





***Alewife Brook Pump Station Rehabilitation  
Construction Update***

November 14, 2018



# Bypass Pumping







# Roof and Doors







# Wet Weather Pumps and Motors





# Screens and Grinders







# Pump Motor Control Center









## Testing Status

- Equipment Dry Check Out – Complete
- Wet Checkout – Pumps and Motors are complete. Screens and Grinders are pending
- Pump Performance Testing – Complete



# Pump Performance Testing

Existing Dry Weather Pump Capacity:	15 MGD
Typical Dry Weather Flows:	9-13 MGD
Wet Weather Pump Capacity (Each):	37.5 MGD
Approx. Flow During Recent Wet Weather Testing :	35 MGD





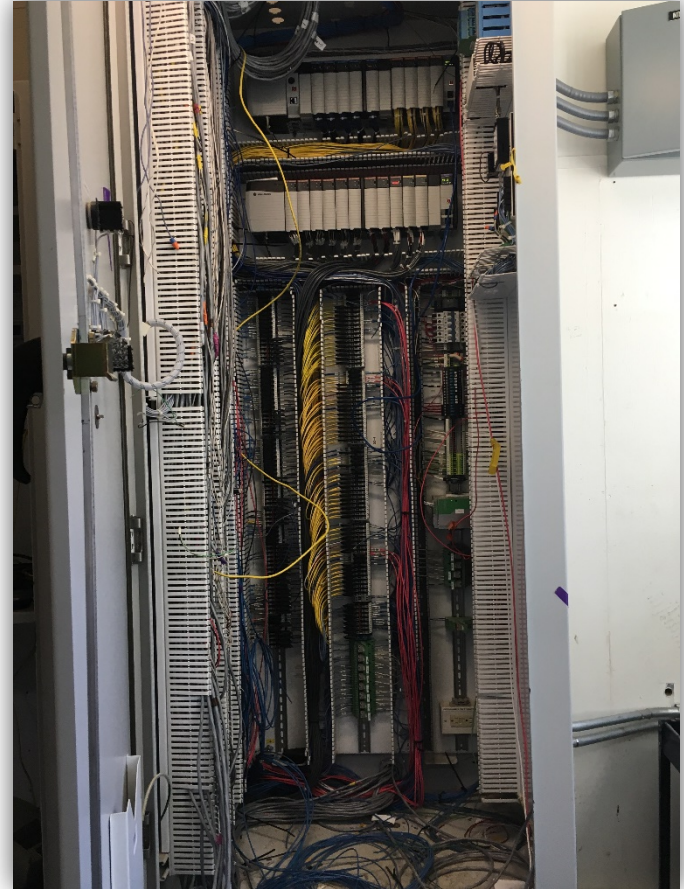


# Remaining Work

SCADA - Finalization of Automated Control is in process

Trial Operations Testing – Weather Dependent

Final Testing – Weather Dependent









***Chelsea Creek Headworks Upgrade  
Contract 7161 - Change Order 22***

November 14, 2018



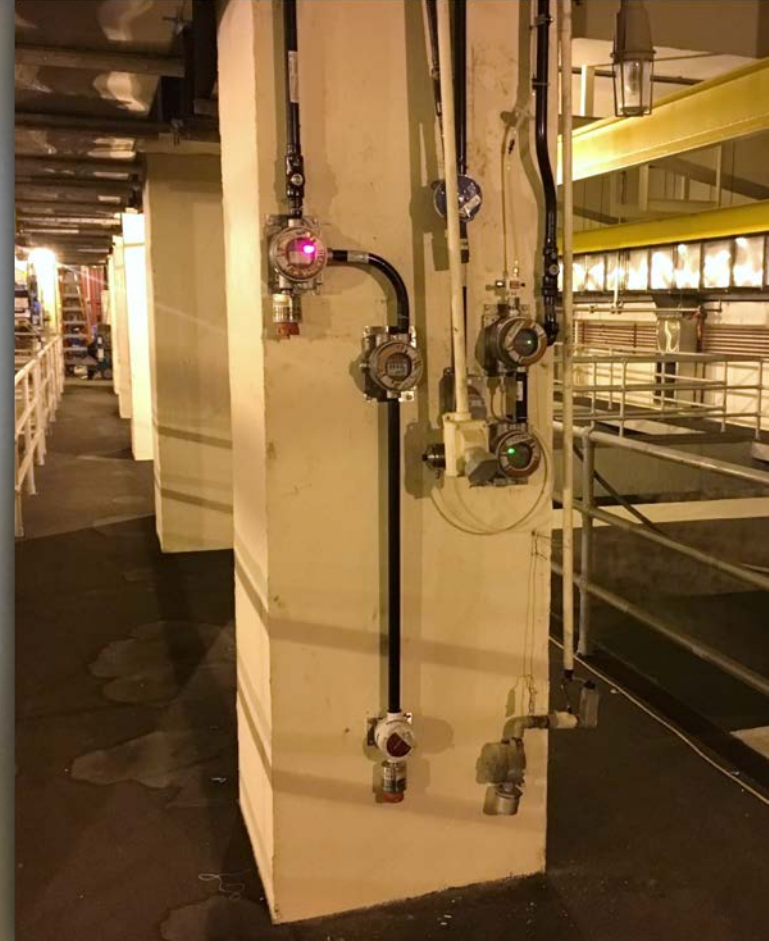
# Existing Gas Monitoring System







# New Gas Monitoring System







# Chelsea Water Services







# Chelsea Water Services











# Grit and Screening Equipment







# Antenna Tower Foundation







