract of \$320,000 due to contractor progress.
Transmission	\$8,479,885	\$11,700,655	\$3,220,770	38.0%	Overspending for the Hultman rehabilitation work of \$2.5M due to contractor progress and acceleration of the project; Dam Projects of \$1.0M mainly for contractor progress on the Dam Safety Modifications & Repairs contract for Foss and Weston Reservoirs; and Watershed Land acquisition of \$329,000 due to timing. Offset by underspending on Long Term Redundancy of \$427,000 due to study work being less than budgeted.
Distribution & Pumping	\$6,056,674	\$8,375,760	\$2,319,086	38.3%	Overspending due to NIH Redundancy & Storage of \$1.0M mainly for Reading/Stoneham Interconnections and Valve Replacement of \$240,000 mainly for contractor progress; and Lynnfield Pipeline of \$975,000 due to timing.
Other Waterworks	\$3,877,650	(\$1,020,951)	(\$4,898,601)	-	Underspending on Local Water Pipeline Assistance Program due to community requests for loans being less than budgeted by \$4.2M and repayments being greater than anticipated by \$684,000.
<b>Total Waterworks</b>	<b>\$24,448,280</b>	<b>\$24,781,564</b>	<b>\$333,284</b>	<b>1.4%</b>	
Business & Operations Support	\$3,393,128	\$4,098,169	\$705,041	20.8%	Overspending due to Alternative Energy projects of \$711,000 mainly for work scheduled in FY11 for Charlestown Wind Turbine construction project completed in FY12.
<b>Total MWRA</b>	<b>\$59,591,233</b>	<b>\$67,973,539</b>	<b>\$8,382,306</b>	<b>14.1%</b>	

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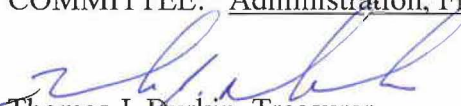
**STAFF SUMMARY**


**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Fiscal Year 2012 Defeasance Account



COMMITTEE: Administration, Finance & Audit

VOTE  
 INFORMATION

  
Thomas J. Durkin, Treasurer  
Matthew R. Horan, Deputy Treasurer *MRA*  
Preparer/Title

  
Rachel C. Madden  
Director, Administration & Finance

**RECOMMENDATION:**

To direct staff on a monthly basis during Fiscal Year 2012 to allocate any favorable budget variance associated with the Capital Finance budget to a defeasance account which will be used as part of the multi-year rates strategy to defease outstanding bonds at the end of the fiscal year and lower debt service payments to mitigate future rate revenue increases.

**DISCUSSION:**

Over the first six months of FY12, MWRA experienced favorable debt service variances as a result of lower than budgeted interest rates on variable rate debt, delays in SRF borrowings from the Massachusetts Water Pollution Abatement Trust, and the 2011 Series C refunding for interest savings. As a result of these favorable trends, MWRA has funds available to continue the practice of defeasing debt as part of the Authority's multi-year rates management strategy.

Staff are recommending that during FY12 all favorable variances associated with the Capital Finance budget be allocated to a defeasance account. Under this proposed plan, the favorable year-to-date debt service variance of approximately \$6.7 million would be directed to the defeasance account, and any additional Capital Finance underspending in the second half of 2012 would also be allocated to this account. This will ensure that rate revenue collected from our member communities for the purpose of paying debt service will be used to defease bonds and lower debt service payments providing much needed rate relief in future years. It is worthy of note that while these funds are being allocated for a defeasance, the money would be available for other budgetary purposes until the defeasance is executed at the end of the fiscal year should circumstances change.

As part of the Proposed FY13 Current Expense Budget presentation at the February Board meeting, staff will recommend a specific defeasance structure to reduce rate revenue increases in targeted future years. In addition, staff will seek formal approval to execute the defeasance similar to previous years.

Finally, this authorization for a defeasance account would only be applicable to FY12 and the use of a similar approach in future years would require prior approval of the Board.

**BUDGET/FISCAL IMPACT:**

The defeasance of bonds will reduce future debt service payments and the associated rate revenue requirement in a given fiscal year.



# 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:* J. Foti  
*Vice-Chair:* J. Walsh  
*Committee Members:*  
J. Carroll  
M. Gove  
J. Hunt  
A. Pappastergion  
M. Turner

to be held on

Wednesday, January 18, 2012

Location: **\*MWRA Chelsea Facility\***  
**2 Griffin Way – Muster Room**  
**Chelsea, MA**

Time: Immediately following AF&A Comm.

### **AGENDA**

#### **A. Information**

1. Use of an Innovative Stormwater Wetland in Alewife Brook CSO Control Plan
2. Remote Headworks Upgrade

#### **B. Contract Awards**

1. Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations: Woodard & Curran, Inc., Contract S506

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**\*NOTE DIFFERENT MEETING LOCATION; DIRECTIONS FOLLOW AFTER BOARD AGENDA.**

STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Use of an Innovative Stormwater Wetland in the Alewife Brook CSO Control Plan

COMMITTEE: Wastewater Policy & Oversight

X INFORMATION  
     VOTE

David A. Kubiak, Sr. Program Manager  
Jae R. Kim, Chief Engineer  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

**RECOMMENDATION:**

For information only.

**DISCUSSION:**

The CAM004 Stormwater Outfall and Wetland Basin project, managed by Cambridge, (Cambridge Contract 12 with a cost of \$16.1 million which includes an MWRA contribution of \$3.6 million) has as a key component the use of innovative green technology involving the construction of a new 4-foot by 8-foot box culvert storm drain to convey separated stormwater to



a new 10.3 acre-foot stormwater wetland in the Alewife Brook Reservation. This is one of five Cambridge projects in the MWRA long-term CSO control plan (with a total cost of about \$112 million and an MWRA contribution of \$60 million). Described in the Boston Globe as “a far cry from the traditional treatment prescribed by engineers,” the stormwater wetland incorporates

both conventional and bioengineered structures designed with a natural look and feel that has won praise from stakeholder groups. Together with the separation of stormwater from combined sewers, the basin will increase historically depleted base flows in the brook and enhance the health of adjacent natural wetlands via infiltration for area groundwater recharge. Site layout and plant species were carefully designed and selected to conform with existing ecological patterns and natural processes while providing a significant improvement over the existing degraded habitat caused by many decades of abuse.

Construction of the basin will involve placement of over 115,000 new wetland plants and 3,800 new upland plants and the removal of invasive species. The basin design also includes improved site use amenities, both educational and recreational, paid for by the City of Cambridge, including a multi-use connector path, 1,600 feet of trails and boardwalks, a “green” amphitheatre for educational presentations, benches and bike racks, a DCR kiosk and interpretive signage.

Owen O’Riordan, Assistant Commissioner, Cambridge Department of Public Works, will make a presentation to the Board on construction progress, as well as the functional elements and “green” attributes of the project, including plant and wildlife habitat, natural flood control, wetlands treatment, recreational and educational benefits, and consistency with Massachusetts Department of Conservation and Recreation’s (DCR) Alewife Reservation Master Plan.

### **Alewife Brook CSO Control Plan**

The stormwater outfall and wetland basin is one of six projects (five being managed by Cambridge) that comprise MWRA’s CSO control plan for Alewife Brook (see Figure 1, attached). The primary purpose of the CAM004 stormwater outfall and wetland basin is to deliver the separated stormwater flows to the Little River and Alewife Brook without causing an increase in Alewife Brook flood levels or pollutant loadings. The basin will provide detention storage and the control of pollutants associated with urban stormwater by natural processes in the constructed wetland system. The proposed location of the wetland basin is on land within DCR’s Alewife Brook Reservation that is currently an undeveloped greenway along the Little River and Alewife Brook near the MBTA Alewife Station. To gain the support of DCR, Cambridge designed the wetland basin to meet DCR’s long-term goals and objectives by fully integrating the design with the DCR Alewife Reservation and Greenway Master Plan.

### **Construction Progress**

Since commencement of work in April 2011, Cambridge’s Contractor, P. Gioioso and Sons, completed the relocation of an 8-inch gas line, a 36-inch electric bundle, three 4-inch telecommunication conduits, and the City of Cambridge’s 10-inch and 12-inch water mains in the area where the stormwater wetland basin is being constructed. The contractor has cleared the 3.4-acre area of the wetland basin, commenced excavation of the basin, and completed the wetland basin outlet structure, a perimeter berm and a French drain system. Deeper excavation and shaping of the western portion of the basin is now underway.

The Contractor also continues with construction of the new 4-foot by 12-foot storm culvert and associated special structures that will ultimately convey separated stormwater flows to the basin. The contractor has completed initial sections of the box culvert, including the section that crosses beneath MBTA’s high speed commuter rail tracks, as well as construction of a large concrete stormwater diversion structure. Cambridge expects the Contractor to complete the wetland basin



in Fall 2012. The contract has a completion date of April 2013 in compliance with Schedule Seven.

On March 17, 2010, the City of Cambridge and DCR entered into a Memorandum of Agreement (MOA) relative to the construction and maintenance of the stormwater wetland. The MOA addresses the responsibilities for operation and maintenance of the stormwater wetland system, including monitoring, removal of accumulated sediment, maintenance of the plant community, management of invasive species, and maintenance of the inflow and outfall structures, berms, spillways and recreational features.

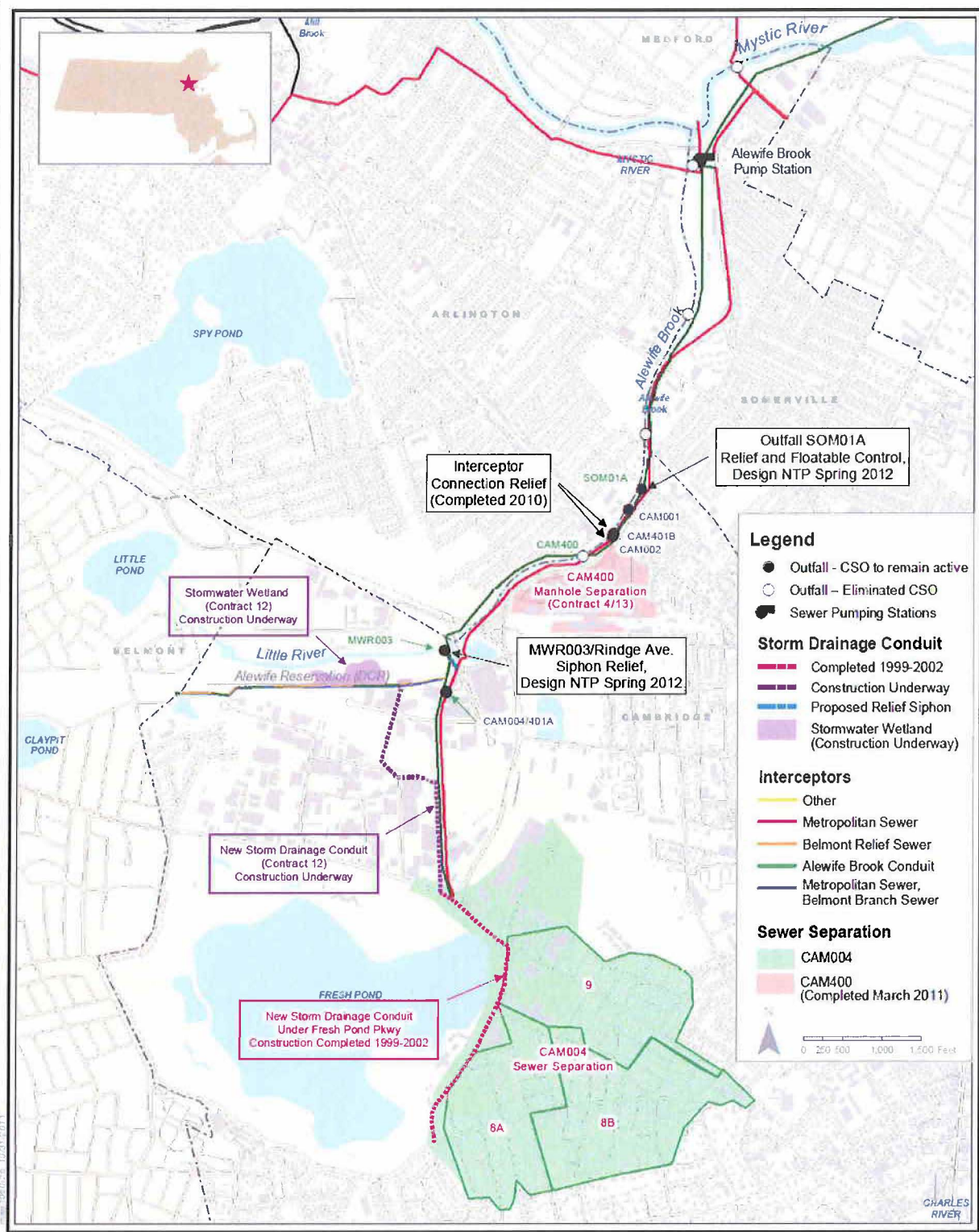
**BUDGET/FISCAL IMPACT:**

The FY12 CIP budget includes \$56,788,571 for design and construction of the projects in MWRA's CSO control plan the City of Cambridge is implementing. Staff estimate the MWRA share of the \$16.1 million estimated construction cost of Contract 12 to be \$3.6 million (primarily related to sewer separation portions of the project).

**ATTACHMENTS:**

Attachment 1 – Figure 1: Alewife Brook CSO Control

Attachment 1 (Figure 1)



Alewife Brook CSO Control Plan

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### STAFF SUMMARY


**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Remote Headworks Upgrade



COMMITTEE: Wastewater Policy & Oversight

X INFORMATION  
\_\_\_ VOTE

Margery J. Johnson, Project Manager  
Elizabeth M. Gowen, Assistant Director, WW Engineering  
Jae R. Kim, Chief Engineer  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

*MWRA is preparing to upgrade its three remote headworks facilities, which will be one of the more complex and expensive MWRA projects in a number of years from both a design and a construction perspective. Currently, the Proposed FY13 CIP contains \$163,750,000 for design and construction of upgrades to the Chelsea Creek, Columbus Park and Ward Street Headworks based upon a sequential construction schedule. This option presents the lowest risks associated with keeping each facility operational during construction and it also affords an opportunity to incorporate "lessons learned" into the design and construction of the next facility potentially avoiding costly future change orders. However, this option also carries the greatest overall cost due to additional design costs and inflationary factors resulting from an extended construction period.*

*Designing and rehabilitating all three headworks concurrently presents the lowest cost due to a shorter project duration thereby reducing significant potential inflationary increases and engineering costs but this option has higher risks for change orders and operational impacts, not allowing for lessons learned at one facility to help avoid problems at the other facilities.*

*This issue has prompted spirited debate among staff, as they weigh the need to quickly replace old and increasingly unreliable facilities against the risks inherent in major construction taking place simultaneously in three critical facilities that must remain operational, and the added costs of spreading the construction out several more years versus the risk of higher change order costs.*

*A third option that has been identified and is being evaluated is a hybrid approach of first moving forward with design and construction of Chelsea Creek Headworks, and then utilizing lessons learned in completing the design and commencing the construction of Ward Street and Columbus Park together.*

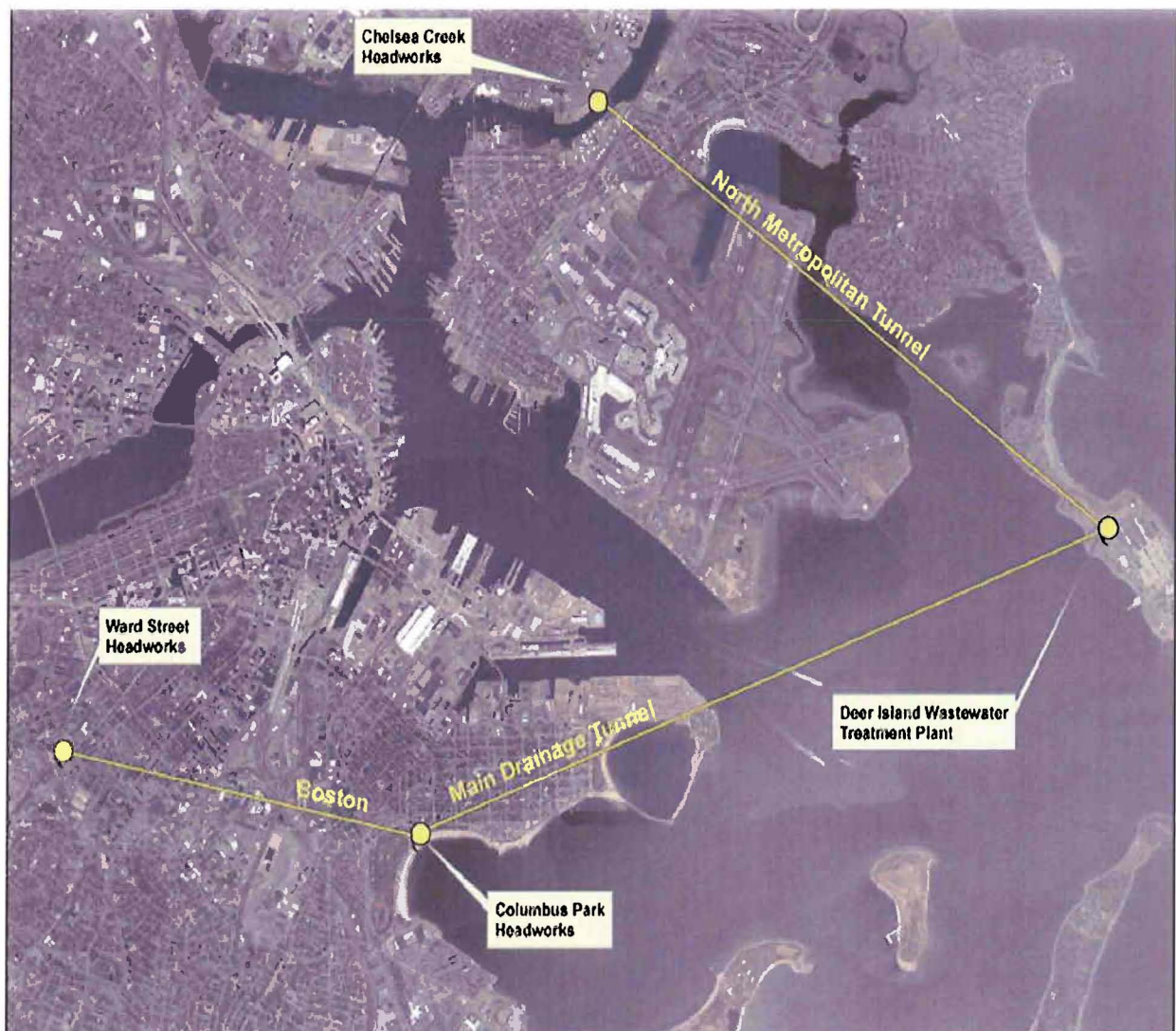
*This staff summary provides the Board with a detailed discussion of the need for the project, as well as a discussion of the benefits and risks of the most likely construction scheduling options. Staff anticipate presenting a final recommendation to the Board as part of the final CIP budget process in June. Board members will be offered a tour of the Chelsea Creek Headworks.*

## RECOMMENDATION:

For information only.

