Update on Invasive Aquatic Plant Management at MWRA Reservoirs

February 19, 2020
Aquatic Invasive Plants Under Control And Their Removal Methods

Control methods:
- Diver Assisted Suction Harvesting (EWM, VLM, FW)
- Diver Hand Harvesting (VLM)
- Manual Harvesting from Boat and Shoreline (WC)
- Winter Drawdown (EWM)
- Fragment Barriers (VLM, EWM, FW)
Where Invasive Plants Control Efforts Are Underway In MWRA System

Legend
- MWRA Water Communities
- MWRA Reservoirs
- Major Roads

No invasive plants
Wachusett Reservoir
Ware River
Sudbury Reservoir
Foss Reservoir
Fells Reservoir
Spot Pond
Weston Reservoir
Norumbega Reservoir
Chestnut Hill Reservoir
Quabbin Reservoir
Wachusett Reservoir Has The Heaviest Level Of Effort For Aquatic Invasive Plants Control
• Catalog plant communities; compare to prior year surveys

• Immediate notification of new aquatic invasives

• Identify new threats in geographic proximity
Suctioned plants (EWM) emerge on screen

Suctioned plants include roots
Total Gallons Invasive Plants Removed from Stillwater Basin
2013 - 2019

<table>
<thead>
<tr>
<th>Year</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>316,841</td>
</tr>
<tr>
<td>2014</td>
<td>122,711</td>
</tr>
<tr>
<td>2015</td>
<td>67,780</td>
</tr>
<tr>
<td>2016</td>
<td>47,480</td>
</tr>
<tr>
<td>2017</td>
<td>6,071</td>
</tr>
<tr>
<td>2018</td>
<td>1,340</td>
</tr>
<tr>
<td>2019</td>
<td>1,250</td>
</tr>
</tbody>
</table>

Days: 0, 20, 40, 60, 80, 100, 120, 140

Gallons: 0, 50,000, 100,000, 150,000, 200,000, 250,000, 300,000, 350,000
Pre-harvest – June 24  
Post-harvest – August 7
Native Urticularia (bladderwort) and native naiad

Native P. robbinsii (front), native Naiad (back)

It's getting harder to find the invasive plants among abundant returned native plants.
Variable Leaf Milfoil

Locations of Variable Leaf Milfoil in MWRA system:

- Wachusett Reservoir:
  - Hastings Cove
  - Hidden Cove
  - Carville Basin
  - Quinapoxet Basin

- Quabbin Reservoir upstream settling basins

- Ware River/Shaft 8 Intake Pool
Wachusett Variable Leaf Milfoil Removal Efforts

Variable Milfoil Removed from Hastings Cove

- Number of VM Plants
- Diver Hours

Variable Milfoil Removed from Carville Basin

- Number of VM Plants
- Diver Hours

Variable Milfoil Removed from Hidden Cove

- Number of plants

Data for the years 2013 to 2019 is presented in the diagrams.
Quinapoxet Basin Variable Leaf Milfoil

Quabbin interflow

Variable Milfoil
Dried-out Variable Milfoil on river bed manually removed down to roots.
Quabbin – Deployment Of Fragment Barriers At Settling Ponds For Variable Leaf Milfoil
In 2008, dense mats and mature plants with many nuts required mechanical control.

Today, control efforts = hand removal by boat of scattered small plants.
Foss Reservoir – Winter Drawdown For Eurasian Milfoil Control

- Live Eurasian Milfoil underwater
- Dead, frozen Eurasian Milfoil
- Small test hole to check freeze depth
Chestnut Hill Reservoir – Dual Approach Has Resulted In Reduction Of Aquatic Invasive Plants

- Recently exposed Eurasian Milfoil
- Winter drawdown to freeze and desiccate plants and roots.
- Mechanical harvest of dense Eurasian Milfoil
Report on 2019 Water Use Trends and Reservoir Status

February 19, 2020
Total Consumption by MWRA Communities (1980 to 2019)

2019 -- 180.57 mgd
Boston Water Use (1900 to 2019)