# Odor Control Foundations







# Building Exterior







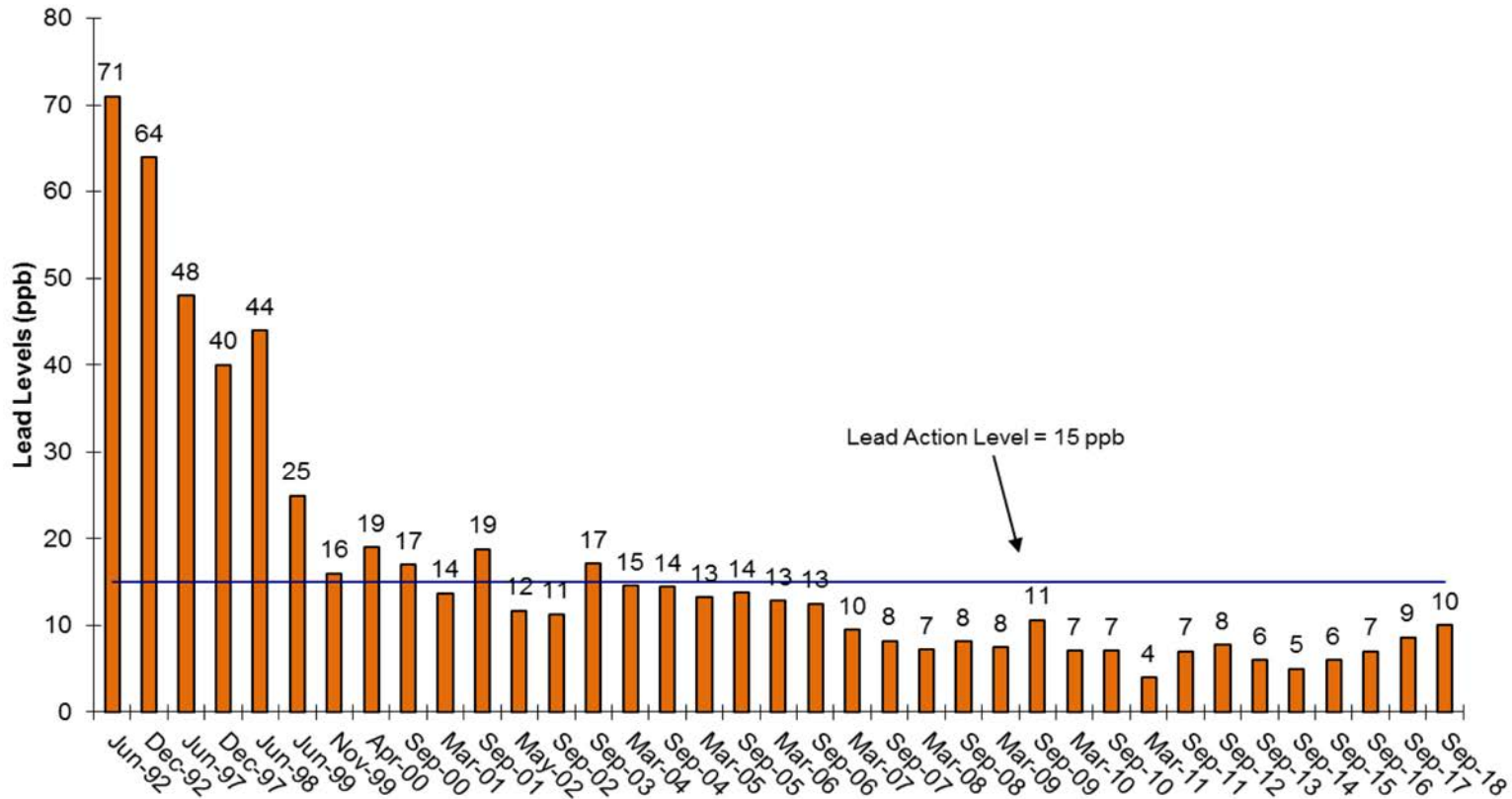


***Lead and Copper Rule Compliance***

November 14, 2018



# Lead Levels in Fully Service Communities









***Wachusett Dam Lower Gatehouse  
Pipe Break***

November 14, 2018



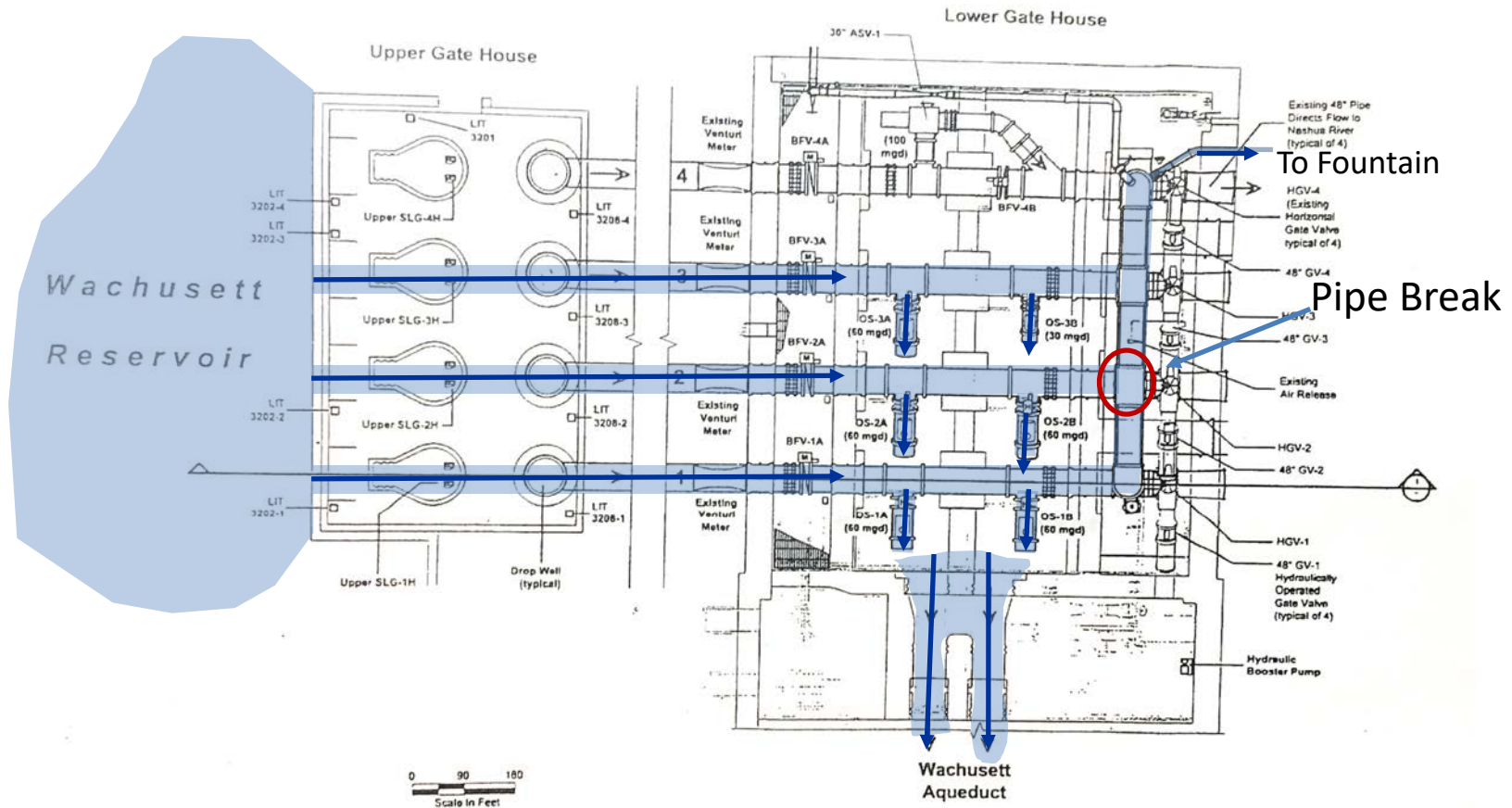


# Wachusett Dam Lower Gatehouse





# Wachusett Dam Upper and Lower Gatehouse







# Wachusett Dam Lower Gatehouse Pipe Break

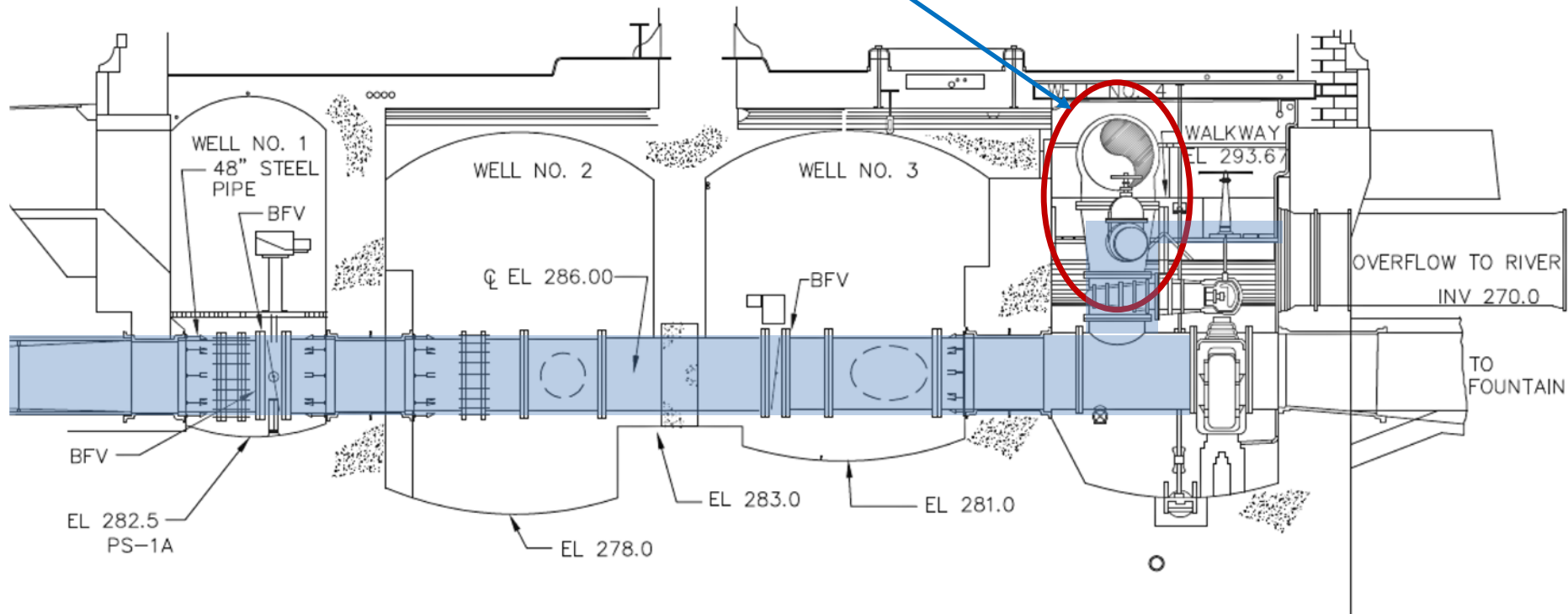
Break of 1905 Equalizer Pipe during testing of the Wachusett Aqueduct Pumping Station