## BACKGROUND:

Wastewater flows from MWRA's Northern Service Area are collected at the three remote headworks before reaching the Deer Island Treatment Plant. These headworks are the Chelsea Creek Headworks in Chelsea, the Columbus Park Headworks in South Boston and the Ward Street Headworks in Roxbury, as shown below. Flow at these headworks is controlled, preliminarily treated, and measured before dropping into deep rock tunnels for transport to the Deer Island Wastewater Treatment Plant for full treatment. Flow measurement and control are necessary during heavy rain events to ensure that flow does not exceed Deer Island's maximum treatment capacity of approximately 1.3 billion gallons per day. Preliminary treatment at the headworks includes grit and screenings removal, which prevents excessive wear and maintenance of equipment at Deer Island and protects the cross harbor tunnels from filling with debris. In addition, the operation of the headworks at their peak hydraulic capacity during heavy rain events is critical in minimizing the risk of upstream CSOs and SSOs.



The three remote headworks were placed in operation in the 1960s, and in 1987 were upgraded with replacement of mechanical equipment, and associated structural, electrical, and instrumentation improvements. Since 1987, several other smaller improvements have been implemented. However, most of the major equipment is beyond its reliable service life, in fair to poor condition, and maintenance has become increasingly costly and labor intensive. Automation is limited, with screenings sorted and handled manually by MWRA staff. All three headworks need to be upgraded to meet a number of current building code requirements, including plumbing, electrical, ventilation, fire protection, and egress.

On June 30, 2010, the Board approved the award of Contract 7206 to Malcolm Pirnie, Inc. for design and construction administrations services for the complete upgrade of the Chelsea Creek, Columbus Park, and Ward Street Headworks<sup>1</sup>. In September 2011, Malcolm Pirnie submitted the Final Preliminary Design Report. However, due to some concerns with the project that are discussed in more detail below, MWRA has not authorized Malcolm Pirnie to proceed with Final Design.

## **DISCUSSION:**

### Project Scope

The Remote Headworks Upgrade Project is part of MWRA's program for asset protection and addresses critical needs for system rehabilitation and optimization of MWRA's wastewater system. Due to the age of these facilities, any new construction work, however small in scope, triggers more extensive renovations to meet current Massachusetts Building Code requirements. The planned upgrades will replace more than 1,000 pieces of equipment with significant improvements in screenings and grit removal and handling, HVAC and odor control, instrumentation and electrical systems, and automation of processes which will permit limited staffing during dry weather conditions.

The project will provide the ability to optimize operational performance and minimize the risk of asset failure. The project also will include the replacement and automation of all solids handling equipment, including screens, screenings and grit collector systems, and solids conveyance systems. Staff also recommend the replacement of the existing wet scrubber odor control systems with carbon adsorber systems and upgrades to the HVAC systems. New odor control and HVAC systems will be provided with standby capacity and manifolding, allowing operation at full capacity with one unit out of service. Ancillary systems, including emergency generators and fuel oil tanks, will be replaced, and instrumentation/control systems and electrical services will be upgraded. All operations will be automated. The buildings' egress and fire suppression systems also need to be modified to meet applicable codes. All equipment upgrades or replacement will include energy efficiency considerations to the maximum extent practicable.

### Preliminary Design

As part of Preliminary Design, a Hazardous Building Materials Evaluation was performed. The results of that evaluation indicated the presence of Polychlorinated Biphenyls (PCBs) in the caulking and painted surfaces at the Chelsea Creek Headworks at levels which must be abated during construction. With the exception of one exterior location at Ward Street, PCBs identified at Columbus Park and Ward Street are below regulated levels, and, as such, are considered an

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<sup>1</sup> The Nut Island Headworks was placed in service in 1998 and is not included in this contract.

*Excluded PCB Product* and do not require abatement. Following discovery of PCBs at Chelsea Creek, MWRA staff took air samples and surface wipe samples at Chelsea Creek and had them analyzed to ensure worker safety. The results from that sampling indicate that all air samples and all wipe samples except one were below laboratory quantification levels, and that short-term risks posed to workers are negligible.

A Phase 2 round of sampling and analysis was completed at all three remote headworks in November 2011 and confirmed the initial findings. It was further confirmed that at Columbus Park and Ward Street, with the one exception at Ward Street, PCBs are below regulated levels. A Phase 3 round of sampling and analysis will be required at Chelsea Creek so that the extent of the contamination in the substrate behind the paint can be quantified, and appropriate abatement measures can be included in subsequent construction documents. This process will involve coordination the Environmental Protection Agency (EPA).

Staff are considering which PCB abatement strategy should be employed at Chelsea Creek. The alternatives are to implement PCB abatement as a separate project, or to include the abatement in the construction project. The benefits of the latter would be to place full responsibility for successful PCB abatement with the general contractor, minimizing the potential for construction conflicts, delays, and change orders.

#### Construction Scheduling

Coordination and scheduling between MWRA, Malcolm Pirnie, and the contractor will be critically important to maintain continuous service throughout construction. During construction, each of the headworks must retain the ability to handle maximum flow capacity, necessitating that screening and grit equipment at each headworks be replaced one channel at a time. Uninterrupted operation of the headworks - including screenings and grit collection and removal, odor control, HVAC, flow monitoring, instrumentation programming and controls, and SCADA monitoring and control activities - must continue throughout construction. Installation of temporary equipment and systems, such as ventilation, odor control, and electrical, need to be completed prior to demolition of the existing equipment, and installation of any new equipment.

Staff and Malcolm Pirnie have identified constraints, and design and construction sequencing requirements that will be necessary to maintain treatment capacity and process and auxiliary systems, to perform the required PCB abatement, and to maintain a safe working environment.

There appear to be three viable options for Final Design and construction, with varying risks and benefits. The three options are discussed below and are summarized in the table on the following page.

The first option, included in the Proposed FY13 CIP, poses the least operational and change order risks but carries the highest cost. Final Design and construction would be completed sequentially for each of the three headworks. Design of the second facility would begin two years into construction of the first facility, and design of the third would begin two years into construction of the second. Malcolm Pirnie would complete design of Chelsea Creek, and Final Design would be bid separately for the remaining two headworks. Completing the headworks upgrade project sequentially would limit the coordination concerns inherent in keeping each facility operational during construction to one facility at a time. An added benefit would be the ability to employ "lessons learned" from the design and construction of the first contract. MWRA could include successfully-tested proprietary mechanical, HVAC, electrical, and

instrumentation equipment into the design and construction of subsequent contracts. Increased bidding competition would likely result due to a larger pool of general contractors for the more moderately-sized single facility construction contracts. However, sequential construction scheduling will take longer and will result in overall higher costs due to additional design costs and inflation for the extended construction period. Staff estimate that this option would cost \$163.8 million taking approximately 12 years to construct.

The second option would be to design and complete Chelsea Creek first, and then, employing lessons learned as discussed above, proceed with a combined project to design and construct the remaining two facilities. This option creates greater coordination efforts and risks than does the first option because two facilities are impacted at the same time, but design and inflationary construction costs would be reduced. Staff estimate that this option would cost \$157.8 million taking approximately eight years to construct.

The third option would be to complete Final Design and construction of the three headworks as one contract. This option, while being the least costly, at least initially, presents the greatest operational and change order risks because of concurrent construction work taking place at all three facilities. MWRA's experience with rehabilitation of older facilities that must remain operational during construction is that not all issues can be identified and addressed in design and these types of projects result in significantly higher change order costs than construction of new facilities.

With this option, the available pool of contractors with the experience and capacity to successfully undertake a large combined contract such as this would likely limit competition. Staff estimate that this option would cost \$151.7 million and take approximately five years to construct.

**SUMMARY OF OPTIONS**

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>
Design/CA/REI Costs	\$22.4M	\$17.8M	\$13.2M
Construction Costs	\$141.4M	\$140M	\$138.5M
<b>Total Costs</b>	<b>\$163.8M</b>	<b>\$157.8M</b>	<b>\$151.7M</b>
Construction Duration	12 years	8 years	5 years


MWRA must balance its goals to improve and maintain wastewater service with its goal for cost-effective service, which requires MWRA to prioritize its capital projects and expenditures. Staff continue to evaluate the design and construction packaging options. It is likely that Chelsea Creek Headworks will be the first facility to be upgraded. It is the largest of the three headworks, both hydraulically and physically, serving the largest area in MWRA's Northern Service Area. Chelsea Creek will be the most challenging upgrade due to the elevated levels of PCBs.

Once a final determination has been made as to how best to proceed with this project, Contract 7206 with Malcolm Pirnie, Inc. will need to be amended to reflect any changes in the project.

**BUDGET/FISCAL IMPACT:**


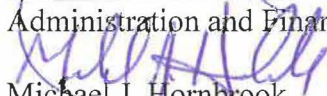
The FY12 CIP includes a total of \$138,688,469 for the Remote Headworks Upgrade. The Proposed FY13 CIP amends that amount to \$163,750,000 to reflect the inclusion of PCB abatement and separate design and construction contracts for the three headworks facilities.

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations  
Woodard & Curran, Inc.  
Contract S506

COMMITTEE: Wastewater Policy & Oversight

Stephen D. Cullen, Director, Wastewater O&M  
John P. Vetere, Deputy Chief Operating Officer  
Preparer/Title

INFORMATION  
 VOTE  
  
Rachel C. Madden, Director  
Administration and Finance  
  
Michael J. Hornbrook  
Chief Operating Officer

**RECOMMENDATION:**

To approve the award of Contract S506, Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations, to the lowest responsible and eligible bidder, Woodard & Curran, Inc., and to authorize the Executive Director, on behalf of the Authority, to jointly execute said contract, along with the Boston Water and Sewer Commission (BWSC), for a contract service fee amount of \$3,908,074 (of which MWRA will pay \$1,055,179.98 (27%) and BWSC will pay \$2,852,894.02 (73%)), plus a funding allowance amount of \$690,000 for corrective maintenance and minor repairs to process equipment (which includes \$150,000 for MWRA and \$540,000 for BWSC), for a total contract amount not to exceed \$4,598,074, and for a contract term of 1,097 calendar days from the Notice to Proceed, with options, subject to future Board approval, to extend the term for up to two additional years.

**DISCUSSION:**

BWSC and MWRA currently own and operate, the Union Park Pumping Station/CSO Facility, which is a wet-weather facility that handles combined sewage in the South End of Boston (see attached map, and exterior facility photograph on the following page). This facility is staffed 24 hours per day, 7 days per week and typically takes CSO flow into its storage tanks approximately 30 times per year and discharges to Fort Point Channel approximately 10 times per year.





As part of the Boston Harbor Federal Court Order, MWRA expanded the Union Park Pumping Station to include CSO control (screening, chlorination, storage, and dechlorination). In addition to the CSO process equipment, the project included upgrading pumping equipment and other improvements to BWSC's pumping station (paid for by BWSC).

Construction of the facility was substantially complete in late 2006, and in 2007 MWRA and BWSC entered into a Memorandum of Agreement (MOA) establishing that the jointly-owned Union Park Pumping Station/CSO would be operated as one facility. The two agencies worked jointly to procure a contract to manage, operate, and maintain the Union Park Pumping Station/CSO (as well as nine other smaller, unstaffed pump stations owned exclusively by BWSC). The contract was awarded to Woodard & Curran, Inc. and will expire on February 27, 2012.

This replacement contract was bid for a three-year term with the option of two 1-year extensions. The contract requires the operator to perform all necessary preventive and routine maintenance for the facilities. Corrective maintenance and repair of the CSO facility, beyond the scope of this contract, as well as chemical supplies and other services, will be performed under separate existing or future MWRA contracts.

MWRA and BWSC have agreed to continue to split the annual fee portion of the contract at 73% (BWSC) and 27% (MWRA) based on a review of the existing contract and likely similar assignment of time of the contract base and wet-weather staffing to MWRA and BWSC for the Union Park facility and the nine other unstaffed BWSC pump stations. Other cost splits (e.g., utilities) will be based on the percentage of Union Park ownership and/or the ability to clearly assign cost responsibility.

**Procurement Process**

BWSC’s Procurement Department advertised the contract on November 28, 2011 and issued the Information for Bidders. A low-bid procurement process was used, which included minimum qualifications requirements for firms and key personnel assigned to the project. In addition, the following operations and maintenance services firms were contacted to encourage competition and participation in this procurement: Weston & Sampson, Woodard & Curran, Veolia, United Water, Aquarion, American Water, Obrien & Gere, and Great Blue Heron. A site visit was held on December 14, 2011 and two firms, Woodard & Curran and Weston & Sampson, attended.

Bids were opened on January 5, 2012 and contained the following service fees for the full three-year term of the contract:

Woodard & Curran, Inc.	\$3,908,074
Weston & Sampson, Inc.	\$3,941,760

Woodard & Curran’s bid includes a service fee of \$1,265,091, \$1,302,319, and \$1,340,664, respectively, for the next three years of the contract. Under this bid, the service fee for the next two years is less than the average service fee of \$1,312,000 during the last three years of the contract. Woodward & Curran’s third year service fee represents a modest increase above the last three years’ average service fee. Woodard & Curran operated these facilities for six years prior to the new jointly-owned facility coming online and has operated the facilities for five years under the current contract. Based on several years of experience working with Woodard & Curran, MWRA and BWSC staff are of the opinion that Woodard & Curran possesses the skill and ability necessary to successfully complete the work under this contract and can operate the facilities at the price bid. Qualifications of the firm and key personnel, as required in the RFB, have been checked by BWSC and were found to meet the minimum requirements.

Included in the contract is an annual “funding allowance” in the amount of \$180,000 per year for BWSC expenditures, and in the amount of \$40,000, \$50,000, and \$60,000 per year, respectively, to cover MWRA’s spare parts inventory and minor equipment maintenance and repairs.

**BUDGET/FISCAL IMPACT:**

The FY12 Current Expense Budget (CEB) currently includes adequate funds for MWRA’s portion of the operation and maintenance of the Union Park Pumping Station/CSO Facility. The Proposed FY13 through FY15 CEBs will include adequate funds for the remaining term of the contract.

**MBE/WBE PARTICIPATION:**

There were no MBE or WBE participation requirements established for this contract due to limited opportunities for subcontracting.

**ATTACHEMENT:**

Aerial Map of Union Park Pump Station/CSO Facility





# 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:* J. Hunt  
*Vice-Chair:* V. Mannering  
*Committee Members:*  
J. Barrera  
J. Carroll  
J. Foti  
M. Gove  
A. Pappastergion  
J. Walsh

to be held on

Wednesday, January 18, 2012

Location: **\*MWRA Chelsea Facility\***  
**2 Griffin Way – Muster Room**  
**Chelsea, MA**

Time: Immediately following Wastewater Comm.