2019 average = 62.13 mgd
Daily System Demand

- **Max Day:** 277.65 mgd
- **Xmas:** 143.66 mgd

Graph showing system demand with peaks indicating daily usage over time.
Fully Supplied Communities Demand (2000 to 2019)

Seasonal demand
Base (or indoor) demand
Fully Supplied Communities (Annual Base and Outdoor Use)
Reservoir Withdrawals – 5-Year Running Average

5-year average withdrawal = 201.6 mgd
Quabbin Reservoir Volume

Yearly Volume Graph:
- Normal
- Below Normal

2018: Black line
2019: Red line
2020: Purple line

Legend:
- 80
- 85
- 90
- 95
- 100
- 105

X-axis: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
Y-axis: % Full

Graph shows the reservoir volume changes from January to December for three different years.
Chloride in MWRA Reservoirs and Steps to Mitigate Water Quality Impacts

February 19, 2020
Background

- Rising chloride concentrations observed throughout Northeast US
- Road salt run-off enters reservoirs through rivers, streams and aquifer
- Chlorides increase the corrosivity of water and threaten aquatic life
Rising Chloride Levels in MWRA Reservoirs

Chloride in MWRA Reservoirs

- Wachusett
- Quabbin
• Documented increase in specific conductance (surrogate for chloride) in Wachusett tributaries

• Gates Brook has the highest concentrations
## Annual Salt Application – Wachusett Watershed

<table>
<thead>
<tr>
<th>Town</th>
<th>Estimated Salt Use (tons)</th>
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<tbody>
<tr>
<td>Boylston</td>
<td>993</td>
</tr>
<tr>
<td>Holden</td>
<td>2,198</td>
</tr>
<tr>
<td>Paxton</td>
<td>301</td>
</tr>
<tr>
<td>Princeton</td>
<td>1,803</td>
</tr>
<tr>
<td>Rutland</td>
<td>947</td>
</tr>
<tr>
<td>Sterling</td>
<td>1,025</td>
</tr>
<tr>
<td>West Boylston</td>
<td>3,722</td>
</tr>
<tr>
<td>Worc/Clint/Leom</td>
<td>700</td>
</tr>
<tr>
<td>MassDOT</td>
<td>4,093</td>
</tr>
<tr>
<td>DCR DWSP</td>
<td>35</td>
</tr>
<tr>
<td>Parking lots</td>
<td>2,522</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>&gt;18,000 tons</strong></td>
</tr>
</tbody>
</table>

*Source: DCR*
Proper salt application
  – In November, MWRA funded a one-day training for watershed community DPW Staff on best practices for salt application
  – Investigate grant opportunities to replace inefficient salt application equipment

Research to predict road salt inputs and impacts
  – DCR/UMass Amherst collaboration
  – MWRA investigating corrosivity impacts on distribution system
Increased monitoring of chloride inputs in reservoir

- DCR to install real-time data loggers across the watershed
- DCR to track chloride inputs from ground water and tributaries
- MWRA will continue routine sampling for chlorides in raw and finished water
Board of Directors Report

Key Indicators of MWRA Performance

for Second Quarter FY2020

Frederick A. Ladd, Executive Director
David Copps, Chief Operating Officer
February 18, 2020
Metro Boston Levels

Min Max Quarterly Results for HAA5

CVA Results

Min Max Quarterly Results for HAA5

MCL Limit for LRAA

HAA5 (ug/L) min result of all sites
HAA5 (ug/L) max result of all sites
LRAA Max based on 33 quarterly results

HAA5 (ug/L) min result of all sites
HAA5 (ug/L) max result of all sites
LRAA Max based on 15 quarterly results

MCL Limit for LRAA
Natural Organic Matter Levels in Reservoirs

UV 254
Reservoir Source Water Grab Data

- Wachusett
- Quabbin

<table>
<thead>
<tr>
<th>Month</th>
<th>Wachusett</th>
<th>Quabbin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec-18</td>
<td>0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>Mar-19</td>
<td>0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>Jun-19</td>
<td>0.12</td>
<td>0.06</td>
</tr>
<tr>
<td>Sep-19</td>
<td>0.10</td>
<td>0.04</td>
</tr>
<tr>
<td>Dec-19</td>
<td>0.08</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Clinton Wastewater Treatment Plant NPDES Flow Compliance