# Wachusett Dam Lower Gatehouse

Tee and Reducer Failed







# Wachusett Dam Lower Gatehouse Equalizer Pipe





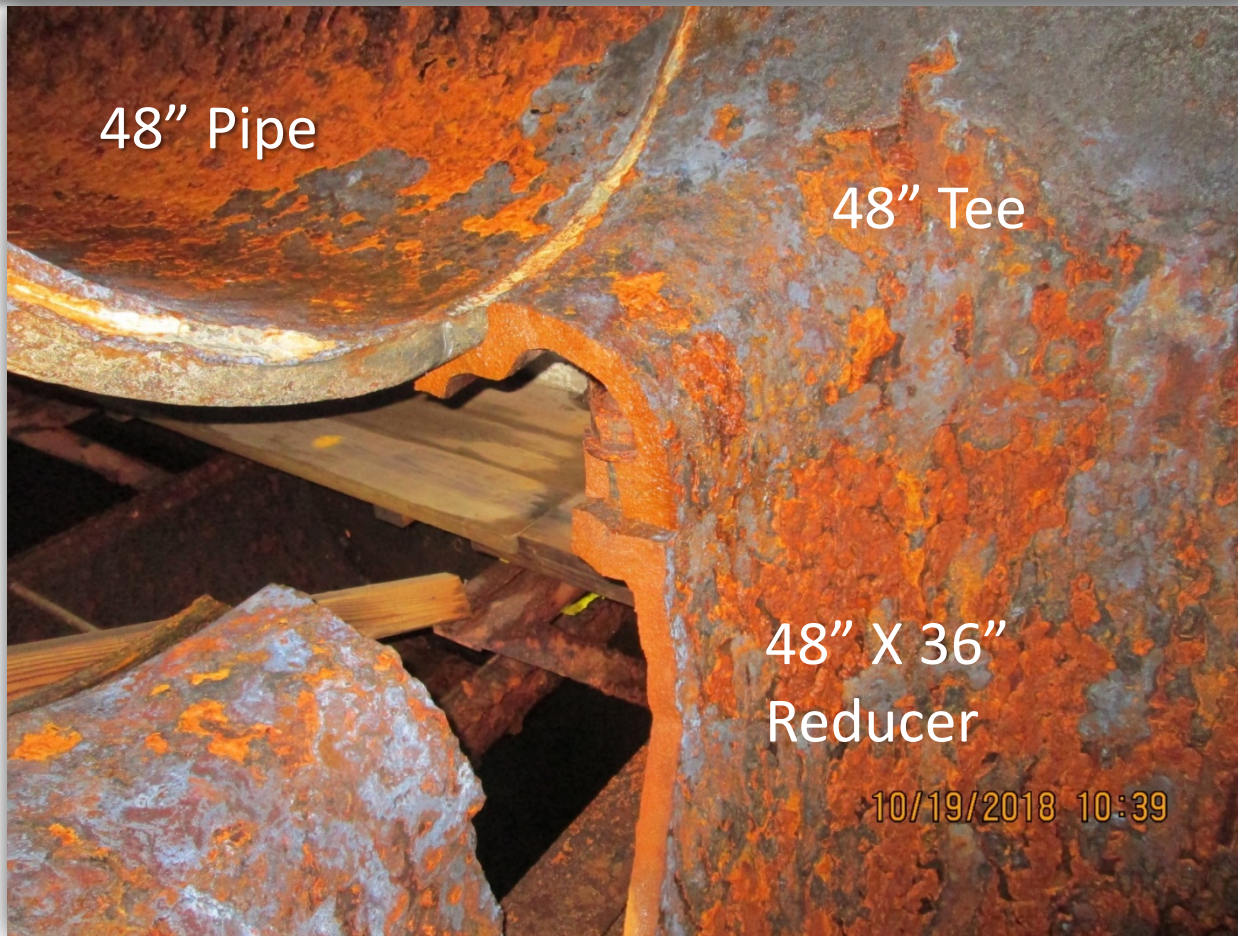
# Wachusett Dam Lower Gatehouse Equalizer Pipe