### AGENDA

#### **A. Information**

1. Report on 2011 Water Use Trends
2. Update on Changes in Required Disinfection Byproducts Sampling
3. Update on System Expansion (verbal report)
4. Update on the Completion of Recent Water Projects
5. Hultman Aqueduct Rehabilitation: Contract 6975

#### **B. Contract Awards**

1. Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services: Fay, Spofford & Thorndike, LLC, Contract 7156

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**\*NOTE DIFFERENT MEETING LOCATION; DIRECTIONS FOLLOW AFTER BOARD AGENDA.**

**C. Contract Amendments/Change Orders**

1. Northern Intermediate High - Stoneham-Reading Connection: Albanese D&S, Contract 7261, Change Order 3
2. Southern Extra High Distribution Storage and Redundancy Plan: SEA Consultants, Inc., Contract 6452, Amendment 5

WA.1  
1/18/12

### STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Report on 2011 Water Use Trends



COMMITTEE: Water Policy & Oversight

INFORMATION  
 VOTE

Daniel Nvule, Senior Program Manager  
Stephen Estes-Smargiassi, Director, Planning  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

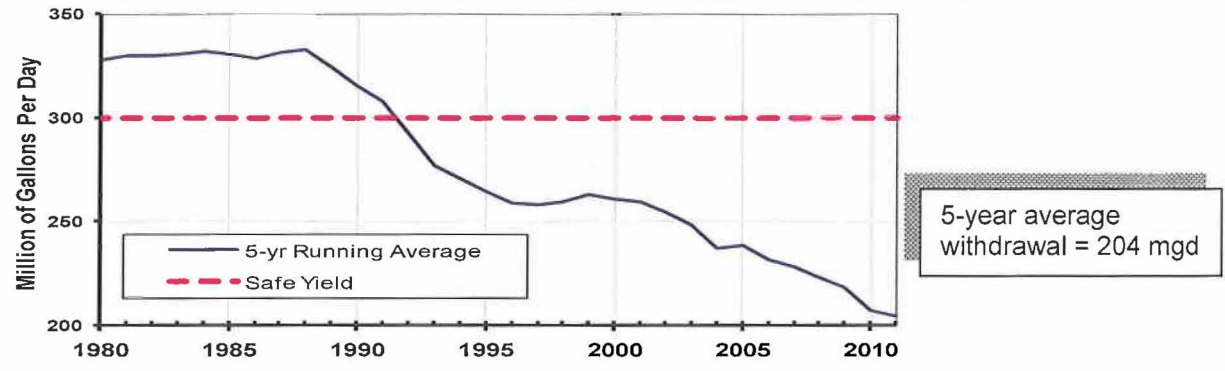
### RECOMMENDATION:

For information only.

### DISCUSSION:

Total MWRA water withdrawals dropped in 2011, from 204 million gallons per day (mgd) in 2010 to 195.1 mgd in 2011. Water use in 2011 was comparable to 2009's use of 194.3 mgd. Indoor water use continued its long-term decline. The five-year running annual average of water use also continued to decline, extending the trend that began when MWRA adopted its demand management policies in 1986, reflecting the on-going increase in water use efficiency in homes and businesses, as well as the effects of the economic slowdown. Figure 1 below shows 5-year averages of withdrawals from 1980 to present<sup>1</sup>. The five-year averaging reduces the effects of year to year variability due to weather and provides a good indication of longer term trends.

Figure 1: Total Reservoir Withdrawals -- Five Year Running Average 1980 to 2011



### Reservoir Withdrawals and Releases

Figure 2 shows Quabbin elevations and spill volumes for the past 14 years. Quabbin spilled small quantities of water in 1998, 2000, 2001, and 2004. Significant spills occurred with the reservoir more than full for extended periods each year between 2005 and 2010 with the largest spills in 2006. In 2011, Quabbin spilled for 113 days for a total of about 21.1 billion gallons (an

<sup>1</sup> Withdrawals include water sold to MWRA communities, as well as other uses in the watershed and MWRA system. They are the metric used to compare to the 300-mgd safe yield of the watershed/reservoir system.

average of 57.8 mgd). In 2011, Wachusett Reservoir spills averaged 9.6 mgd.

Figure 2: Quabbin Elevation with Quabbin Spill Volumes

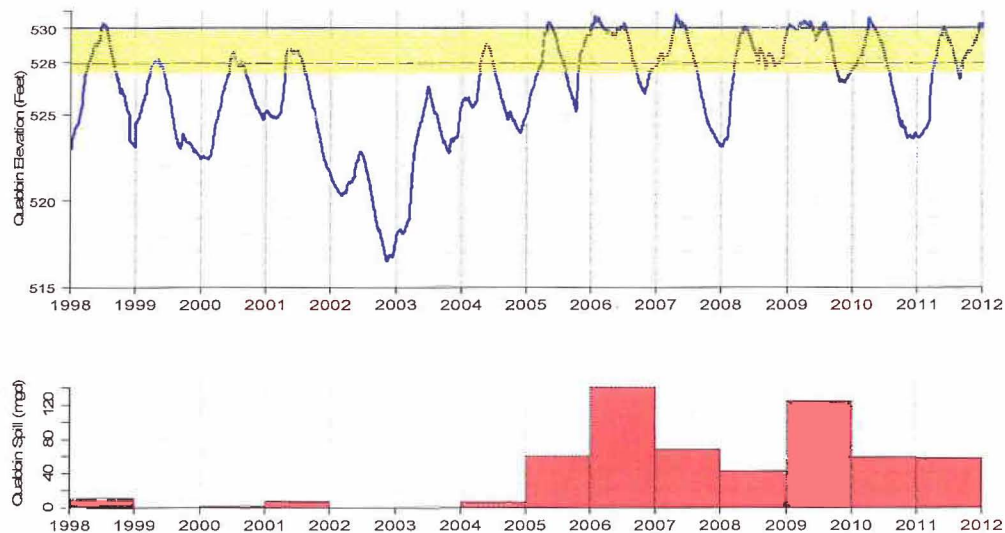
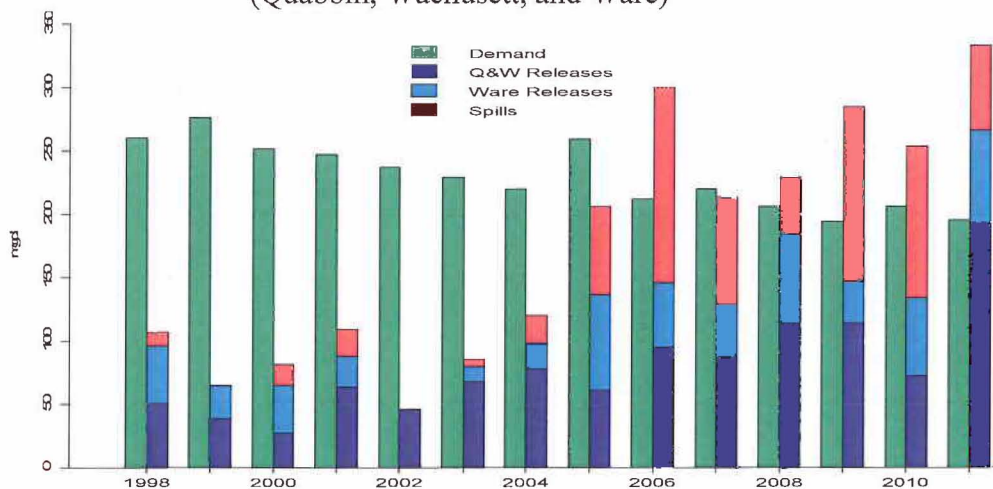


Figure 3 below compares the amount of water withdrawn to supply customer demand to the total amount of water spilled and released, including the spills at Quabbin shown in Figure 2 above, water spilled or released to the Nashua River from Wachusett Reservoir, water released from Wachusett Reservoir to the Sudbury River through the Wachusett Aqueduct, and Ware River water, which could have been transferred to Quabbin but was not due to lowered demands. MWRA's annual average releases and spills from the reservoir system have exceeded the amount of water withdrawn for water supply purposes five times in the last 14 years: 2006, 2008, 2009, 2010, and 2011.

Figure 3: Withdrawals, Spills, and Releases (Quabbin, Wachusett, and Ware)



## Water Consumption by MWRA Communities

Calendar year 2011 water sales to MWRA communities of 188.5 mgd were approximately 3.1% lower than 2010 (see Figure 4). Sales to all but 12 communities were lower in 2011 than in 2010, as shown in the attached monthly community water use report. Demand from MWRA's largest customer, BWSC, was 64.7 mgd, slightly lower than last year, and still a figure last seen prior to 1900 (See Figure 5).

Figure 4 – Total Sales to MWRA Communities (1980 to 2011)

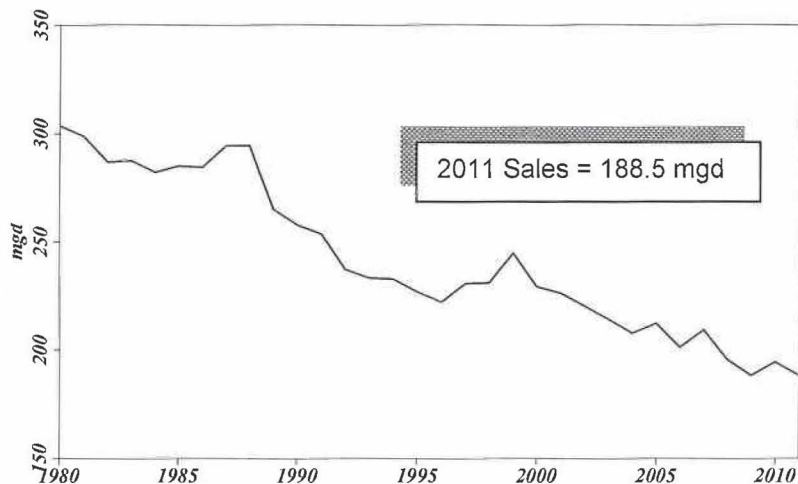
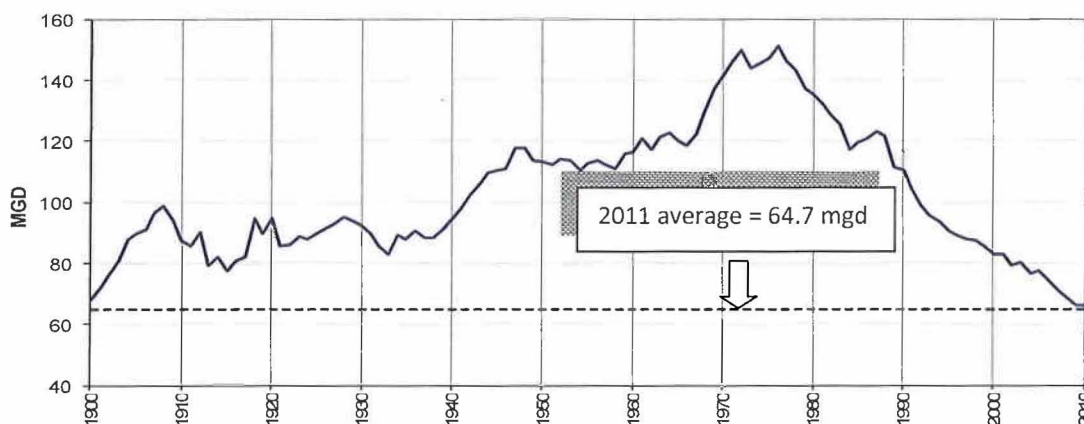


Figure 5: Boston Water Use 1900-2011



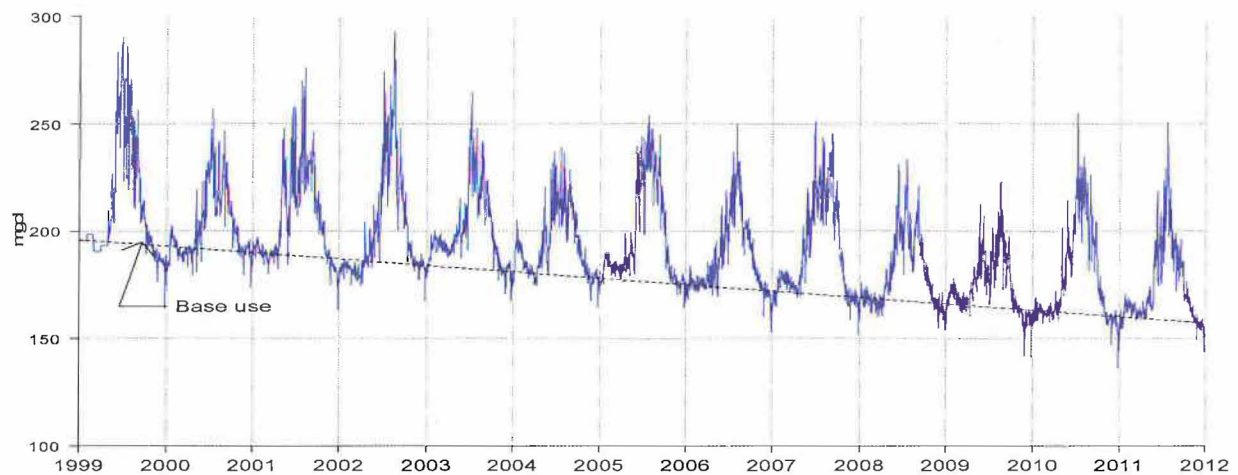
Over time, reductions have come in both base use, defined as water use from November to March, and outdoor use (or seasonal use), defined as the increase over the base demand during the irrigation season of May to September. As staff have reported for the last two years, reductions in base use in fully-supplied communities continue to show a decrease of approximately 3 mgd per year, as shown by the dotted sloping line in Figure 6<sup>2</sup>. These reductions of approximately 1.8% annually are generally due to increases in the efficiency of

<sup>2</sup> Certain analyses can only be done on fully-supplied communities where MWRA has information on their total use available from MWRA's revenue meters. MWRA receives data on monthly total use for partially-supplied communities, but not until they provide that data to DEP in their Annual Statistical Reports in March. Fully supplied communities represent almost 90% of the total annual demand.



water use in homes and businesses as water-saving technologies continued to increase market share and consumers reacted to price increases, as well as reduced pipeline leaks. These reductions seem likely to continue for some time. This trend is similar to New York City's decline in base demand of 1.6% annually over the last 5 years.

Figure 6: Fully-Supplied Communities Demand 1999-2011



Seasonal water use is more variable and driven in large part by weather during the irrigation season. Factors influencing seasonal use include the total irrigation season precipitation, the number of dry days between rainfall events, temperature, and the total amount of sunshine. Over time, water price also influences seasonal use. During the past 13 years, seasonal use in the fully-supplied communities has varied from a low of 10 mgd (6% of total use) in 2009 to 21 mgd (11%) in 2005, with an average of approximately 16 mgd (8%). Monthly average summer temperatures for 2011 were comparable to those experienced in 2010, with 2011 having a somewhat wetter summer. Seasonal use in the fully supplied communities for 2011 averaged 16 mgd (9%)<sup>3</sup>. 2011 had a maximum day demand of 307.45 mgd on July 22. Once again, Christmas was the lowest day in 2011 at 149.87 mgd, the lowest single day usage since MWRA was created.

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<sup>3</sup> Note how the percentage increases for the same volume as the total demand decreases over time. This issue also affects other measures reported on a percentage basis, such as unaccounted-for water use.

Figure 7 shows the seasonal water use variation over the years, and Figure 8 shows both the relatively small impact that seasonal demand has on total water use and the longer-term decline in both base and total use.