Monthly Average Flow

- Measured Flow (FY20)
- Measured Flow (FY19)
- Rolling Average Flow

Rolling average limit

- mgd
Maintenance Kitting

- Items Kitted Goal
- Items Kitted

Graph showing the percentage of items kitted from July to June.
Occupational Health and Safety at MWRA

February 19, 2020
- OSHA safety for public sector employees – February 1, 2019
- Strictly adhering to recordkeeping regulations likely to cause an increase in recorded injuries and illnesses as compared to previous years, but not necessarily an increase in injuries
- Differences in the Workman’s Comp Standards account for some of the differences
- The rise on the chart should start to stabilize as new data replaces old data
- One bad month or one good month can affect the chart
OSHA Safety for Public Sector Employees
Highlights of Updated Law G.L. c. 149, § 6 ½

- Increased requirements on injury reporting and record keeping
  Emphasis on accident reporting and investigation

- Incident investigations internal to MWRA and potentially DLS
  Incident Investigation with Root Cause analysis followed by corrective actions

- Implement Corrective Actions
  Follow through with corrective actions and develop tool box talks to create a learning moment
How does OSHA define a recordable injury or illness?

• Any work related fatality
• Injury that results in loss of consciousness
• Days away from work
• Restricted work, or job transfer

• Medical treatment beyond first aid
• Chronic irreversible diseases
• Cancer
• Cracked teeth or bones
• Punctured eardrums
Why are we seeing an increase in recorded injuries while following OSHA?

- Lost time is any work related injury requiring a day or more away from work to recover
  - Workman’s Comp is Lost time after 5 days away
- New medical info days to years later can require an injury to be recorded
  - Cases where surgery is delayed or treatment plans are not working become recordable
- Employee is given a prescription strength medication while at the emergency room
  - Prescription strength medication is considered more than First Aid. If a medicine is given at the time of visit or if a prescription is written and not filled, the case is still recordable
**Injury Reporting - OSHA 300 Log**

### OSHA's Form 300
#### Log of Work-Related Injuries and Illnesses

You must record information about each work-related injury or illness that results in lost work time, restricted work activity, or job transfer. Any time the work is not compensated by absence or leaves of employees, you must also record work-related injuries and illnesses that result in a recordable injury or illness, as defined in paragraph (a) of this form. The injury or illness is recordable if it meets any of the criteria defined in 29 CFR 1904.7. You must investigate each incident to determine the root cause of the incident. You must complete an initial incident report (OSHA 304A) or equivalent form for each injury or illness reported on this form. You must not investigate an incident that is recordable, and you must OSHA 300 Log.

### Investigate

- [x] Investigate

### Learn

- [x] Learn

### Trend

- [x] Trend

### Correct

- [x] Correct
<table>
<thead>
<tr>
<th>Culture</th>
<th>Safety Training</th>
<th>Audits/Inspection</th>
<th>Investigations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee engagement</td>
<td>Provide skills needed</td>
<td>Facility walks</td>
<td>Injury investigation</td>
</tr>
<tr>
<td>Management commitment</td>
<td>Invest the time</td>
<td>Job safety reviews</td>
<td>Near miss investigation</td>
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<tr>
<td>Safety committees</td>
<td>Constantly evaluate needs</td>
<td>Employee concerns</td>
<td>Develop Corrective Actions</td>
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<tr>
<td>Follow policy and procedures</td>
<td>Future incident prevention</td>
<td>Internal audit</td>
<td>Follow through with fixes</td>
</tr>
<tr>
<td>See Something/ Say Something</td>
<td>Toolbox talks</td>
<td></td>
<td>Share with employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Review injury trends</td>
</tr>
</tbody>
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**Safety Focus Areas**