# Wachusett Dam Lower Gatehouse Equalizer Pipe





# Wachusett Aqueduct Pumping Station Testing is On-Going



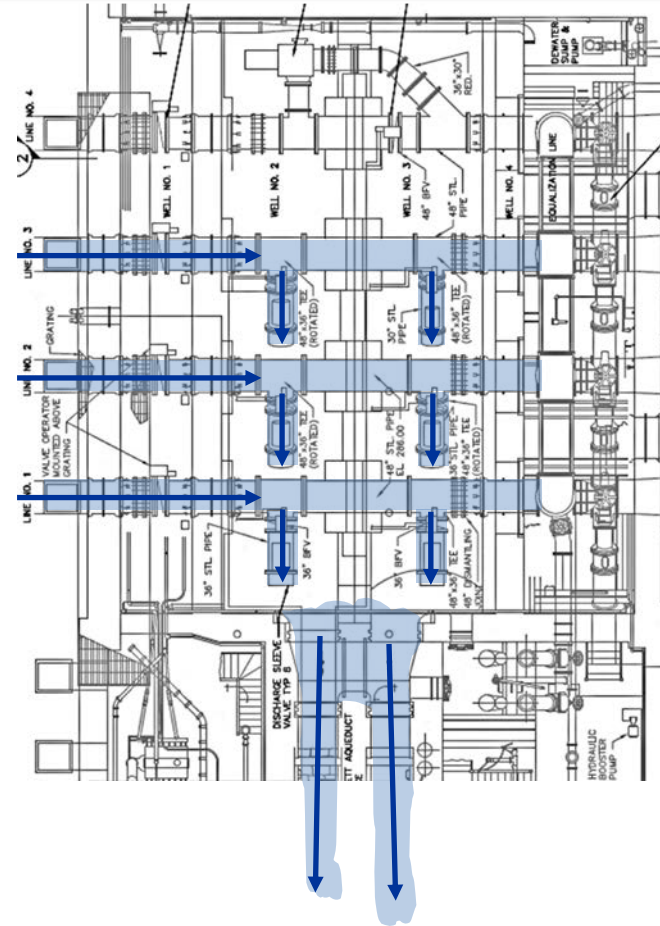




# Short-Term Action

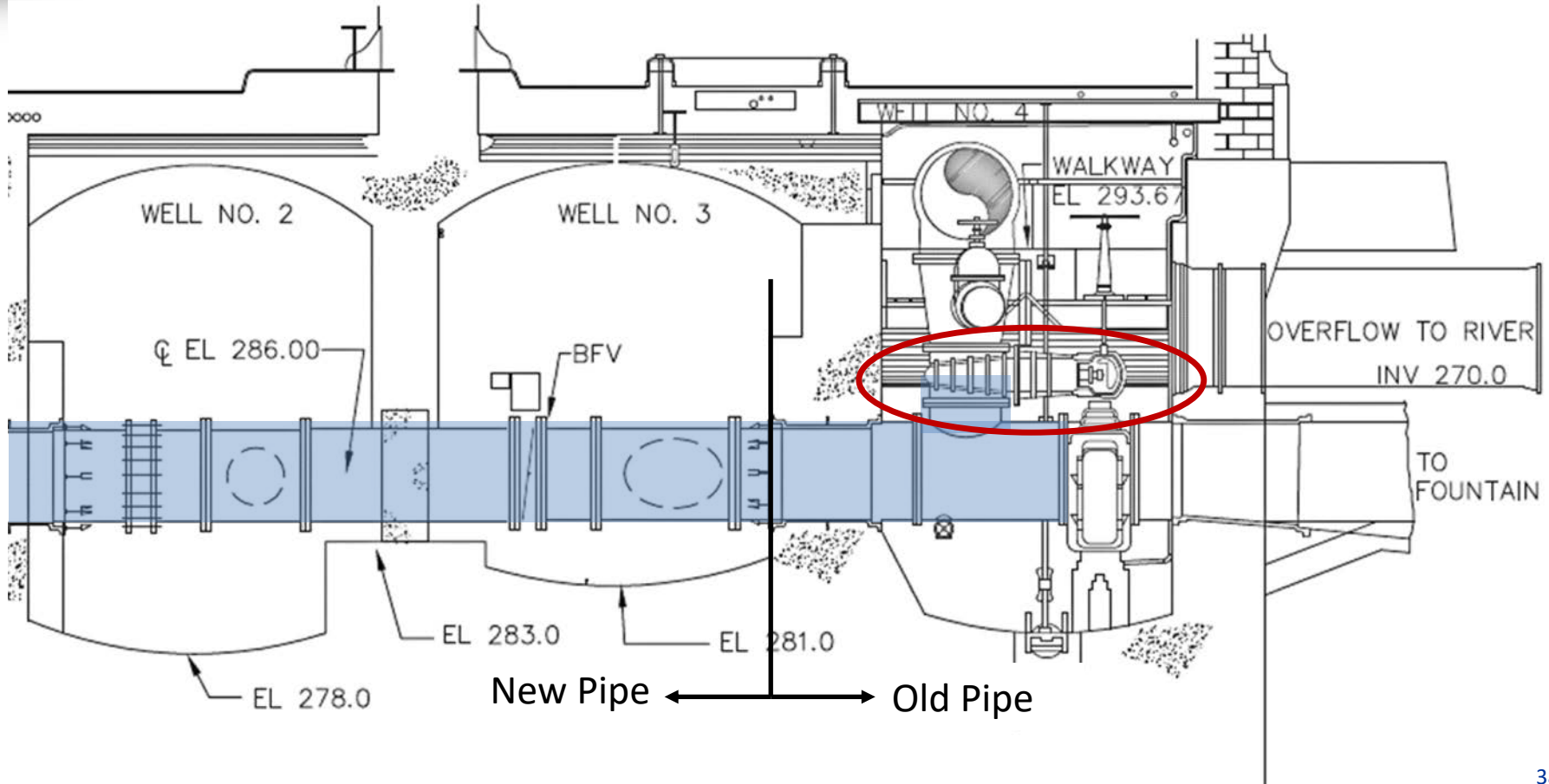
## Alternatives to Permit Continuation of Wachusett Aqueduct Pumping Station Testing:

1. Close the valves on Lines 1 and 2 to isolate water from the equalizer pipe. Test pipe integrity
2. Install blind flanges on Lines 1, 2 and 3





# Valve to Equalizer Pipe

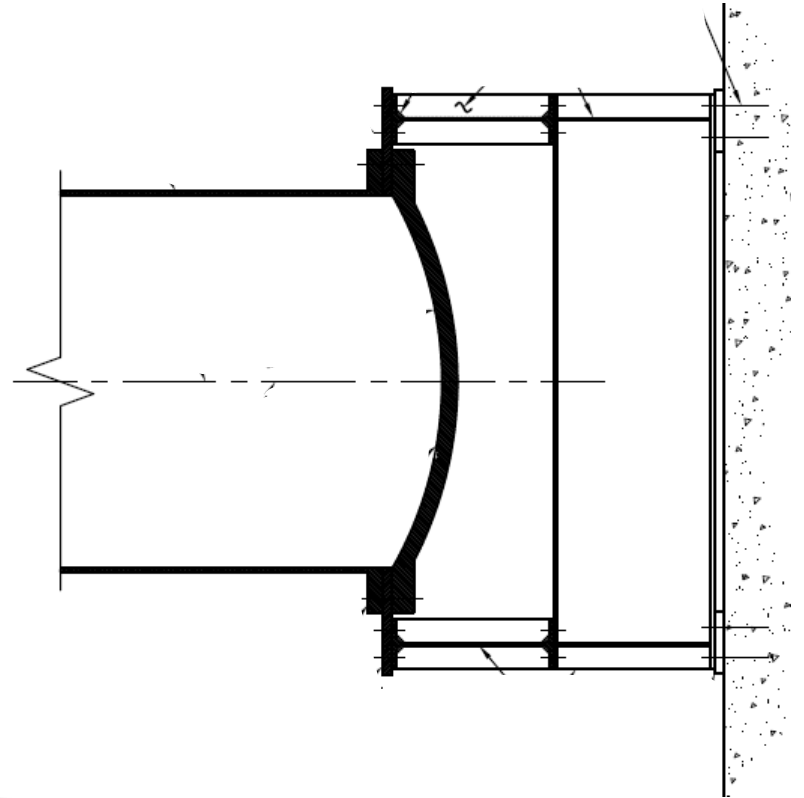
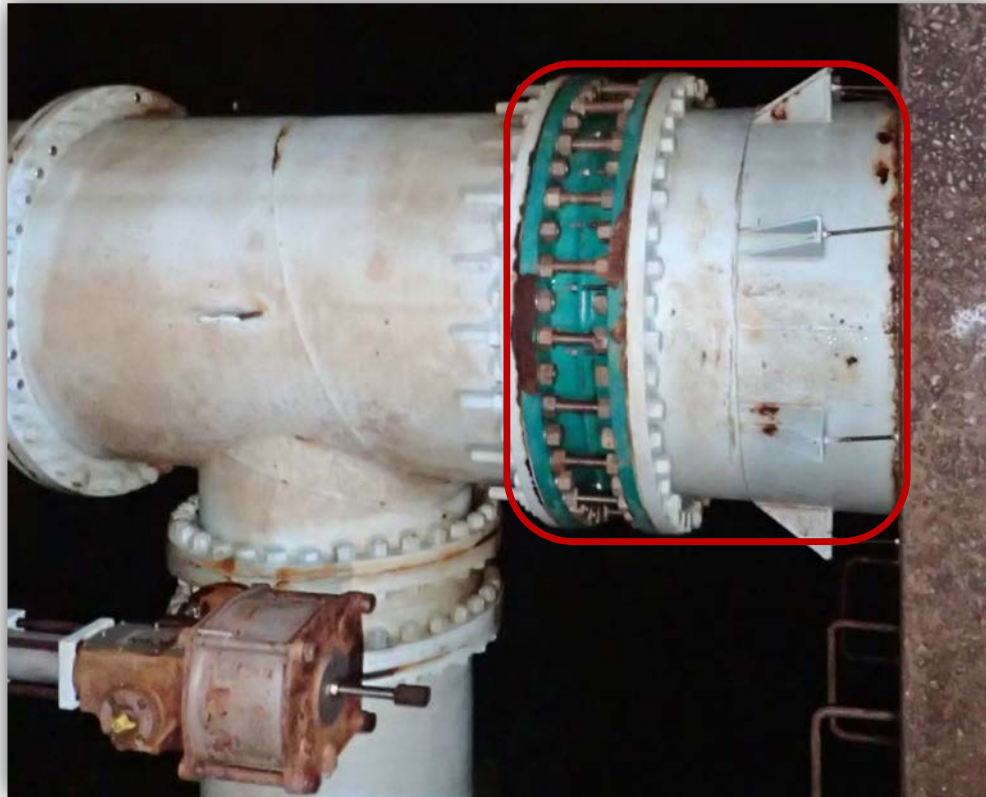