Figure 7: Fully-Supplied Communities' Annual Seasonal Demand

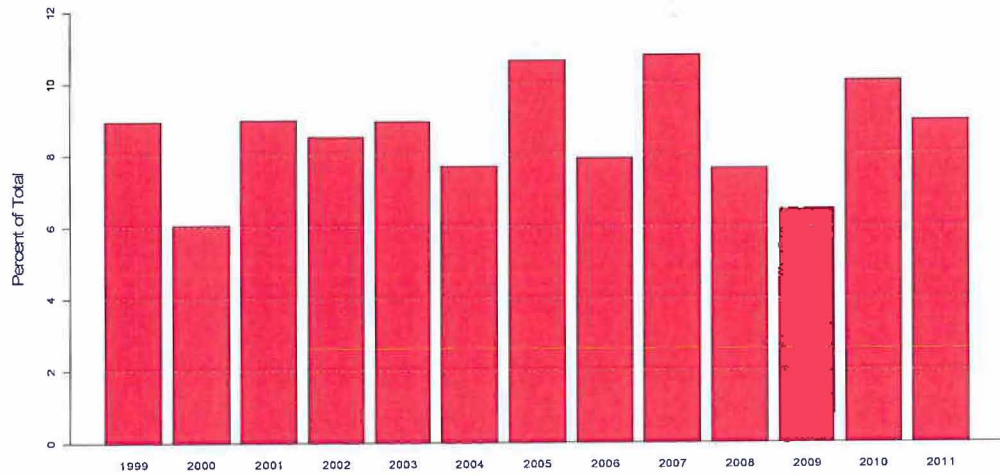
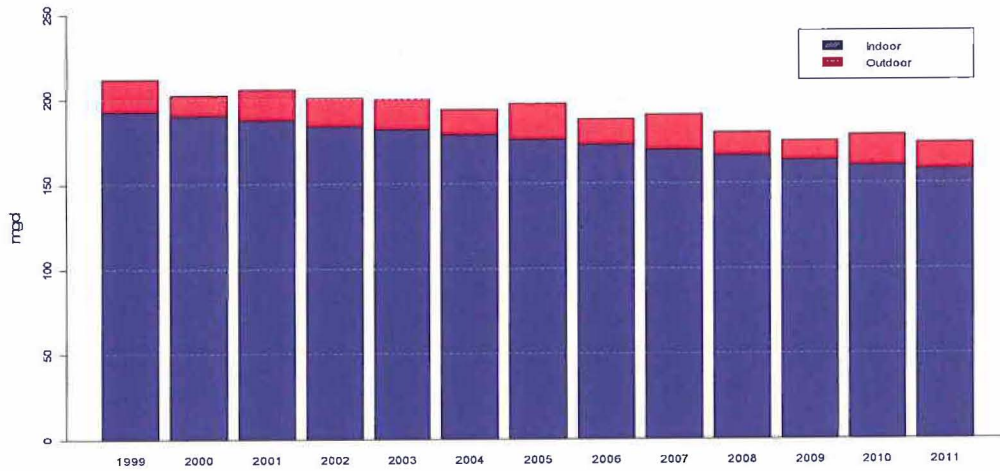


Figure 8: Fully-Supplied Communities' Annual Base and Seasonal Demand



**Massachusetts Water Resources Authority**  
**Monthly and Year-to-Date Water Use Comparisons**  
**Reporting Period: December 2011**

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

	Monthly			YTD			YTD			Totals	
	Flow mgd		Flow Change	Flow mgd		Flow Change	Flow Share <sup>1</sup>		Change in YTD Flow Share	Ave. Flow mgd	Flow Share <sup>1</sup>
	Dec-11	Dec-10		CY11	CY10		CY11	CY10			
<b>Metro-System Customers</b>											
Arlington	3,627	3,912	-7.3%	4,252	4,079	4.3%	2.4%	2.2%	7.4%	4,079	2.2%
Belmont	1,898	1,736	9.3%	2,045	2,236	-8.5%	1.2%	1.2%	-5.8%	2,236	1.2%
Boston (BWSC)	58,777	59,875	-1.8%	64,710	66,048	-2.0%	36.5%	36.1%	0.9%	66,048	36.1%
Brookline	4,149	4,229	-1.9%	5,110	5,134	-0.5%	2.9%	2.8%	2.5%	5,134	2.8%
Canton (P)	1,331	1,155	15.2%	1,932	2,198	-12.1%	1.1%	1.2%	-9.4%	2,198	1.2%
Chelsea	3,908	2,824	6.4%	3,077	3,032	1.5%	1.73%	1.66%	4.5%	3,032	1.66%
Dedham-Westwood W.D. (P)	0.0018	0.0002	818.1%	0.026	0.047	-44.5%	0.01%	0.03%	-42.9%	0.047	0.0256%
Everett	3,499	3,661	-4.4%	3,916	4,125	-5.1%	2.2%	2.3%	-2.2%	4,125	2.3%
Framingham	6,214	5,701	9.0%	6,712	6,805	-1.4%	3.8%	3.7%	1.6%	6,805	3.7%
Leominster (P)	0.000	0.000	0.0%	0.000	0.000	0.0%	0.0%	0.0%	0.0%	0.000	0.0%
Lexington <sup>2</sup>	3,382	3,734	-9.4%	4,649	5,010	-7.2%	2.6%	2.7%	-4.4%	5,010	2.7%
Lynn (LWSC) (P)	0.242	0.239	1.2%	0.235	0.201	16.7%	0.1%	0.1%	20.2%	0.201	0.1%
Lynnfield W.D.	0.240	0.285	-15.8%	0.362	0.421	-13.8%	0.2%	0.2%	-11.3%	0.421	0.2%
Malden	5,460	5,228	4.4%	5,469	5,385	1.6%	3.1%	2.9%	4.6%	5,385	2.9%
Marblehead	1,275	1,276	-0.1%	1,650	1,815	-9.1%	0.9%	1.0%	-6.4%	1,815	1.0%
Marlborough (P)	1,331	3,124	-57.4%	2,488	2,943	-15.5%	1.4%	1.6%	-12.9%	2,943	1.6%
Medford	4,482	4,756	-5.7%	5,001	5,023	-0.4%	2.8%	2.7%	2.5%	5,023	2.7%
Melrose	1,899	1,906	-0.3%	2,174	2,260	-3.8%	1.2%	1.2%	-1.0%	2,260	1.2%
Milton	2,464	2,166	13.8%	2,468	2,362	4.5%	1.4%	1.3%	7.6%	2,362	1.3%
Nahant	0.224	0.223	0.8%	0.280	0.321	-12.7%	0.2%	0.2%	-10.1%	0.321	0.2%
Needham (P)	0.329	0.816	-59.7%	0.871	0.605	43.9%	0.5%	0.3%	48.3%	0.605	0.3%
Newton	7,726	7,504	3.0%	8,760	8,873	-1.3%	4.9%	4.9%	1.7%	8,873	4.9%
Northborough (P)	0.837	0.638	31.1%	0.798	0.742	7.6%	0.4%	0.4%	10.8%	0.742	0.4%
Norwood	2,520	2,837	-11.2%	3,047	3,158	-3.4%	1.7%	1.7%	-0.6%	3,158	1.7%
Peabody (P)	0.103	0.364	-71.6%	0.555	0.661	-16.0%	0.3%	0.4%	-13.5%	0.661	0.4%
Quincy	8,411	8,702	-3.3%	8,935	9,232	-3.2%	5.0%	5.1%	-0.3%	9,232	5.1%
Reading	1,403	1,454	-3.5%	1,636	1,758	-6.9%	0.9%	1.0%	-4.1%	1,758	1.0%
Revere	3,642	3,564	2.2%	3,941	4,127	-4.5%	2.2%	2.3%	-1.6%	4,127	2.3%
Saugus	2,327	2,376	-2.1%	2,847	2,873	-0.9%	1.6%	1.6%	2.1%	2,873	1.6%
Somerville	5,184	5,252	-1.3%	5,573	5,818	-4.2%	3.1%	3.2%	-1.4%	5,818	3.2%
Southborough	0.596	0.657	-9.2%	0.838	1,022	-18.0%	0.5%	0.6%	-15.5%	1,022	0.6%
Stoneham	2,394	2,417	-0.9%	2,805	2,855	-1.7%	1.6%	1.6%	1.2%	2,855	1.6%
Stoughton (P)	0.593	0.650	-8.8%	0.633	0.623	1.5%	0.4%	0.3%	4.6%	0.623	0.3%
Swampscott	1,326	1,209	9.7%	1,502	1,463	2.6%	0.8%	0.8%	5.7%	1,463	0.8%
Wakefield (P)	1,198	1,321	-9.3%	1,462	1,466	-0.3%	0.8%	0.8%	2.7%	1,466	0.8%
Waltham	5,823	5,909	-1.5%	7,040	7,637	-7.8%	4.0%	4.2%	-5.1%	7,637	4.2%
Watertown	2,330	2,338	-0.3%	2,643	2,638	0.2%	1.5%	1.4%	3.2%	2,638	1.4%
Wellesley (P)	0.097	0.650	-85.0%	0.772	1,035	-25.4%	0.4%	0.6%	-23.1%	1,035	0.6%
Weston	0.865	0.837	3.3%	1,522	1,738	-12.4%	0.9%	1.0%	-9.8%	1,738	1.0%
Wilmington (P)	0.238	0.241	-0.9%	0.271	0.486	-44.4%	0.2%	0.3%	-42.7%	0.486	0.3%
Winchester (P)	0.420	0.411	2.1%	0.881	1,007	-12.5%	0.5%	0.6%	-9.9%	1,007	0.6%
Winthrop	1,161	1,172	-1.0%	1,253	1,230	1.9%	0.7%	0.7%	4.9%	1,230	0.7%
Woburn (P)	1,123	1,035	8.6%	2,303	2,277	1.1%	1.3%	1.2%	4.2%	2,277	1.2%
<b>Subtotal Metro-System</b>	<b>154,147</b>	<b>158,382</b>	<b>-2.7%</b>	<b>177,445</b>	<b>182,768</b>	<b>-2.9%</b>	<b>100%</b>	<b>100%</b>		<b>182,768</b>	<b>100%</b>
<b>Chicopee Valley Aqueduct</b>											
Chicopee	4,822	4,423	9.0%	5,351	5,771	-7.3%	70.8%	70.1%	0.9%	5,771	70.1%
South Hadley FD #1	0.930	0.962	-3.4%	1,147	1,250	-8.2%	15.2%	15.2%	-0.1%	1,250	15.2%
Wilbraham	0.813	0.846	-3.9%	1,064	1,210	-12.0%	14.1%	14.7%	-4.3%	1,210	14.7%
<b>Subtotal CVA System</b>	<b>6,565</b>	<b>6,231</b>	<b>5.4%</b>	<b>7,563</b>	<b>8,231</b>	<b>-8.1%</b>	<b>100%</b>	<b>100%</b>		<b>8,231</b>	<b>100%</b>
<b>Other Revenue Supply</b>											
Cambridge (P)	0.000	0.000	0.0%	0.000	0.000	0.0%				0.000	
Clinton <sup>3</sup>	1,710	1,712	-0.1%	1,942	1,879	3.4%				1,879	
Worcester (P)	0.000	0.000	0.0%	0.000	0.000	0.0%				0.000	
Other Revenue Customers <sup>4</sup>	1,462	1,506	-3.0%	1,549	1,580	-1.9%				1,580	
<b>Subtotal Other Revenue Supply<sup>5</sup></b>	<b>3,172</b>	<b>3,218</b>	<b>-1.4%</b>	<b>3,492</b>	<b>3,458</b>	<b>1.0%</b>				<b>3,458</b>	
<b>Total Water Supplied</b>											
Fully Supplied Metro Communities	146,303	147,738	-1.0%	164,219	168,477	-2.5%				168,477	
Communities	6,565	6,231	5.4%	7,563	8,231	-8.1%				8,231	
Partially Supplied Communities	7,843	10,645	-26.3%	13,226	14,290	-7.5%				14,290	
Other Revenue Customers	3,172	3,218	-1.4%	3,492	3,458	1.0%				3,458	
<b>Total Water Supplied<sup>6</sup></b>	<b>163,884</b>	<b>167,831</b>	<b>-2.4%</b>	<b>188,499</b>	<b>194,457</b>	<b>-3.1%</b>				<b>194,457</b>	

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

2) Lexington supplies Bedford with partial MWRA water service.

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

4) Other Revenue Customers: Fernald School (State), D.C.R. (Parks & Pools), Stone Zoo, Deer Island WWT P and Westborough State Hospital.

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

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

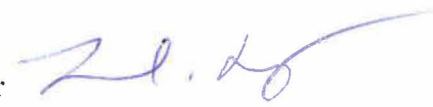
(P) Community is partially supplied by MWRA.

Questions regarding water supplied can be directed to David Liston @ (617) 305-5853 or Leo Norton @ (617) 788-2256.

6-Jan-12

W.A.2  
1/18/12

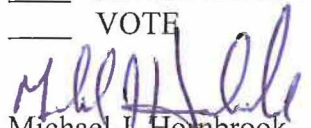
**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** Update on Changes in Required Disinfection Byproducts Sampling

COMMITTEE: Water Policy & Oversight

X INFORMATION  
     VOTE

Stephen Estes-Smargiassi, Director, Planning  
Preparer/Title

  
Michael J. Hombrook  
Chief Operating Officer

*In May 2012, MWRA will begin a revised sampling program for disinfection byproducts compliance, based on the Environmental Protection Agency's Stage 2 Disinfectants/Disinfection Byproducts Rule. The new rule requires one quarterly sample from each of MWRA's 30 fully supplied communities, which is an increase from the current 16. It also includes a change in how compliance is calculated. MWRA staff will perform the sampling and do not anticipate any problems resulting from either aspect of the new rule.*

**RECOMMENDATION:**

For information only.

**DISCUSSION:**

The Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2) was issued by the Environmental Protection Agency (EPA) in January 2006, changing how EPA regulates trihalomethanes (THMs) and haloacetic acids (HAAs), as of spring 2012.

**Changes in Compliance Calculation Method**

Under the new DBP rule, compliance will be calculated at each individual site by averaging the four quarterly results at that site (a "locational running annual average") rather than the current method of averaging all samples from all sites over a four-quarter period. The locational running annual average at every site must remain below the MCL. MWRA's DBPs have dropped to very low levels, and, based on review of the data since the CWTP came on line in 2005, staff anticipate no problems with compliance.

## **Changes in Required Number of Samples**

For a consecutive system like MWRA's, with centralized treatment and community customers that do not provide any additional treatment, the Stage 2 Rule requires one sample per community. There are 30 fully-served communities downstream of the CWTP<sup>1</sup> so 30 samples will be required, rather than the current 16. While staff believe that this is more than is required to adequately characterize DBP levels, it is certainly better than being treated as 30 individual systems. That would require approximately 160 quarterly samples in total. Staff will be submitting MWRA's Stage 2 sampling plan shortly; it must be received and approved by DEP prior to beginning the required new sampling in May 2012.

Samples will be collected by MWRA staff quarterly and analyzed by MWRA's laboratory, as is the current case. No additional work by communities is required.

## **Community Outreach**

While these changes will not directly affect MWRA communities, staff will be providing a brief update on the sampling plan and the new DBP rule to the Advisory Board at its January 19, 2012 meeting. Staff also will send written notification to communities prior to the new sampling program beginning in May 2012.

## **BUDGET/FISCAL IMPACTS:**

The increased number of samples represents approximately \$12,000 in additional laboratory costs. This has been incorporated into the laboratory's proposed FY13 budget. The additional sample collection will be done by existing staff within the Quality Assurance group.

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<sup>1</sup> There are actually 29 fully-supplied communities. DEP is treating a section of the partially-served community of Winchester, which is always provided with exclusively MWRA water, as a "fully supplied community" for the purposes of this rule. In the CVA system, each community provides additional corrosion control or residual disinfection treatment, so each community continues to be regulated separately for the Stage 2 rule.

**STAFF SUMMARY**


**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Update on the Completion of Recent Water Projects



COMMITTEE: Water Policy & Oversight

INFORMATION  
 VOTE

Frederick O. Brandon, Senior Program Manager  
A. Navanandan, Director, Construction  
Jae R. Kim, Chief Engineer  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

**RECOMMENDATION:**

For information only.

**DISCUSSION:**

Significant progress has recently been achieved on several water system projects that provide system improvements and much needed redundancy to certain key areas in the water system. The projects presented in this staff summary are:

- Southern Spine Section 107 Pipeline Phase 2 (Boston, Milton, Quincy)
- Pipeline Sections 18, 50, and 51 Rehabilitation (Medford, Somerville)
- Meter 78 Replacement (a portion of Phase VII Valve Replacement, Somerville)

Southern Spine Section 107 Pipeline

The Southern Spine Distribution Water Main Project (See Figure 1) involves the rehabilitation and/or replacement of three water transmission mains in the Southern High Service (SHS) area serving the communities of Boston (partial), Milton, and Quincy. Three of the five Southern Spine Project's pipeline construction contracts have been completed, with the fourth (Section 107 Phase 2) being recently placed into service on December 20, 2011. This includes completion of the pipeline and valve work in Dorchester Lower Mills.

The activation of Section 107 provides critical system redundancy with a pipe loop to the Blue Hills Covered Storage Tanks from the tunnel system. This project has improved the water distribution system providing sufficient capacity, improved water quality including maintaining chlorine residual in the system and now provides a new level of redundancy for these communities. The hydraulic grade line to Milton and Quincy also improved slightly.

The most recent work replaced two water mains that have been in service since 1897 and 1915, respectively, with almost 2 miles of newly installed 48-inch main and provided cleaning and

lining of 1,500 linear feet of other water main segments and three new community revenue meters and valves. The new and rehabilitated lines are in service today and Substantial Completion (final paving and restoration) is expected in June 2012, nine months ahead of schedule. The cost to date of this contract is \$15.7 million.