**WORKPLACE SAFETY**

*January 2020*

**Recordable Injury & Illness Rates**
MWRA Fiscal Year 2021
Proposed Current Expense Budget

February 19, 2020
Objective: Sustainable and predictable assessments by applying a multi-year rates management strategy.
• Capital Finance Expenses
• Existing Expenses and Revenue – Inflation, Changes
• Long-Term Liabilities
Ways to address the Debt Service challenge

- Defeasance
- Refundings
- Use of Reserves
  - Rate Stabilization Fund
  - Bond Redemption Fund
- Tactical Issuance – Repayment Structure
- Control Capital Spending
- Strategic Use of Current Revenue/Capital Funding
Actual and Forecasted Rate Revenue Changes

MWRA Combined Utilities
Historical and Projected Rate Revenue Changes

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Actual</th>
<th>Projected</th>
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<tbody>
<tr>
<td>FY16</td>
<td>3.4%</td>
<td>3.6%</td>
</tr>
<tr>
<td>FY17</td>
<td>3.3%</td>
<td>3.3%</td>
</tr>
<tr>
<td>FY18</td>
<td>3.2%</td>
<td>3.0%</td>
</tr>
<tr>
<td>FY19</td>
<td>3.1%</td>
<td>3.0%</td>
</tr>
<tr>
<td>FY20</td>
<td>3.1%</td>
<td>2.9%</td>
</tr>
<tr>
<td>PFY21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY23</td>
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<tr>
<td>FY24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Actual and Forecasted Rate Revenue Changes by Utility

<table>
<thead>
<tr>
<th></th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
<th>FY19</th>
<th>FY20</th>
<th>PFY21</th>
<th>FY22</th>
<th>FY23</th>
<th>FY24</th>
<th>FY25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1.4%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.1%</td>
<td>3.6%</td>
<td>3.9%</td>
<td>3.9%</td>
<td>3.9%</td>
<td>3.9%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Sewer</td>
<td>7.7%</td>
<td>3.3%</td>
<td>3.0%</td>
<td>3.1%</td>
<td>2.8%</td>
<td>3.5%</td>
<td>3.0%</td>
<td>2.5%</td>
<td>2.5%</td>
<td>2.3%</td>
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</tbody>
</table>

**MWRA Water & Sewer Utilities**

**Historical and Projected Rate Revenue Changes**

- **Actual Revenue Changes**
  - FY16: 7.7%
  - FY17: 3.5%
  - FY18: 3.5%
  - FY19: 3.1%
  - FY20: 3.6%

- **Projected Revenue Changes**
  - PFY21: 3.9%
  - FY22: 3.9%
  - FY23: 3.9%
  - FY24: 3.9%
  - FY25: 3.9%

**Note:** The chart above illustrates the historical and projected rate revenue changes for water and sewer utilities from FY16 to FY25.
CEB Budget Structure

- Direct Expenses
- Indirect Expenses
- Capital Finance Expenses
- Non-Rate Revenue
- Rate Revenue