# Wachusett Dam Lower Gatehouse Blind Flange and Bracing







## Long-Term Plan

- Remove all the old cast-iron piping in Well 4 of the Lower Gatehouse
- Install new pipe and flow control valves for releases to the Nashua River



# Carroll Plant Electric Generator No. 1

- Replacement of Generator No. 1 is required following attempts to repair it
- All four generators needed to power Carroll plant and Wachusett Aqueduct Pumping Station at full capacity
- Contract for replacement advertised









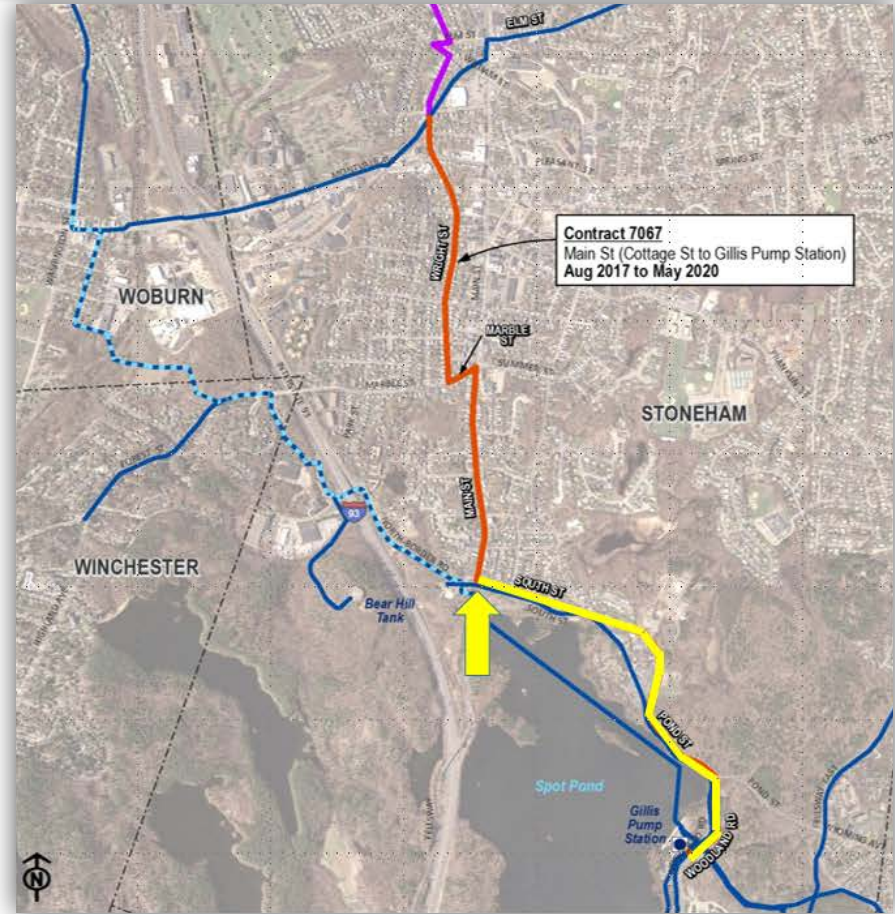
***Northern Intermediate High Pipeline  
Contract 7067, Change Order 3***

November 14, 2018



# Pipeline Route

- Soil sampling occurred from Cottage Street at Montvale Avenue to Main Street at South Street
- DCR would not allow soil testing along South street, Pond Street and Woodland Road during design
- Design Engineer estimated that material was clean





# Soil Borings to Pre-characterize Soil







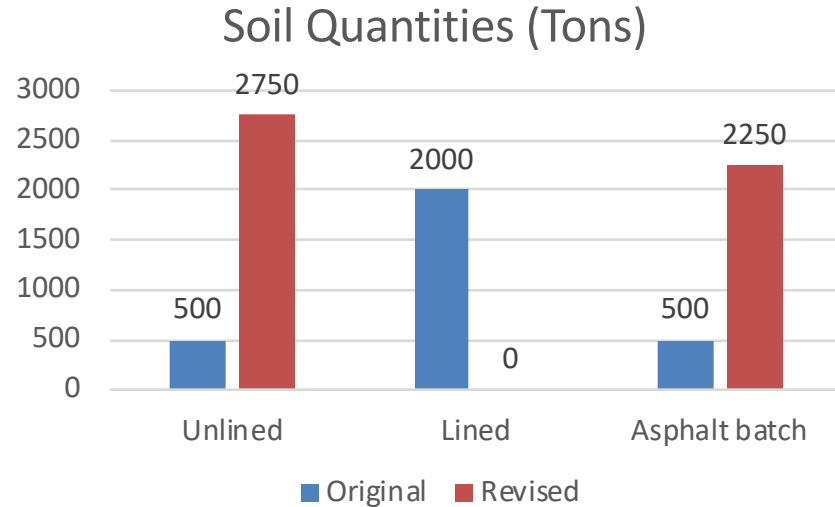
# Quantities of Contaminated Soil

## Original Contract

Group 1A – Unlined landfill	500 Tons
Group 1B – Landed landfill	2,000 Tons
Group II – Asphalt batch	500 Tons