#### Pipeline Sections 18, 50, and 51 Rehabilitation

This project was a two-year contract to rehabilitate Section 18, 50 & 51 Supply Mains in the Northern High Service (NHS) area, which provide high service water to Medford and a majority of the high service area in Somerville (see attached Figure 2). These pipes consist of approximately three miles of cast-iron water mains that range in age from 80 to 100 years old. The rehabilitation of the mains protect water quality including maintaining chlorine residual in the system, improve the hydraulic capacity of the pipelines and provide better reliability of both the pipelines and valve operations serving the NHS communities.

Prior to rehabilitation, the carrying capacity of the mains had been reduced to approximately 50% of the original design capacity due to build-up of rust deposits on the pipeline walls. The existing pipe was deemed to be structurally sound so the rehabilitation work consisted of cleaning and cement mortar lining. The project also improved the system capacity by replacing flow restrictions (undersized valves and pipe segments). Eliminating these flow restrictions, along with the cleaning and lining of the pipe, is one of the key elements in allowing a future shutdown of the Weston Aqueduct Supply Main (WASM) 3 line during the pending replacement/rehabilitation of that critical pipe.

Many of the existing valves on these lines were inoperable and beyond their useful lives, limiting MWRA's ability to isolate portions of the mains and re-route flows in case of a water main leak or break, or for pipeline maintenance. The project replaced 12 mainline valves; retrofitted blow-off valves to eliminate cross-connections; and replaced Meter 32 serving Somerville. The final cost of the project is expected to be \$5.6 million.

#### Meter 78 Replacement

New Meter 78, a low service meter serving Boston, was activated in December 2011. The meter is now located on Broadway in Somerville. This meter replacement project included six valve replacements, allowing for more reliable and effective system isolations if water main breaks occur within BWSC's system, and also allows for MWRA system maintenance. This work was the first phase of the Phase VII Valve Replacement contract. This contract is part of MWRA's long-term program to replace valves, blow-offs, and meters to provide reliable isolation of critical pipeline segments, and updated new revenue meters. In addition to the meter replacement, work included 325 feet of pipe replacement, the replacement of six mainline valves referenced above, and three blow-off valves.

Meter 78 was relocated from the off-ramp from I-93 to the edge of Broadway where maintenance can be safely performed without impacting traffic, which requires using police details. Work was coordinated closely with Somerville and scheduled to occur prior to the

reconstruction of Broadway, a main thoroughfare in Somerville and a main route to Sullivan Square and the MBTA's Sullivan Station in Boston (see attached Figure 3).

Construction took place in an area with many other utilities, which proved to be problematic. Change orders were needed to locate underground structures and route the new piping to avoid interferences with the existing utilities. A large volume of contaminated soil required out-of-state disposal and an NGRID gas line was relocated prior to Meter 78 construction at NGRID's expense.

The Contractor has completed approximately 52% of the work valued at \$1.5 million. Additional work to be completed in 2012 is Meter 48 replacement in Somerville, replacement of a 48-inch valve, a new 36-inch valve, and rehabilitation of six blow-off valves. The entire contract value to date is \$2.89 million.

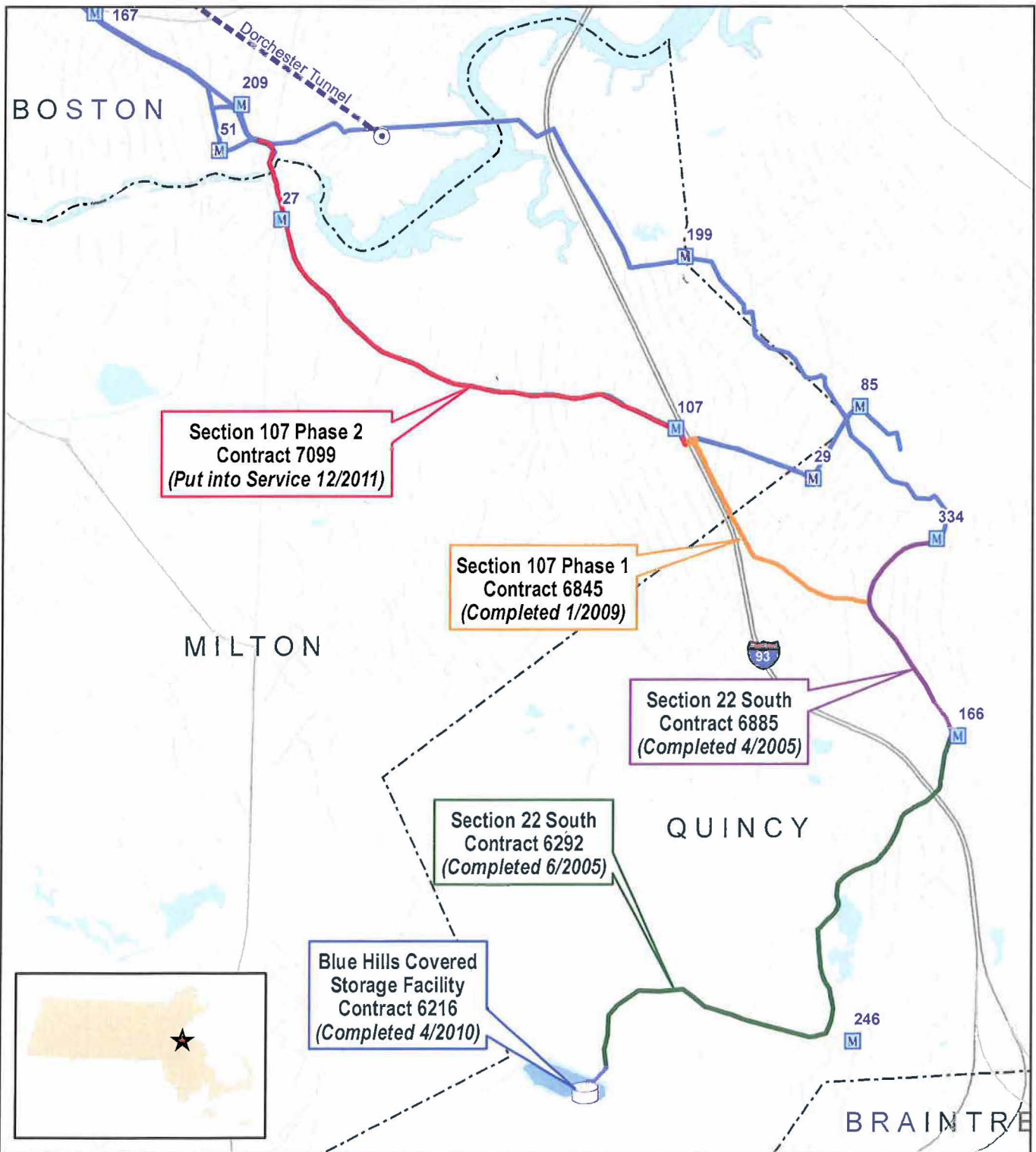
**ATTACHMENTS:**

Figure 1: Southern Spine Water Mains Rehabilitation Project

Figure 2: Section 18, 50 and 51 Rehabilitation Contract 6394

Figure 3: Phase VII Valve Replacement Contract 6436



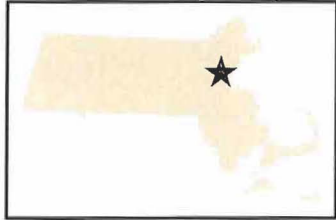
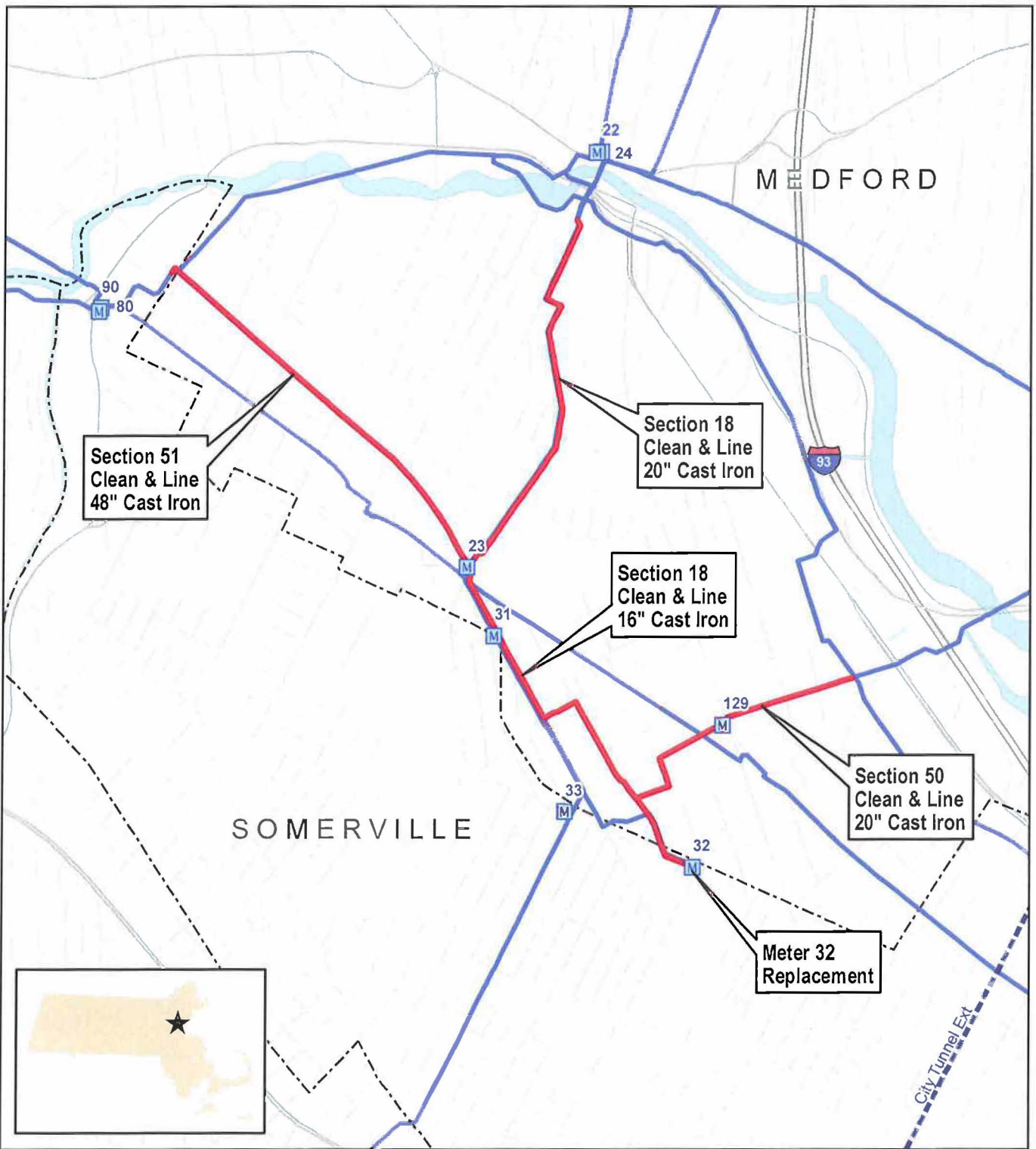


-  Covered Storage
-  Transmission Shafts
-  Transmission Lines
-  Other Existing Water Distribution Pipes
-  Contract 6292
-  Contract 6885
-  Contract 6845
-  Contract 7099

**Figure 1**  
**Southern Spine Water Mains**  
**Rehabilitation Project**

0 1,250 2,500 5,000 Feet



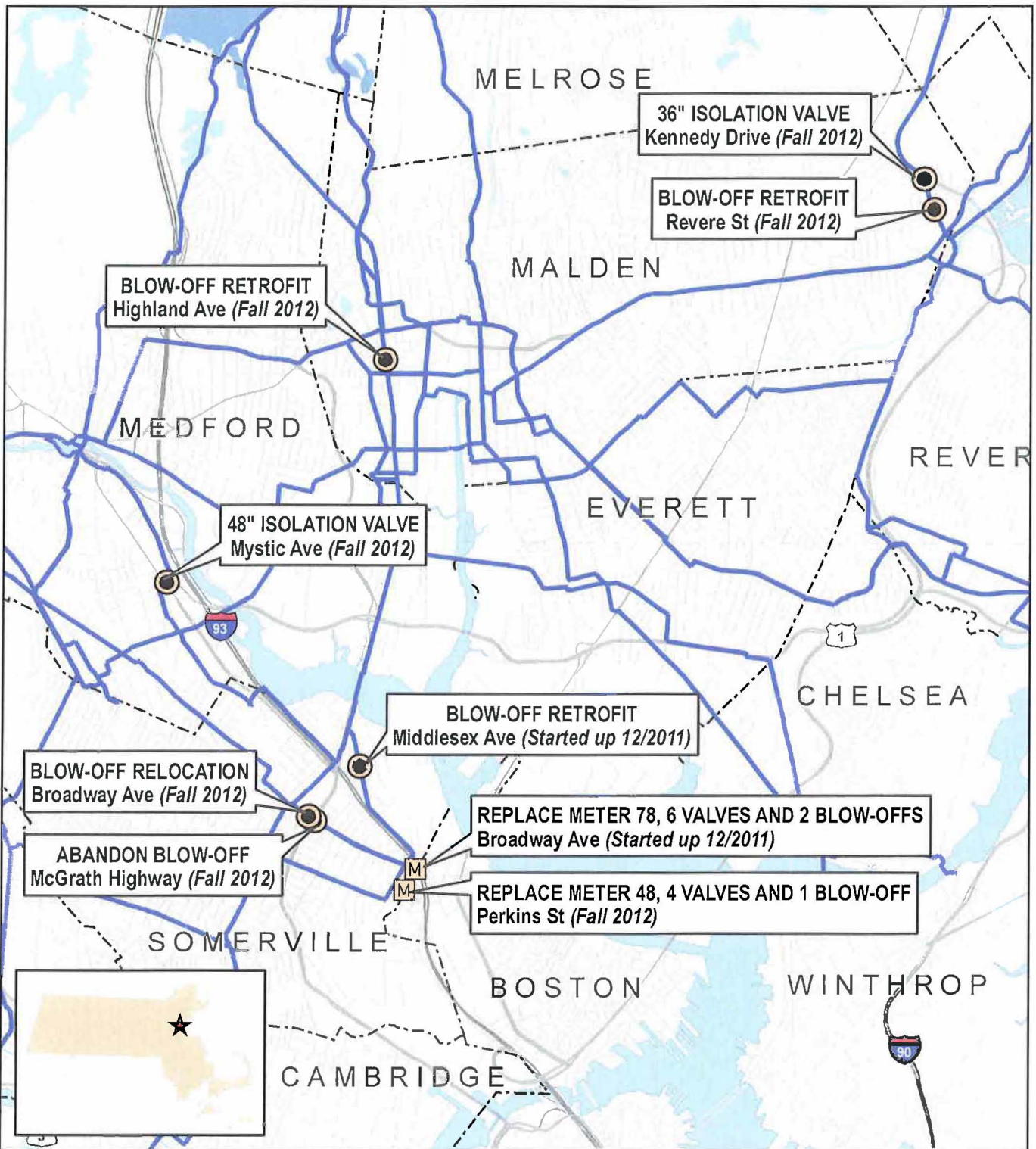



- M Water Meters
- Sections 18, 50, 51
- Other Existing Water Distribution Pipes
- - - Transmission Lines

**Figure 2**  
**Section 18, 50 & 51 Rehabilitation**  
**Contract 6394**

0      750      1,500      3,000 Feet





● Valves - PHASE VII Valve Replacement

■ Meters - Phase VII Valve Replacement

— MWRA Water Distribution Pipes

**Figure 3**  
**Phase VII Valve Replacement**  
**Contract 6436**

0 2,000 4,000 8,000 Feet



W.A.A  
1/18/12

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Hultman Aqueduct Interconnections  
Barletta Heavy Division, Inc.  
Contract 6975




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COMMITTEE: Water Policy & Oversight

INFORMATION  
 VOTE

A. Navanandan, P.E., Director, Construction  
Frank Westberg, P.E. Construction Coordinator  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

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**RECOMMENDATION:**

For Information Only. At the Board meeting, staff will make a power point presentation that will then be attached to the meeting record.


**DISCUSSION:**

On December 14, 2011, the Board approved Change order 19 to activate the Hultman Aqueduct almost one year earlier in manual operation to avoid sole dependence on the MetroWest Tunnel during the 2012 summer peak-demand period. Staff will make a presentation to the Board on the current construction progress and benefits of this and previous accelerations, and the remaining work to be completed.

The presentation will show that the Contractor has made significant construction progress and staff expect that the objective of activating the Hultman and providing two major water feeds to the metropolitan Boston area will be completed prior to the peak summer demand period.