ATTACHMENT A
FY21 Proposed Budget vs FY20 Approved Budget

<table>
<thead>
<tr>
<th>EXPENSES</th>
<th>FY20 Actuals</th>
<th>FY20 Approved Budget</th>
<th>FY21 Proposed Budget</th>
<th>Change FY21 Proposed Budget vs FY20 Approved Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAGES AND SALARIES</td>
<td>$102,311,904</td>
<td>$109,913,463</td>
<td>$113,879,999</td>
<td>$3,966,536 (3.6%)</td>
</tr>
<tr>
<td>OVERTIME</td>
<td>$5,026,556</td>
<td>$4,800,985</td>
<td>$5,076,206</td>
<td>$275,221 (5.6%)</td>
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<tr>
<td>FRINGE BENEFITS</td>
<td>$8,982,221</td>
<td>$8,717,553</td>
<td>$9,467,274</td>
<td>$751,721 (8.4%)</td>
</tr>
<tr>
<td>WORKER COMPENSATION</td>
<td>$2,172,598</td>
<td>$2,354,209</td>
<td>$2,476,605</td>
<td>$122,396 (5.2%)</td>
</tr>
<tr>
<td>CORROSION</td>
<td>$69,999</td>
<td>$63,840</td>
<td>$63,622</td>
<td>$218 (0.3%)</td>
</tr>
<tr>
<td>ENERGY AND UTILITIES</td>
<td>$24,446,788</td>
<td>$24,645,796</td>
<td>$25,741,081</td>
<td>$1,095,285 (4.4%)</td>
</tr>
<tr>
<td>MAINTENANCE</td>
<td>$39,855,570</td>
<td>$32,928,954</td>
<td>$32,818,589</td>
<td>($108,365) (-0.3%)</td>
</tr>
<tr>
<td>TRAINING AND MEETINGS</td>
<td>$468,988</td>
<td>$564,564</td>
<td>$512,344</td>
<td>($52,220) (-9.2%)</td>
</tr>
<tr>
<td>PROFESSIONAL SERVICES</td>
<td>$6,194,761</td>
<td>$3,291,515</td>
<td>$8,777,283</td>
<td>$5,485,768 (166.1%)</td>
</tr>
<tr>
<td>OTHER MATERIALS</td>
<td>$4,687,854</td>
<td>$6,867,269</td>
<td>$7,809,071</td>
<td>$941,783 (13.2%)</td>
</tr>
<tr>
<td>OTHER SERVICES</td>
<td>$21,792,390</td>
<td>$24,637,210</td>
<td>$24,675,158</td>
<td>$201,948 (0.8%)</td>
</tr>
<tr>
<td>TOTAL DIRECT EXPENSES</td>
<td>$333,660,707</td>
<td>$344,327,071</td>
<td>$355,163,280</td>
<td>$10,836,209 (3.2%)</td>
</tr>
</tbody>
</table>

| INSURANCE | $2,748,983 | $2,631,222 | $3,019,218 | $380,996 (14.5%) |
| WATER/SEWER PILOT DEBT | $24,143,008 | $26,815,600 | $26,311,200 | ($504,400) (-1.9%) |
| MORTGAGE PAYMENT | $1,391,960 | $4,425,516 | $2,715,250 | $275,804 (10.1%) |
| RETIREMENT FUND | $1,881,397 | $2,954,266 | $2,333,728 | $80,784 (3.4%) |
| POSTEMPLOYMENT BENEFITS | $7,000,000 | $7,315,000 | $11,000,000 | $3,685,000 (50.4%) |
| TOTAL INDIRECT EXPENSES | $13,422,093 | $30,950,497 | $27,847,809 | ($3,102,688) (-10.0%) |

| STATE REVOLVING FUND | $87,127,800 | $97,831,382 | $50,013,867 | ($47,817,515) (-49.3%) |
| SRP/SPRING STEEL | $281,647,791 | $282,289,609 | $273,979,833 | $7,309,776 (2.6%) |
| SUBORDINATE DEBT | $44,714,872 | $44,923,984 | $71,496,224 | $26,582,242 (59.0%) |
| LOCAL WATER PIPELINE CP | $2,340,172 | $4,584,027 | $5,068,084 | ($483,057) (-10.5%) |
| CURRENT REVENUE CAPITAL | $12,200,000 | $14,200,000 | $1,900,000 | ($12,300,000) (-86.4%) |
| CAPITAL LEASE | $3,373,000 | $3,373,000 | $2,310,000 | ($1,063,000) (-31.6%) |
| DEBT PREPAYMENT | $3,100,000 | $5,000,000 | $5,961,000 | $961,000 (19.2%) |
| DEBT SERVICE ASSISTANCE | $18,592,989 | $10,199,989 | $10,000,000 | ($199,989) (-1.9%) |
| TOTAL DEBT SERVICE | $48,571,753 | $49,886,599 | $59,911,820 | $10,025,221 (20.4%) |
| TOTAL EXPENSES | $888,466,261 | $982,248,420 | $1,046,479,954 | $64,231,534 (6.5%) |

