Report on 2016 Water Use Trends and Drought Status

January 18, 2017
Total Consumption by MWRA Communities (1980 to 2016)

![Graph showing the total consumption by MWRA Communities from 1980 to 2016. The x-axis represents the years 1980 to 2015, and the y-axis represents mgd (million gallons per day). The graph shows a general downward trend in consumption, with a peak in 2000 and a slight increase in 2016.]
Boston Water Use (1900 to 2016)

2016 average = 65.5 mgd
Fully Supplied Communities Demand (2000 to 2016)
Fully Supplied Communities (Annual Base and Outdoor Use)
Annual demands shown as barplots, while daily is shown as a linegraph on this composite plot.
Reservoir Withdrawals – 5 Year Running Average

5-year average withdrawal = 204.3 mgd
Massachusetts Drought Status Designations

NOTE: The MWRA/DCR water system has an individual Drought Management Plan. Some partially supplied member communities are subject to regional drought status.
It Has Continued To Be Dry In the Service Area
### Driest Summer on Record

**Inches of Precipitation at Logan Airport**

<table>
<thead>
<tr>
<th></th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term Average</td>
<td>3.64</td>
<td>3.36</td>
<td>4.01</td>
<td>3.57</td>
<td>3.37</td>
<td>3.46</td>
<td>3.04</td>
<td>3.40</td>
<td>3.29</td>
<td>3.44</td>
<td>4.01</td>
<td>4.09</td>
<td>42.7</td>
</tr>
<tr>
<td>2016 Total</td>
<td>3.27</td>
<td>4.18</td>
<td>3.17</td>
<td>2.91</td>
<td>2.83</td>
<td>1.33</td>
<td>0.87</td>
<td>1.72</td>
<td>1.38</td>
<td>5.46</td>
<td>2.7</td>
<td>3.25</td>
<td>33.07</td>
</tr>
</tbody>
</table>

Driest summer ever recorded. Total only 3.92 inches
<table>
<thead>
<tr>
<th></th>
<th>1-Month</th>
<th>3-Months</th>
<th>6-Months</th>
<th>12-Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median Yield</strong></td>
<td>Below Normal</td>
<td>Below Normal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td><strong>Dry (75th Percentile)</strong></td>
<td>Below Normal</td>
<td>Below Normal</td>
<td>Below Normal</td>
<td>Normal</td>
</tr>
<tr>
<td><strong>Driest (of Record)</strong></td>
<td>Below Normal</td>
<td>Below Normal</td>
<td>Below Normal</td>
<td>Below Normal</td>
</tr>
</tbody>
</table>
### Communities That Received Emergency Drought Assistance in 2016

<table>
<thead>
<tr>
<th>Community</th>
<th>Amount Supplied (Million Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester</td>
<td>847.3</td>
</tr>
<tr>
<td>Cambridge</td>
<td>515.2</td>
</tr>
<tr>
<td>Burlington</td>
<td>7.9</td>
</tr>
<tr>
<td>Ashland</td>
<td>3.2</td>
</tr>
</tbody>
</table>
• Quabbin Reservoir remains in Below Normal status
• There is sufficient water to meet MWRA member community demand
• Plus help adjacent communities that are stressed by the drought
Settlement Agreement for Various Design Contracts and Hatchery Pipeline and Hydroelectric Project Amendment No. 2
Contract 7017A

January 18, 2017
Settlement Agreement

Design Errors and Emissions
Stantec (Formerly Fay, Spofford, and Thorndike)

<table>
<thead>
<tr>
<th>Contract</th>
<th>Project</th>
<th>Construction Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>6584</td>
<td>Lynnfield/Saugus Pipeline</td>
<td>$4.92 M</td>
</tr>
<tr>
<td>7259</td>
<td>North Dorchester Bay Vent building</td>
<td>$5.16M</td>
</tr>
<tr>
<td>7085A</td>
<td>CWTP Secondary Gaseous Oxygen</td>
<td>$1.23M</td>
</tr>
</tbody>
</table>

Settlement Agreement

• $70,000 Credit to MWRA for Design Errors and Omissions
• Applied to Contract Hatchery Pipeline and Hydroelectric Project
Amendment No. 2 - $146,000

- Design Improvements $ 83,737

  - Meter, Valve and Hydrant at Hatchery Mixing Basin
  - Value Engineering/Cost Reduction
  - Permit Fee Reimbursement

- Engineering Services During Construction and Three Month Time Extension $62,263
Amendment No. 2

- **Time Extension – 3 months to September 1, 2017**
  - Current Stantec End Date: May 31, 2018
  - Current Construction Substantial Completion: Sept. 1, 2017
  - Current Warranty End Date: Sept. 1, 2018

- **Negotiated Settlement- 5B and Amendment Request**
  - Additional Services Provided: $146,000
  - Subtract 5B Settlement: $70,000
    (N Dot Vent Blg., Saugus Pipeline, Gaseous O2)
  - Reallocation – Unexpended Funds: $76,000
  - **Balance**: $0
Project Status

- Pipeline on line - December 2016
- Substantial Completion – September 2017

Hydropower Building

Stainless Steel Pipe Below Rt. 9 Bridge.
NIH Redundancy Pipeline
Design, ESDC/REI
Contract 6906

January 18, 2017
NIH Redundancy Pipeline
Contract 6906
Contract 7066:
- 19,600 linear feet of 48-inch pipeline
- Substantial Completion December 2016

Contract 7067:
- 16,500 linear feet of 36-inch pipeline
- Original Anticipated NTP September 2013
- Substantial Completion September 2016
Current Project Route

- **Contract 7066:**
  - 2,400 linear feet of 36-inch pipeline
  - Completed May 2015.

- **Contract 7471:**
  - 8,800 linear feet of 36-inch pipeline
  - NTP January 2016
  - Substantial Completion December 2017

- **Contract 7478:**
  - 7,800 linear feet of 48-inch pipeline
  - 2,600 linear feet of 16 and 12-inch pipeline
  - NTP January 2017
  - Substantial Completion June 2018

- **Contract 7067:**
  - 14,000 linear feet of 48-inch pipeline
  - Anticipated NTP May 2017
  - Substantial Completion December 2019
NIH Redundancy Pipeline
Contract 6906 – Amendment 2 Summary

• Time Extension
  (September 2017 - December 2020)
  39 Months

• Task 1 Project Administration
  $103,409

• Task 3 Engineering Services During Construction
  $306,722

• Task 4 Resident Engineering Services
  $490,723

• Amendment 2 Total
  $ 900,854
Northern Intermediate High, Section 110
Contract No 7471 – Change Order 7

January 18, 2017
Plan

Added contaminated limits from soil analysis

Original contaminated soil limits
Pre-Characterization of Soil
- Pre-Characterization of Soil
Excavation and Pipe Installation