W.B.1  
IV B.2  
1/18/12


**STAFF SUMMARY**

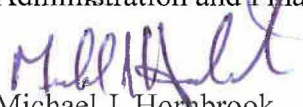
**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services  
Fay, Spofford & Thorndike, LLC  
Contract 7156

COMMITTEE: Water Policy & Oversight

INFORMATION

VOTE

  
Rachel C. Madden, Director  
Administration and Finance

  
Michael J. Hornbrook  
Chief Operating Officer

William G. Sullivan, Design Manager  
Jae R. Kim, Chief Engineer  
Preparer/Title

*This design contract marks the beginning of the next phase of the MWRA's long-term redundancy plan for the transmission system as outlined at the January 13, 2010 Board briefing. This pump station, located adjacent to the CWTP, will address a major weakness in the current redundancy from the Wachusett Reservoir to the Carroll Treatment Plant in Marlborough. When complete, this project combined with the Hultman rehabilitation, will provide complete redundancy for the 25 miles of the transmission system from the Cosgrove Intake in Clinton to Shaft 5 at Route 128 in Weston. The final piece of the plan is to provide redundancy from Shaft 5 to Shaft 7 at Chestnut Hill.*

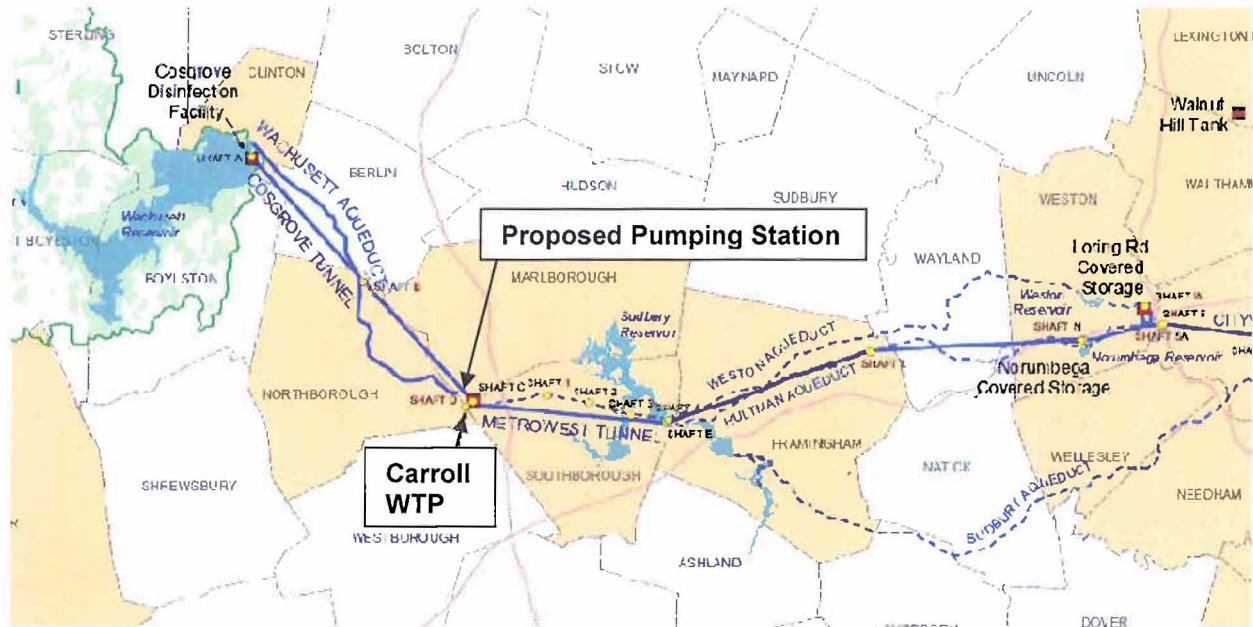
**RECOMMENDATION:**

To approve the recommendation of the Consultant Selection Committee to select Fay, Spofford & Thorndike, LLC to provide design, construction administration, and resident engineering for the Wachusett Aqueduct Pumping Station project, under Contract 7156, and to authorize the Executive Director, on behalf of the Authority, to execute said contract with Fay, Spofford & Thorndike, LLC, in an amount not to exceed \$4,542,283.24, with a contract term of 1,860 calendar days from the Notice to Proceed.

**DISCUSSION:**

The transmission system between Wachusett Reservoir and the John J. Carroll Water Treatment Plant (CWTP) consists of the Cosgrove Tunnel and the Wachusett Aqueduct (see map on the following page). The Cosgrove Tunnel provides the primary raw water supply to the CWTP and the Wachusett Aqueduct is an emergency back-up. Although rehabilitation of the Wachusett

Aqueduct in 2003 allowed its use during a short winter duration so that the Cosgrove Tunnel could be connected to the CWTP, it is limited in its flow capacity and it cannot meet the grade line requirements of the CWTP in the event of an emergency.



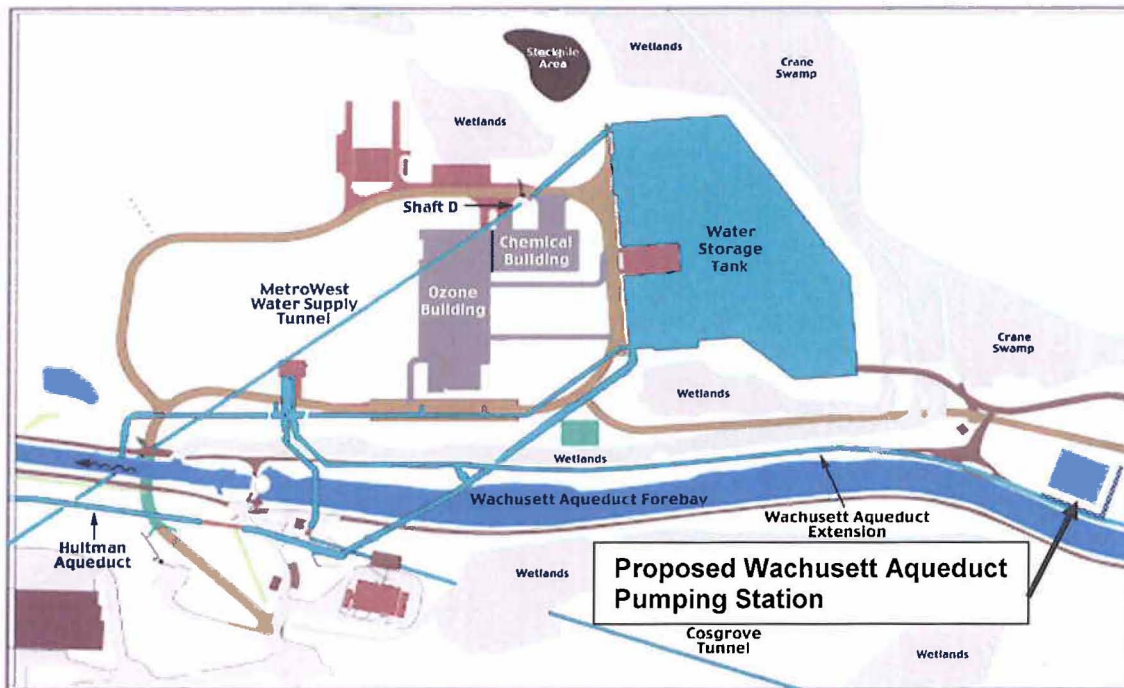
Since the Wachusett Aqueduct could only deliver at a lower hydraulic grade line than the Cosgrove Tunnel, water cannot flow from it into the CWTP’s ozone contactors without pumping. Water from the Wachusett Aqueduct can flow through the pipes under the CWTP storage tank, but lacks the pressure needed to fill the tank. If the Wachusett Aqueduct were needed in an emergency, the CWTP 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. This would not allow for compliance with drinking water regulations that will go into effect in April 2014.

As staff previously briefed the Board on January 13, 2010, the existing Wachusett Aqueduct with the proposed emergency pumping station could deliver approximately 240 million gallons per day (mgd) of raw water to the CWTP for full treatment. Meeting peak system demand is not possible without pressurizing the Wachusett Aqueduct. This limitation in the capacity of the Wachusett Aqueduct is the reason staff have not recommended a 400 mgd pumping station to match the capacity of the Cosgrove Tunnel. The 240-mgd capacity would allow for unrestricted supply for at least eight months in the lower-demand fall/winter/spring period during a planned or emergency shutdown of the Cosgrove Tunnel. If the Cosgrove Tunnel was out of service during high-demand periods, substantial demand reductions would be required to match the 240-mgd capacity of the Wachusett Aqueduct, including mandatory restrictions on outdoor use and limiting supply to some partial user communities.

Once completed, this new pumping station will allow the Wachusett Aqueduct to provide redundancy for the Cosgrove Tunnel. Completion of the ongoing Hultman Aqueduct

rehabilitation and interconnections project will provide redundancy for the MetroWest Water Supply Tunnel. Together, these projects will provide treated water transmission redundancy from Wachusett Reservoir to metropolitan Boston.

The location of the proposed Wachusett Aqueduct Pumping Station is shown in the figure below.



### Procurement Process

Staff utilized a two-step Request for Qualifications and Request for Proposals process. Qualifications statements were received on August 26, 2011 from AECOM Technical Services, Inc., Camp Dresser & McKee Inc., Fay, Spofford & Thorndike, LLC, and Hazen and Sawyer, P.C. The Selection Committee evaluated and ranked each firm’s statement of qualifications using the following criteria and weights: Qualifications/Key Personnel – 35 points; Past Performance on MWRA Projects – 25 points; Similar Experience/Past Performance on Non-MWRA Projects – 30 points; and Capacity – 10 points. The Selection Committee met on September 13, 2011 to review the qualifications.

The Selection Committee scored and ranked the qualifications statements as follows:

<u>Consulting Firm</u>	<u>Total Points</u>	<u>Rank</u>
Hazen and Sawyer, P.C.	326	1
Camp Dresser & McKee, Inc.	324	2
Fay, Spofford & Thorndike, LLC	313	3
AECOM Technical Services, Inc.	282	4

The Selection Committee determined that Hazen and Sawyer, P.C., Camp Dresser & McKee, Inc. (CDM) and Fay, Spofford & Thorndike, LLC (FST) were the most qualified to meet the technical requirements of the contract. The Selection Committee selected the three most qualified firms - CDM, Hazen and Sawyer, and FST, and invited them to submit proposals.

Proposals were received from all three firms. The Selection Committee met on December 12, 2011 to evaluate and rank the proposals. The proposals were evaluated based on the following criteria and weights: Cost – 40 points; Key Personnel – 30 points; Technical Approach/Organization and Management Approach – 25 points; and Minority and Women-Owned Business Enterprise Participation – 5 points.

The level of effort and costs for the proposals are presented below.

<u>Consulting Firm</u>	<u>Proposed Contract Cost</u>	<u>Level of Effort</u>	<u>Cost per Hour</u>
Fay, Spofford & Thorndike, LLC	\$4,542,283 *	35,261	\$104
Hazen and Sawyer, P.C.	\$5,554,345	42,994	\$110
Camp Dresser & McKee Inc.	\$5,702,222*	43,408	\$110

\*Adjusted by MWRA to correct calculation errors

The Selection Committee then scored and ranked the proposals; the results are presented below:

<u>Consulting Firm</u>	<u>Total Points</u>	<u>Order of Preference*</u> <u>Total Score</u>	<u>Final Ranking</u>
Fay, Spofford & Thorndike, LLC	441	5	1
Hazen and Sawyer, P.C.	407	12	2
Camp Dresser & McKee Inc.	404	13	3

\*Order of Preference represents the sum of the individual Selection Committee members' rankings where the firm receiving the highest number of points is assigned a "1;" the firm receiving the next highest number of points is assigned a "2," and so on.

FST proposed the lowest cost. The Selection Committee was in agreement that FST's proposal reflected a highly experienced team that is familiar with the Wachusett Aqueduct Pumping Station, the MWRA's water transmission system and the Carroll Water Treatment Plant (CWTP). The firm's technical approach was strong and demonstrated a thorough understanding of the project. Staff reviewed the adequacy of the proposed cost and hours with FST. During those discussions, FST demonstrated a thorough understanding of the scope of work. The Selection Committee's opinion was that the hours proposed by FST are low but adequate to complete the work under this contract.

FST has successfully completed many projects for MWRA, including design of the 90-mgd Chestnut Hill Pumping Station, design and hydraulic modeling for the MetroWest Water Supply Tunnel, design of the CWTP Closed Loop Cooling System and the design of the 60-mgd



pumping system inside the existing Gillis Pumping Station. FST is currently providing Technical Assistance Consulting Services for the CWTP. FST's proposed MBE/WBE participation was 7.59 and 10.10, respectively.

Based on the final ranking, the Selection Committee unanimously voted to recommend the award of this contract to FST. In accordance with MWRA's procurement procedures, staff entered into discussions with FST to confirm costs, level of effort, and project management. Based on those discussions, staff are of the opinion that Fay, Spofford & Thorndike, LLC can complete the project for the proposed cost.

**BUDGET/FISCAL IMPACT:**

The cost of this contract is \$4,542,283.24. The FY12 Capital Improvement Program contains \$8,284,000 for Contract 7156. This budget amount was based on a standard percentage of the estimated construction cost before the development of any design details.

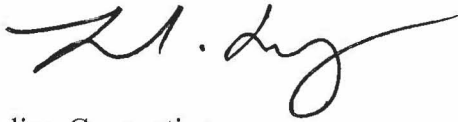
**MBE/WBE PARTICIPATION:**

The minimum participation requirements for this contract are 7.18% for Minority Business Enterprises (MBE) and 5.77% for Women Business Enterprises (WBE). FST's proposal contained a commitment to 7.59% MBE participation and 10.10% WBE participation.

W.C.1  
IV.C.1  
1/18/12

**STAFF SUMMARY**

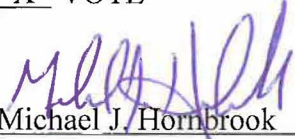
**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director  
**DATE:** January 18, 2012  
**SUBJECT:** Northern Intermediate High, Stoneham-Reading Connection  
Albanese D&S, Inc.  
Contract 7261, Change Order 3



COMMITTEE: Water Policy & Oversight

INFORMATION  
 VOTE

A. Navanandan, P.E., Director, Construction  
Isidoro Perez, Construction Coordinator  
Preparer/Title

  
Michael J. Hornbrook  
Chief Operating Officer

*On December 14, 2011, as part of an informational staff summary concerning police detail rates on this contract, staff informed the Board of several other major construction issues that would result in significant change order items, including asbestos removal associated with an abandoned and unknown electric conduit, additional quantities of rock, realignment of the new 36-inch water main due to an NGRID gas main and NSTAR electric ductbanks, and additional tests pits. Quantities and pricing for these 12 items have now been finalized and this staff summary recommends approval of Change Order 3.*

**RECOMMENDATION:**

To authorize the Executive Director, on behalf of the Authority, to approve Change Order 3 to Contract 7261, Northern Intermediate High, Stoneham-Reading Connection, with Albanese D&S, Inc., for an amount not to exceed \$1,299,545.59, increasing the contract amount from \$2,158,171.31 to \$3,457,716.90, with no increase in contract term.

Further, to authorize the Executive Director to approve additional change orders as may be needed to Contract 7261 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 Stoneham-Reading Interconnection project consists of a 2,200-foot-long, 36-inch-diameter emergency pipeline connection between Stoneham and Reading (see attached map). The pipeline will be available to supply water to Reading through Stoneham's locally owned water system in the event of a failure in the single MWRA pipeline (Section 89) that serves Reading and other communities in the Northern Intermediate High service area. In addition, the

interconnection can also be used to feed water back into Stoneham from Reading if a water main were to break in the Stoneham owned system.

This construction contract has experienced a large total value of change orders, \$1,334,716.90 or 63% of the original contract amount. Out of this 63%, 49% of change order value has been due to unforeseen conditions; 11% has been due to designer errors; and 3% has been due to designer omissions.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery.

### **This Change Order**

This change order consists of the following 12 items (see attached pictures of work related to some of these items:

Excavate and Remove an Additional 1,200 Cubic Yards of Rock \$366,000

The contract documents required bidders to include 650 cubic yards of rock excavation by blasting in their lump sum prices. This quantity was established based on the rock profile which was obtained from nine borings taken on the edge of the roadway and from ground penetrating radar. After commencement of the contract, pre-drilling by the Contractor in the blast areas indicated that the top of rock profile was two to four feet higher than shown in the contract documents. Therefore, the quantity of rock excavation by blasting must be increased. The Schedule of Values carried a unit price of \$240/cubic yard for the 650 cubic yards. The Contractor initially requested a revised unit cost of \$324/cubic yard for the increased quantities but staff negotiated the revised price to \$305/cubic yard for the additional 1,200 cubic yards, based on the actual costs incurred by the Contractor.

The PCO for this work, identified as an unforeseen condition, has been approved. The Design Consultant, Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to an amount not to exceed of \$366,000 for this additional work with no extension to the contract completion date.