<table>
<thead>
<tr>
<th>REVENUE &amp; INCOME</th>
<th>FY20 Actuals</th>
<th>FY20 Approved Budget</th>
<th>FY21 Proposed Budget</th>
<th>Change FY21 Proposed Budget vs FY20 Approved Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATE REVENUE</td>
<td>$139,042,200</td>
<td>$789,386,000</td>
<td>$789,386,000</td>
<td>$0.00 (0.0%)</td>
</tr>
<tr>
<td>OTHER USER CHARGES</td>
<td>$8,358,469</td>
<td>$9,218,452</td>
<td>$8,948,728</td>
<td>($270,006) (-3.0%)</td>
</tr>
<tr>
<td>OTHER REVENUE</td>
<td>$4,947,078</td>
<td>$5,781,022</td>
<td>$5,812,862</td>
<td>$31,840 (0.5%)</td>
</tr>
<tr>
<td>RATE STABILIZATION</td>
<td>$14,947,573</td>
<td>$5,559,873</td>
<td>$2,130,784</td>
<td>($3,428,089) (-61.8%)</td>
</tr>
<tr>
<td>TOTAL REVENUE &amp; INCOME</td>
<td>$702,243,580</td>
<td>$802,248,420</td>
<td>$816,471,094</td>
<td>$14,222,674 (1.7%)</td>
</tr>
</tbody>
</table>

Rate Revenue Increase over FY20: 6.5%
FY21 Proposed Current Expense Budget (CEB)

FY21 Proposed Current Expense Budget

- Direct Expense: $255.0 (31%)
- Indirect Expense: $57.6 (7%)
- Capital Financing: $504.0 (62%)
**CEB Budget Highlights – Direct Expenses**

### Direct Category

**($s in millions)**

- **Personnel Costs**: Increase of $4.8 million or 3.5% over FY20. FY21 includes 5 additional positions for the Tunnel Redundancy Program and a 6% increase to Health Insurance premiums.
- **Maintenance**: Decrease of $0.1 million or 0.3% from FY20. Operations maintenance is essentially level-funded in FY21 (increase of 0.4% over FY20).
- **Utilities**: Increase of $1.1 million or 4.4% over FY20, driven by increases to Electricity and Diesel Fuel.
- **Chemicals**: Increase of $0.4 million or 3.1% over FY20 driven by increases to Ferric Chloride and Sodium Hypochlorite, partially offset by a decrease to Soda Ash.

**Budget Breakdown**

- **Personnel Costs**: $143.7 million (56%)
- **Maintenance**: $32.6 million (13%)
- **Energy & Utilities**: $25.5 million (10%)
- **Chemicals**: $12.2 million (5%)
- **Other**: $40.9 million (16%)
Indirect Expenses by Category
($s in millions)

- Watershed/PILOT: Decrease of $0.5 million or 1.9% from FY20. Assumes 7 FTE vacancy adjustment in FY21.
- Pension: Increase of $3.7 million or 50.4% over FY20. Per January 2018 actuarial valuation.
- HEEC: Increase of $2.8 million or 62.9% over FY20. Final costs to be determined by the DPU.
- OPEB: Increase of $0.1 million or 1.7% over FY20. Per January 2017 actuarial valuation.
- Insurance: Increase of $0.5 million or 17.2% over FY20. Premium increase of 20% based on market conditions. Claims based on 3 year average.
HEEC Cable

HEEC Projected Expense (In Millions)

<table>
<thead>
<tr>
<th></th>
<th>FY20</th>
<th>FY21</th>
<th>FY22</th>
<th>FY23</th>
<th>FY24</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY20 Projection</td>
<td>$4.4</td>
<td>$4.6</td>
<td>$5.6</td>
<td>$5.7</td>
<td>$6.0</td>
</tr>
<tr>
<td>FY21 Projection</td>
<td>$5.9</td>
<td>$7.2</td>
<td>$6.8</td>
<td>$6.4</td>
<td>$6.1</td>
</tr>
</tbody>
</table>

- FY20 Projection includes use of $6.5 million reserve between FY21-25.
- FY21 Projection does not include any use of the $6.5 million reserve between FY21-25.
CEB Budget Structure – Capital Finance Expenses

- Variable Rate Debt Assumption 3.50%
- Assumes $15.0 million defeasance in FY20 with target savings FY21-FY26
- $11.0 million prepayment of debt
- $16.2 million to Current Revenue for Capital
- No Debt Service Assistance
• Rates have experienced volatility with an overall downward trend.
• FY21 CEB assumes an all-in variable rate cost of 3.5%
• A 25 basis point change in variable rate debt is equal to $828,732 in FY21.
**Benefit**

- Low taxable rates allowed for 2019 Series F refunding ($4.7M savings in FY21).
- Low rates may allow for future taxable refundings for interest rate savings.

**Risk**

- MWRA had $88.1 million in long-term investments call during FY20 to date.
- Lower Reinvestment rates resulted in a $816,530 reduction to the FY21 projected investment income
Short-term interest rates decreased significantly during FY20.

FY21 short-term interest income assumption is 1.50%.

A 25 basis-points change has a $1,046,134 impact for FY21.
# Rate Revenue Requirement $s in Millions

<table>
<thead>
<tr>
<th>Category</th>
<th>FY21 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Expenses</td>
<td>$255.0</td>
</tr>
<tr>
<td>Indirect Expenses</td>
<td>$57.6</td>
</tr>
<tr>
<td>Capital Financing</td>
<td>$504.0</td>
</tr>
<tr>
<td><strong>Total Expenditures</strong></td>
<td><strong>$816.7</strong></td>
</tr>
<tr>
<td>Non-Rate Revenue</td>
<td>$27.3</td>
</tr>
<tr>
<td><strong>Rate Revenue Requirement</strong></td>
<td><strong>$789.4</strong></td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$816.7</strong></td>
</tr>
</tbody>
</table>

Rate Revenue Requirement: 3.63%
Actual and Forecasted Rate Revenue Changes

MWRA Combined Utilities
Historical and Projected Rate Revenue Changes

<table>
<thead>
<tr>
<th>Actual</th>
<th>Projected</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY16</td>
<td>3.4%</td>
</tr>
<tr>
<td>FY17</td>
<td>3.3%</td>
</tr>
<tr>
<td>FY18</td>
<td>3.2%</td>
</tr>
<tr>
<td>FY19</td>
<td>3.1%</td>
</tr>
<tr>
<td>FY20</td>
<td>3.1%</td>
</tr>
<tr>
<td>PFY21</td>
<td>3.6%</td>
</tr>
<tr>
<td>FY22</td>
<td>3.3%</td>
</tr>
<tr>
<td>FY23</td>
<td>3.0%</td>
</tr>
<tr>
<td>FY24</td>
<td>3.0%</td>
</tr>
<tr>
<td>FY25</td>
<td>2.9%</td>
</tr>
</tbody>
</table>
FY21 Current Expense Budget Next Steps

- Transmit Proposed Budget to Advisory Board for 60 day review on February 19
- Public Hearing on April 14
- MWRA Board Hearing on May 27
- Staff will present Draft Final Budget on May 27
- Staff anticipate Budget adoption on June 24
Thank You
Fuel Storage and Day Tank System Replacement
Gillis and Lexington Street Pumping Stations
and Hayes Pump Station
Contract 7554

February 19, 2020
This Project

- Replace underground storage tanks
- Replace day tanks, fuel monitoring system, and fuel piping

<table>
<thead>
<tr>
<th>Facility</th>
<th>Location</th>
<th>Existing Tank(s)</th>
<th>Type</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gillis PS</td>
<td>Stoneham</td>
<td>2 @ 6,000 gallons</td>
<td>Double wall steel in vault</td>
<td>25 years</td>
</tr>
<tr>
<td>Hayes PS</td>
<td>Wakefield</td>
<td>1 @ 2,000 gallons</td>
<td>Single wall FRP in vault</td>
<td>33 years</td>
</tr>
<tr>
<td>Lexington Street PS</td>
<td>Waltham</td>
<td>1 @ 1,500 gallons</td>
<td>Double wall steel buried</td>
<td>29 years</td>
</tr>
</tbody>
</table>
Gillis Pumping Station