Provide Asbestos Abatement Plan; Remove and Dispose of Asbestos Contaminated Soil and Asbestos Electrical Transit Pipe \$265,000

During excavation to install the new 36-inch-diameter pipe along Route 28, the Contractor struck several three-inch asbestos electrical transit pipes from an abandoned lighting system which was not indicated on record drawings. Therefore, the Contractor was required to prepare an asbestos abatement plan for Department of Environmental Protection approval and then remove and dispose of the asbestos transit pipe and surrounding asbestos-contaminated soil.

The PCO for this work, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to an amount not to exceed \$265,000 for this additional work with no extension to the contract completion date.

Increase Allowance for Traffic Control for Change Order Work \$150,000

The contract includes an allowance of \$30,000 for additional traffic control required as a result of change order work. Including invoices received through December 12, 2011, approximately \$80,000 in traffic control costs have been incurred due to change order work, including asbestos pipe removal, additional rock, discovery of a reinforced-concrete sub-base, and realignment of the pipe. There are still a number of outstanding invoices not received yet for completed change order work. Due to the unanticipated wage rates charged by local police and other anticipated change order work such as pavement, curbs, pedestrian ramps and rock, it is necessary to increase this allowance to cover all change order work. Expenditures for police services required for change order work is tracked separately from payments for increased wage rates for police services that were included in the lump sum price.

The PCO for this item, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor agreed to an amount not to exceed of \$150,000 for this additional work with no extension to the contract completion date.

Increase Allowance for Traffic Control – Increase Hourly Rates \$60,000

The Contractor carried \$49,000 in its Schedule of Values for police details for traffic control. All of the work is taking place on state roadways so the Contractor based its bid on a \$40-per-hour-rate for State Police. After commencement of the contract, the State Police indicated that they have an agreement with Stoneham, Reading, and Wakefield that local police will provide traffic control except at the on- and off-ramps of Route 128. The rates being charged for local police services significantly exceed State Police rates. This change order item is in addition to the original \$49,000 carried in the Schedule of Values and is necessary to compensate the Contractor for the difference in hourly rates based on the number of hours carried for traffic control in the contract's Construction Zone Safety Plan.

The PCO for this work, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to an amount not to exceed \$60,000 for this additional work with no extension to the contract completion date.

Increase in Test Pits \$104,367

The contract documents include a unit price bid item of 100 cubic yards for test pits. Due to the conflicts with an NGRID gas main and NSTAR ductbanks, discussed in more detail below, significantly more tests pits were required. Additional test pits also were required to locate the Stonehill Towers water line. Staff anticipate that additional test pits will be required to confirm other rock profiles before the contract work is completed. Therefore, staff recommend that this bid item be increased by 715 cubic yards. The first 15 cubic yards will remain at the same unit price of \$200. Staff have renegotiated a new unit price of \$144.81 for the additional 700 cubic yards.

The PCO for this work, identified as a combination of a design error (285 cubic yards) and an unforeseen condition (430 cubic yards), has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to an amount not to exceed of \$104,367 for this additional work with no extension to the contract completion date.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery for this item.

Abandon Water Line and Hydrant; Install Six-Inch Waterline, Six-Inch Gate Valve and a New Hydrant \$96,240

The contract drawings show a six-inch Reading water line in the wrong location resulting in a direct conflict with the alignment of the new 36-inch water line. The Town of Reading reviewed the drawings during design and indicated that its line was not shown correctly but this error was not corrected prior to bid. The Town of Reading will allow a portion of the six-inch line to be abandoned if an existing hydrant is relocated and a new six-inch line and a new hydrant is installed where there is no longer a conflict.

The PCO for this work, identified as a design error, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$96,240 for this additional work with no extension to the contract completion date.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery for this item.

Realign the 36-inch Water Main and Install Restraint Joint Pipe and Fittings \$53,370.25

Record drawings correctly indicate a 12-inch NGRID gas main within the alignment of the new 36-inch water main. However, the contract drawings do not show the conflict so the 36-inch line had to be realigned. This realignment resulted in a second conflict with an NSTAR ductbank at a different location. The ductbank also was correctly shown on the record drawings. Installation of the water main in the redesigned location would have required more than 100 feet of trench support. Therefore, the Contractor was required to furnish and install additional 36-inch restrained joint pipe to accommodate two 45-degree offsets to avoid the NSTAR ductbank.

The PCO for this work, identified as a design error, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$53,370.25 for this additional work with no extension to the contract completion date.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-

Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery for this item.

Remove and Dispose of Reinforced-Concrete Sub-base Excavation \$52,569.24

During test pits and probe drilling, the Contractor encountered a reinforced-concrete sub-base below the bituminous roadway pavement on Route 28. During initial design, the Consultant only obtained record drawings for the Route 128 Cloverleaf portion of Route 28. However, the Consultant did not obtain the available record drawings for the remainder of Route 28, which indicate the original concrete roadway.

The PCO for this work, identified as a design omission, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$52,569.24 for this additional work with no extension to the contract completion date.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery for this item.

Remove Push-On Pipe and Install Restrained Joint Pipe and Joint Fittings \$50,742

Due to the realignment of the 36-inch water main discussed above and after the Contractor installed 40 feet of push-on pipe, it was discovered that the same NSTAR ductbank mentioned above crossed the trench in a different location than shown on the record drawings, requiring an additional realignment. NSTAR did not Dig Safe this section of ductbank accurately, resulting in the ductbank being hit and damaged by the Contractor, requiring NSTAR to perform repairs at two locations. NSTAR's repairs required the Contractor to remove the push-on pipe that had been installed. The Contractor also had to furnish and install restrained joint pipe to accommodate two 45-degree offsets to avoid the ductbank.

The PCO for this work, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$50,742 for this additional work with no extension to the contract completion date.

Staff will refer this item to MWRA's Law Division for potential cost recovery from NSTAR due to inaccurate Dig Safe markings.

Perform Probe Drilling \$44,671.41

Because the Contractor encountered unanticipated rock at higher elevations than shown on the contract drawings, it was necessary to conduct additional probe drilling to identify the actual location and depth of the top of rock prior to pre-drilling for blasting between the known locations of rock shown on the contract drawings.

The PCO for this work, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$44,671.41 for this additional work with no extension to the contract completion date.

Remove and Replace Existing Guard Rail and Median \$31,080.29

Although the Construction Zone Safety Plan was submitted to the Town of Stoneham, the issue of local egress to the Stonehill Towers apartment complex during blasting was overlooked. After commencement of the contract it was discovered that the blasting restrictions actually blocked egress from the Stonehill Towers and required residents to have extended delays of 30-45 minutes. The Town of Stoneham said this was not acceptable. As a result, it was necessary to remove 50 feet of the existing median and guardrail to allow an opening and temporarily close it after every shift. The Contractor also was required to restore the median and guardrail to its original condition per the MassDOT permit.

The PCO for this work, identified as a design error, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount \$31,080.29 for this additional work with no extension to the contract completion date.

Staff are compiling a list of all change order items that have resulted from an error or omission on the part of the Design Consultant, Dewberry-Goodkind, Inc., and have notified Dewberry-Goodkind, Inc., in writing, of the current status of these findings and of MWRA's intention to seek appropriate cost recovery for this item.

Furnish and Install Two Line Stops and Two Gate Valves \$25,505.40

The contract requires installation of a 12-inch x12-inch x 12-inch tee, gate valve, and couplings to connect the new 36-inch main to Stoneham's water main. In order to install the tee, Stoneham's line must be shut down. During design, Dewberry-Goodkind, Inc. met with Stoneham and advised the town that a shutdown would be required. At that time, the town did not indicate that said shut down would be a problem. During construction, Stoneham indicated that its system could not be shut down due to system constraints. Therefore, the Contractor was required to furnish and install two line stops and two 12-inch gate valves instead of the specified tee, gate valve, and couplings in order to make the connection without shutting down the line. A credit for the specified installation is included in the agreed additional costs.

The PCO for this work, identified as an unforeseen condition, has been approved. Dewberry-Goodkind, Inc., MWRA staff, and the Contractor have agreed to a lump sum amount of \$25,505.40 for this additional work with no extension to the contract completion date.

The Contractor has 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:	\$2,123,000.00	1,420 Days	07/18/11
Change Orders:			
Change Order 1*	\$20,845.47	0 Days	12/22/11
Change Order 2*	\$14,325.84	0 Days	01/10/12
Change Order 3	<u>\$1,299,545.59</u>	<u>0 Days</u>	Pending
Total of Change Orders:	\$1,334,716.90	0 Days	
Adjusted Contract:	\$3,457,716.90	1,420 Days	

\*Approved with delegated authority

If Change Order 3 is approved, the cumulative total value of all change orders to this contract will be \$1,334,716.90 or 63% of the original contract amount. Work on this contract is approximately 82% complete, with final paving and site restoration work scheduled for spring 2012.

**BUDGET/FISCAL IMPACT:**

The FY12 CIP contains a budget of \$2,653,243 for Contract 7261. Including this change order for \$1,334,716.59 the adjusted subphase total is \$3,457,716.90 or \$804,473.90 over budget. This amount will be covered within the five-year spending cap.

**MBE/WBE PARTICIPATION:**

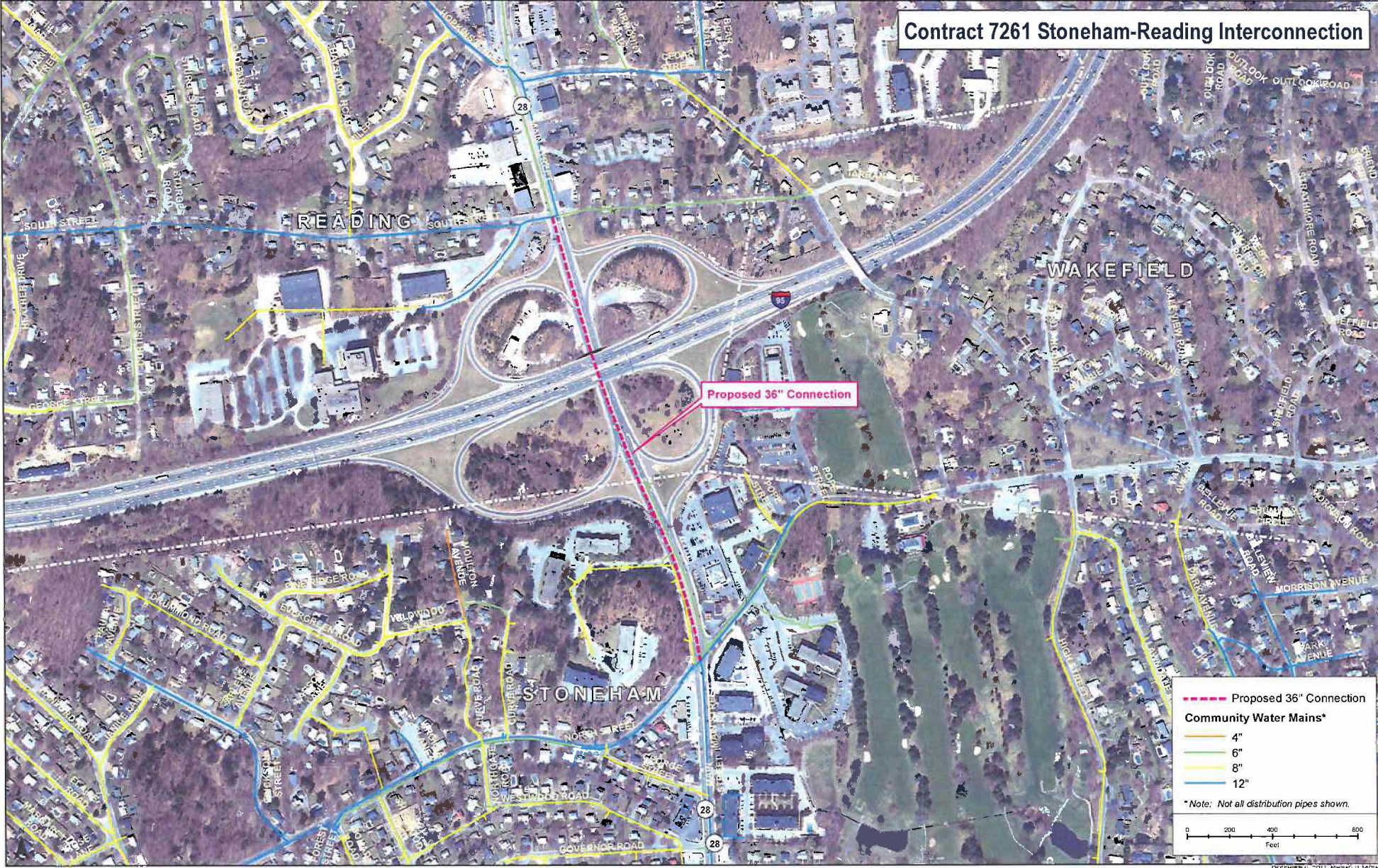
The minimum MBE and WBE participation requirements for this project were established at 5.30% and 4.40%, respectively. The Contractor will be notified that these requirements are expected to be met.

**ATTACHMENTS:**

Aerial Map of Contract 7261 Stoneham-Reading Interconnection Project Site  
Various Pictures of Certain Change Order Item Work