6,000 GALLON ABOVEGROUND DIESEL STORAGE TANK

FAILED STEEL TANK
25 YEARS OLD
Hayes Pump Station

EXISTING
SINGLE WALL TANK, 33 YEARS OLD

NEW 3,000-GALLON ABOVE GROUND DIESEL STORAGE TANK

EXISTING
2000-GALLON UNDERGROUND DIESEL STORAGE TANK

SINGLE WALL TANK, 33 YEARS OLD
## Procurement Process

<table>
<thead>
<tr>
<th>Bids Opened December 20, 2019</th>
<th>Bid Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRC East Environmental Services, Inc.</td>
<td>$1,432,799.00</td>
</tr>
<tr>
<td>MECO Environmental Services, Inc.</td>
<td>$1,688,888.00</td>
</tr>
<tr>
<td><em>Engineer’s Estimate</em></td>
<td>$1,729,000.00</td>
</tr>
<tr>
<td>IPC Lydon, LLC</td>
<td>$2,345,678.90</td>
</tr>
</tbody>
</table>

Construction duration 18.5 months
Oxygen Generation Facility Services, Deer Island Treatment Plant

February 19, 2020
Cryogenic Oxygen Generation Plant

- Critical to NPDES permit
- Significant Energy User
  - 11% of Deer Island electrical demand
- Complex and extensive instrumentation and controls
- Maintenance is Specialized
- Significant Level of effort
  - Over 800 Preventive Maintenance Work Orders per year
Cryo Facility Components Requiring Calibration And Service

- 4 Large Air Compressors (2 @ 2,000hp, 2 @ 2500 hp)
- 2 Molecular Sieves
- 2 Cold Boxes
- 1,000 Ton Liquid Oxygen Storage
- Instrumentation & Controls
Main Air Compressor #1 Repair

• Overhaul needed

• Identified late in existing contract, just prior to bid opening

• Significant level of effort and time required
  – 6 months
  – $500,000 (pending negotiations)

• May need future change order to add funds
**S587 Contract Award**

<table>
<thead>
<tr>
<th>Bidder</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solutionwerks</td>
<td>$2,220,450</td>
</tr>
<tr>
<td>Engineer’s Estimate</td>
<td>$2,224,950</td>
</tr>
</tbody>
</table>

- 3-year contract
Siphon and Junction Structure Rehabilitation
Contract 6224

February 19, 2020
Typical Siphon Structure
• 171 siphon and junction structures in MWRA system

• Prioritized based upon:
  – Internal and external structural condition
  – Access conditions
  – Flood protection (100 yr. storm + 2.5 feet)

• 41 structures Included in Phase 1

• Remaining structures to be addressed in future efforts
Project Purpose

- Ensure long term system integrity and reliability
- Provide flood protection (100-year storm + 2.5 feet)
- Reduce inflow into sewer system
- Improve ingress to structures (hatches, manholes, safety)
- Make structural repairs (interior and exterior)
- Improve access to structures
- Provide odor control as necessary
Example of Siphon Structure Improvements
Subject to Inflow (Dedham)
Existing Conditions (Medford)

Heavy Equipment Needed to Access

Interior Deterioration
Deterioration of Structure Armoring

Braintree along Fore River

Dover along Charles River
Difficult Access (Everett)
Difficult Access (Needham)
### Procurement Process

- **Total of 54 Months**
  - Design: 24 Months
  - Construction: 18 Months
  - Warranty: 12 Months

<table>
<thead>
<tr>
<th>Proposer</th>
<th>Cost</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineer’s Estimate</td>
<td>$2,124,850</td>
<td>13,669</td>
</tr>
<tr>
<td>Kleinfelder</td>
<td>$2,854,552</td>
<td>20,651</td>
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</tbody>
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