# Contract 7261 Stoneham-Reading Interconnection

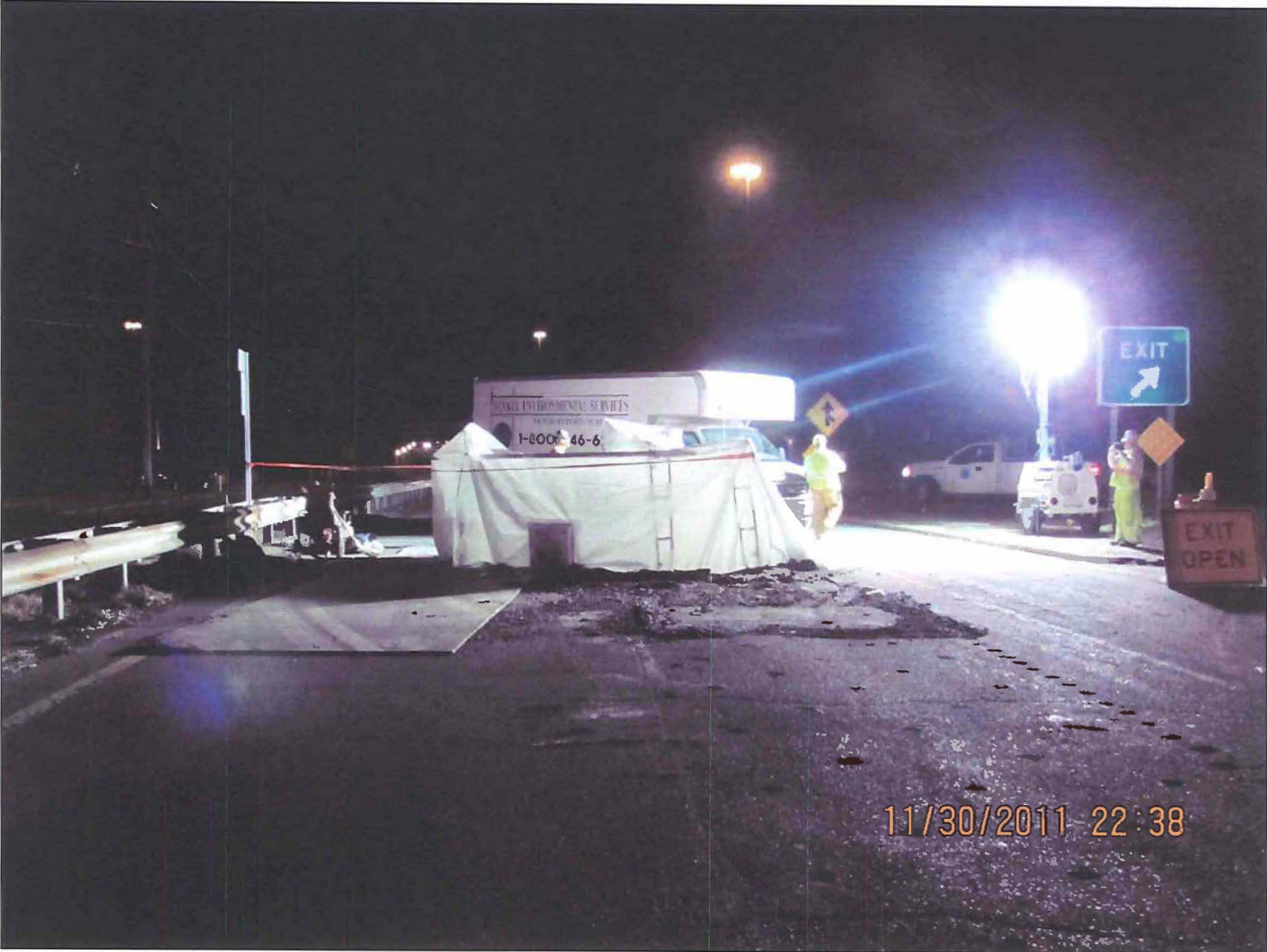




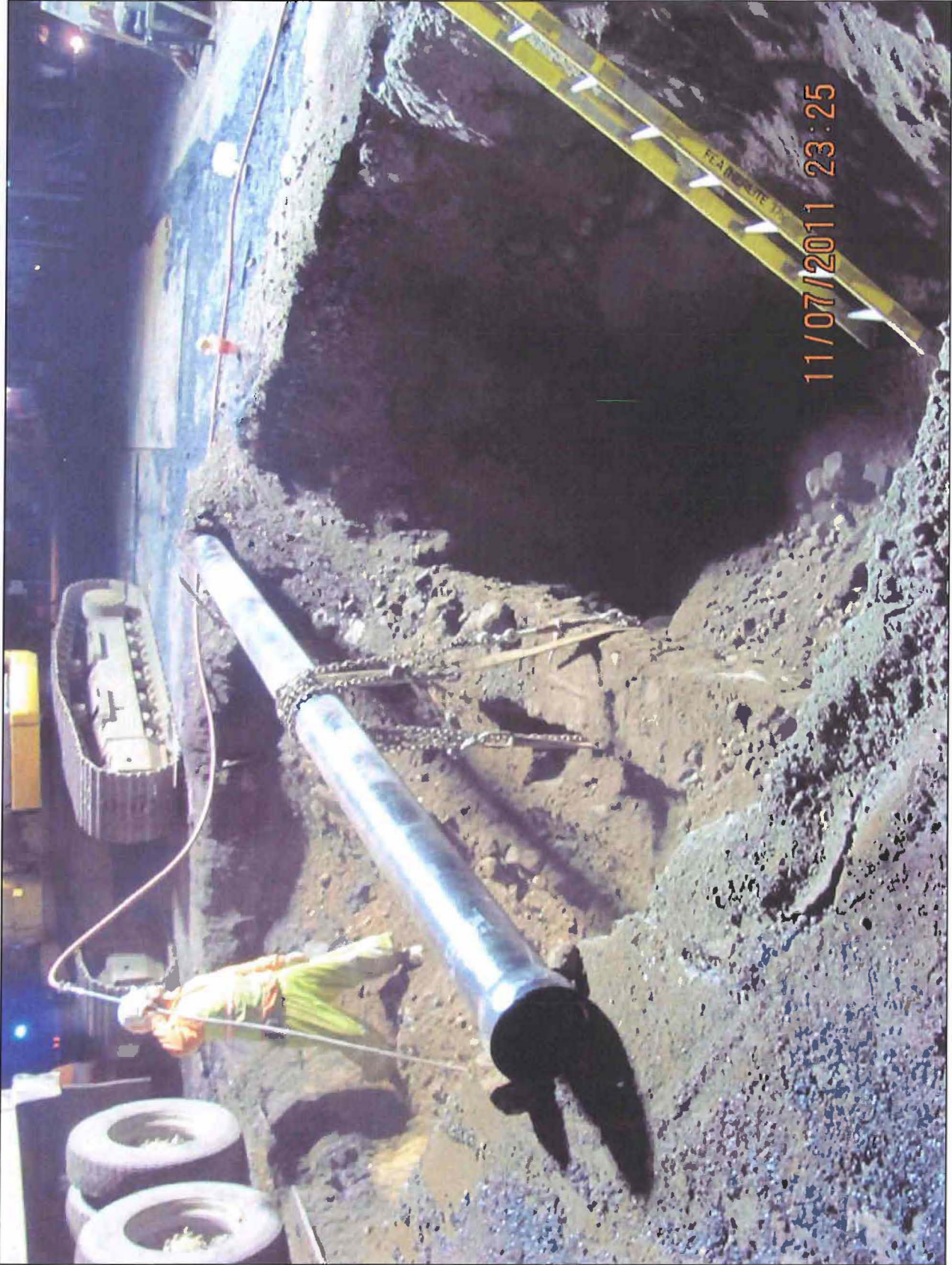
PROVIDE ASBESTOS ABATEMENT PLAN; REMOVE AND DISPOSE OF ASBESTOS  
CONTAMINATED SOIL AND ASBESTOS ELECTRICAL TRANSIT PIPE



PROVIDE ASBESTOS ABATEMENT PLAN; REMOVE AND DISPOSE OF ASBESTOS  
CONTAMINATED SOIL AND ASBESTOS ELECTRICAL TRANSIT PIPE



ABANDON WATER LINE AND HYDRANT; INSTALL SIX-INCH WATERLINE, SIX-INCH GATE VALVE AND NEW HYDRANT




REMOVE AND DISPOSE OF REINFORCED-CONCRETE SUB-BASE EXCAVATION

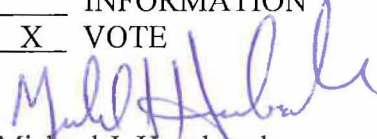


W.C.2  
IV.C.2  
1/18/12

**STAFF SUMMARY**

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** January 18, 2012  
**SUBJECT:** Southern Extra High Distribution Storage and Redundancy Plan  
SEA Consultants, Inc.  
Contract 6452, Amendment 5

COMMITTEE: Water Policy & Oversight

     INFORMATION  
  X   VOTE  
  
Michael J. Hornbrook  
Chief Operating Officer

Mike Rivard, Design Manager  
Jae R. Kim, Chief Engineer  
Preparer/Title

**RECOMMENDATION:**

To authorize the Executive Director, on behalf of the Authority, to approve Amendment 5 to Contract 6452, Southern Extra High Distribution Storage and Redundancy Plan, with SEA Consultants, Inc., increasing the contract term by 12 months, from February 28, 2012 to February 28, 2013, with no increase in contract amount.

**BACKGROUND:**

MWRA's Southern Extra High service area provides water to Canton, Dedham, Norwood, Stoughton, Westwood, portions of Brookline and Milton, and the Roslindale and West Roxbury sections of Boston. The five communities in the southern portion of the service area (Canton, Norwood, Dedham, Westwood, and Stoughton) are served by a single 36-inch-diameter transmission main (Section 77), which is five miles long. Canton and Stoughton are served by a branch (Section 88) off of Section 77. Although several of these communities are partially supplied by MWRA, the loss of this single transmission main would result in a rapid loss of service in Norwood and Canton, and potential water restrictions for Stoughton and Dedham/Westwood.

The Southern Extra High (SEH) service area has been identified as being deficient in distribution storage and lacking redundant distribution pipelines. Correction of these deficiencies has been assigned a Priority One under MWRA's Water Master Plan due to the potential critical threat to public health that could result from a failure in this single transmission main.

In addition, a major goal of system redundancy is to provide a secondary means of supplying the service area that will reduce vulnerabilities and enhance operational flexibility in the event of unforeseen conditions.

On February 7, 2007, the Board approved the award of Contract 6452 to SEA Consultants, Inc. to provide concept planning services for the Southern Extra High Distribution Storage and Redundancy Plan.

**DISCUSSION:**

The study initially included an evaluation of 11 alternatives, which were presented to the Board in January 2009. At that time, staff had not yet selected a preferred alternative and the Board approved staff’s recommendation to extend the contract by 12 months to provide additional time to coordinate with the communities involved and to complete the MEPA Environmental Notification Form.

Since that date, the Board has approved two additional 12-month time extensions to coordinate this project with a larger MWRA study to provide transmission redundancy for the metropolitan tunnel system and to coordinate with the potential expansion of MWRA’s water system to serve the communities of Braintree, Holbrook, and Randolph (also known as “Tri-Town”). A new alternative was developed that would loop from Norwood through Canton, Randolph, and Braintree to Quincy to accommodate potential system expansion to serve the Tri-Town communities.

Staff have met with Braintree, and Randolph, and Holbrook several times over the past years (the most recent meeting with Randolph and Holbrook was held on January 9, 2012) to discuss if there would be any potential for a connection with MWRA’s water system. None of the communities indicated that they have made a final decision on an MWRA option for supply.

After further evaluation of the alternatives, two alternatives remain as possible supply solutions for the SEH system. Alternative 6 does not incorporate the addition of the Tri-Town communities, while Alternative 7 allows for water service to these communities and provides redundancy for MWRA’s existing customers. Alternative 6 (shown in the attached Figure 1) has the lowest initial cost for a redundant pipeline coming from the Bellevue Tanks through West Roxbury and Dedham to connect to Section 77 in the vicinity of East Street at Route 95/128 in Westwood. This option requires additional pipeline construction to access one of the proposed tank sites. Alternative 7 (also shown on Figure 1) requires substantially more pipe up front and requires a pump station. At least one proposed tank site is along the pipeline route. The cost comparison of the two alternatives is presented below.

<b>Routing Option</b>	<b>Length of Pipe in LF</b>	<b>Pipeline Cost</b>	<b>Pump Station Cost</b>	<b>Phase 1 Initial Cost</b>	<b>Tank Cost</b>	<b>Length of Pipe in LF</b>	<b>Future Storage Tank Connection Cost</b>	<b>Phase 2 Future Cost</b>	<b>TOTAL COST</b>
6	26,400	\$29.8	-	\$29.8	\$20.7	18,310	\$19.3	\$40.0	\$69.8
7	51,145	\$54.3	\$12.8	\$67.1	\$20.7	1,270	\$1.3	\$22.0	\$89.1

\* Project Costs are in Millions

\*\* Project Costs include 25% contingency and 20% Engineering



**This Amendment**

The current expiration date for Contract 6452 is February 28, 2012. To allow staff additional time to continue to coordinate with Tri-Town regarding system expansion, staff recommend a contract extension of 12 months. Amendment 5 will not increase the contract amount because the remaining contract budget is sufficient to complete the anticipated remaining work, Environmental Notification Form preparation and filing, and community coordination. Staff plan to return to the Board with a proposed plan at a future meeting.

<b>CONTRACT SUMMARY:</b>	<u>Amount</u>	<u>Time</u>	<u>Dated</u>
Original Contract:	\$840,072	548 Days	02/27/07
Amendment 1*	\$0.00	182 Days	10/16/08
Amendment 2:	\$0.00	365 Days	01/14/09
Amendment 3:	\$0.00	365 Days	02/10/10
Amendment 4:	\$0.00	365 Days	12/14/11
Proposed Amendment 5:	<u>\$0.00</u>	<u>365 Days</u>	Pending
Adjusted Contract Amount:	\$840,072	2,190 Days	

\*Approved under delegated authority

**BUDGET/FISCAL IMPACT:**

The FY12 CIP includes a budget of \$840,072 for Contract 6452. Amendment 5 is for a time extension only and will have no budgetary impact.

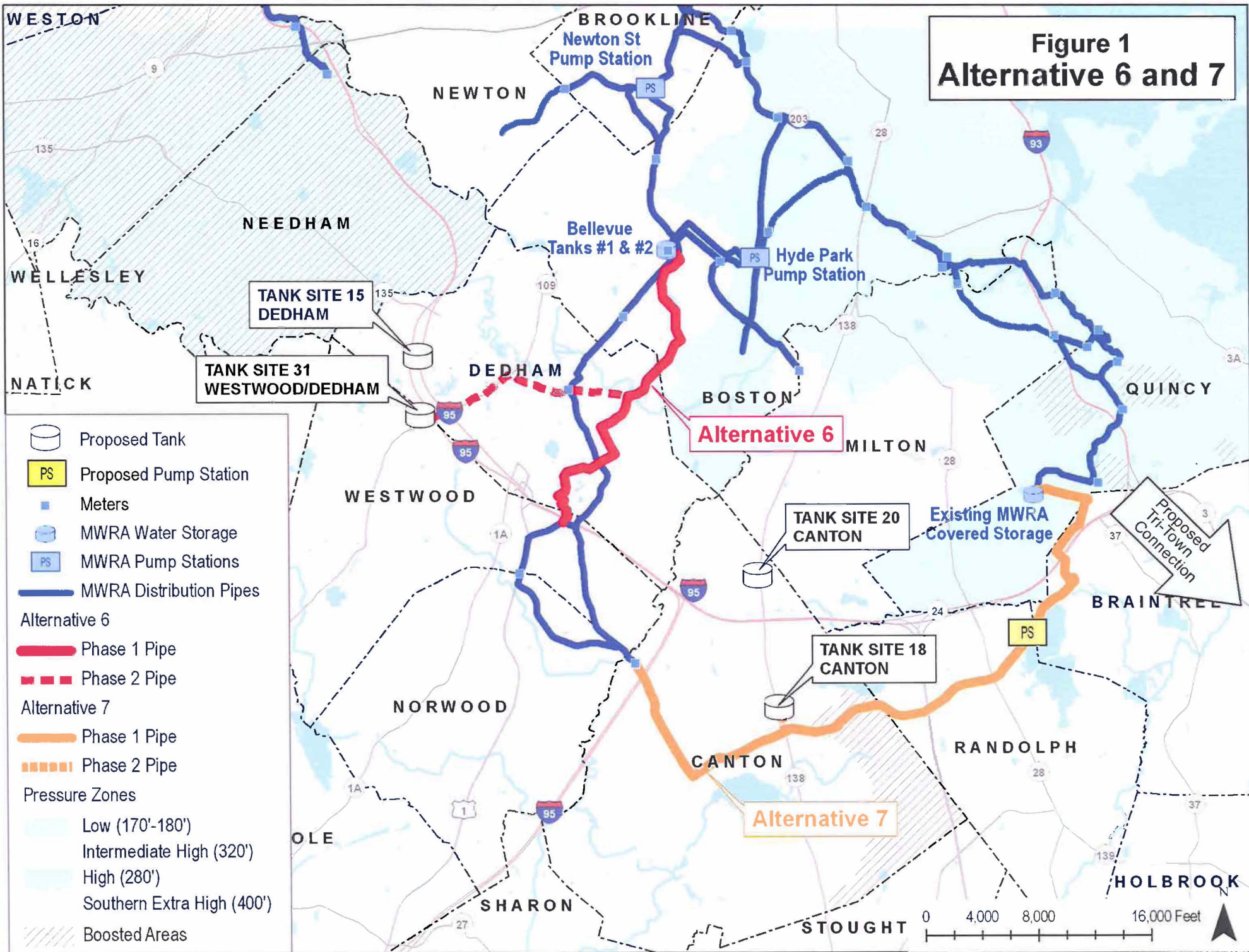
**MBE/WBE PARTICIPATION:**

The MBE and WBE participation requirements for this contract were established at 7.18% and 5.77%, respectively. These requirements will remain unchanged by this amendment.

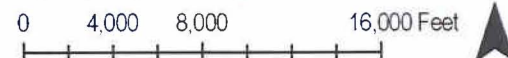
**ATTACHMENT:**

**Figure 1, Alternative 6 and 7**

**Figure 1  
Alternative 6 and 7**



- Proposed Tank
- Proposed Pump Station
- Meters
- MWRA Water Storage
- MWRA Pump Stations
- MWRA Distribution Pipes
- Alternative 6**
- Phase 1 Pipe
- Phase 2 Pipe
- Alternative 7**
- Phase 1 Pipe
- Phase 2 Pipe
- Pressure Zones**
- Low (170'-180')
- Intermediate High (320')
- High (280')
- Southern Extra High (400')
- Boosted Areas





# MASSACHUSETTS WATER RESOURCES AUTHORITY

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

Frederick A. Laskey  
Executive Director

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*Chairman:* R. Sullivan  
*Vice-Chair:* J. Carroll  
*Secretary:* J. Foti  
*Board Members:*  
J. Barrera  
K. Cotter  
M. Gove  
J. Hunt  
V. Mannering  
A. Pappastergion  
M. Turner  
J. Walsh

## **BOARD OF DIRECTORS' MEETING**

to be held on

Wednesday, January 18, 2012

Location: \*MWRA Chelsea Facility\*  
2 Griffin Way – Muster Room  
Chelsea, MA

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. Fiscal Year 2012 Defeasance Account (ref. AF&A B.1)
  - B. **Contract Awards**
    1. Management, Operation and Maintenance of the Union Park Pump Station/CSO Facility and the Unmanned Stations: Woodard & Curran, Inc., Contract S506 (ref. WW B.1)
    2. Wachusett Aqueduct Pumping Station Design, Construction Administration and Resident Inspection Services: Fay, Spofford & Thorndike, LLC, Contract 7156 (ref. W B.1)

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\*NOTE DIFFERENT MEETING LOCATION; DIRECTIONS FOLLOW AFTER BOARD AGENDA.

**C. Contract Amendments/Change Orders**

1. Stoneham-Reading Connection: Albanese D&S, Contract 7261, Change Order 2 (ref. W C.1)
2. Southern Extra High Distribution Storage and Redundancy Plan: SEA Consultants, Inc., Contract 6452, Amendment 5 (ref. W C.2)

**V. CORRESPONDENCE TO THE BOARD**

**VI. OTHER BUSINESS**

**VII. EXECUTIVE SESSION**

A. Litigation

1. Release of Executive Session Minutes

B. Real Estate

1. Watershed Land Acquisition Approval

**VIII. ADJOURNMENT**