## Revised Quantities

Group 1A – Unlined landfill	2,750 Tons
Group 1B – Landed landfill	0 Tons
Group II – Asphalt batch	2,250 Tons







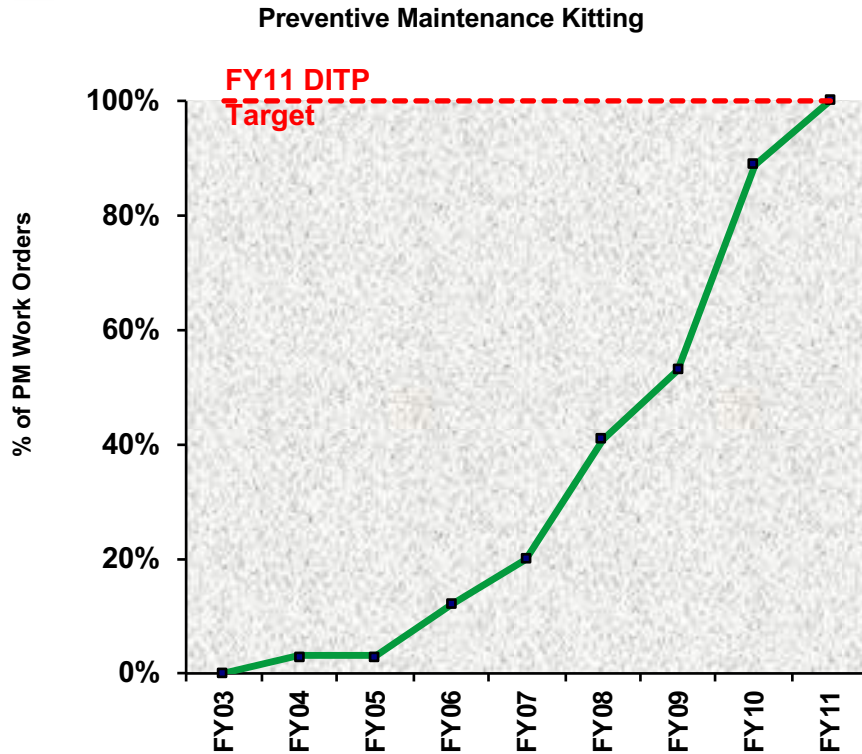
# Massachusetts Water Resources Authority







# Deer Island Maintenance: Kitting of Preventive Work Orders – FY03 to FY11

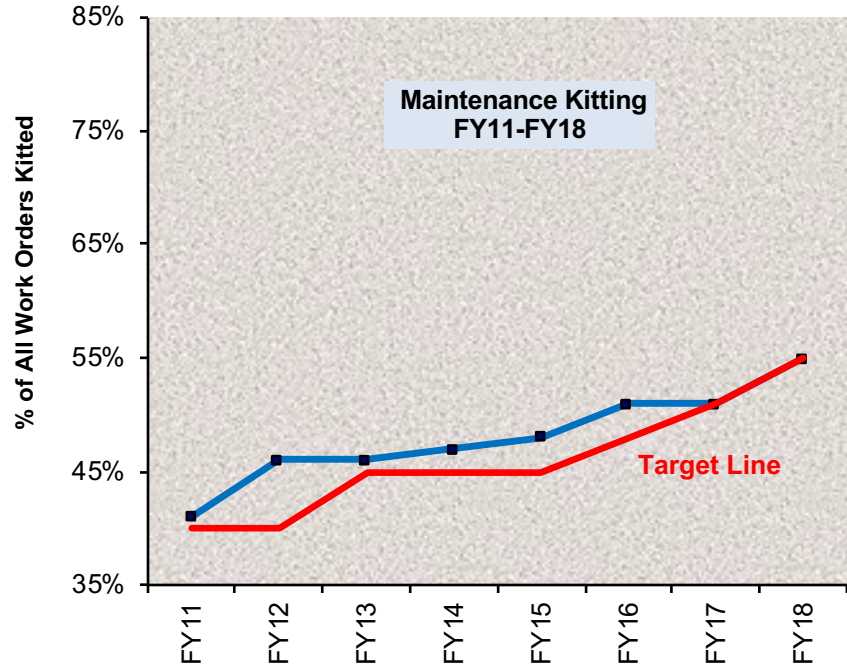


- Kitting allows maintenance staff to spend more time turning the wrench rather than waiting for parts at the stockroom window
- Deer Island started at 0% in FY03 and progressively moved up each fiscal year to 100% in FY11



# Deer Island Maintenance: Kitting of All Work Orders – FY11 – FY18

- In FY11 Deer Island Maintenance changing from Kitting just Preventative Maintenance work orders to expanding this best practice to all Maintenance work orders
- Preventative Maintenance work orders consist of approximately 30% of total work orders
- Maintenance Kitting has had a steady increase and is now at 55% in FY18





# Deer Island Maintenance: Secondary Blending Events

- **99.6% of all flows** were treated at full secondary during the 1st Quarter. There were four secondary blending events this quarter, all due to high plant flow resulting from heavy rain
- Secondary permit limits were met at all times during the 1st Quarter

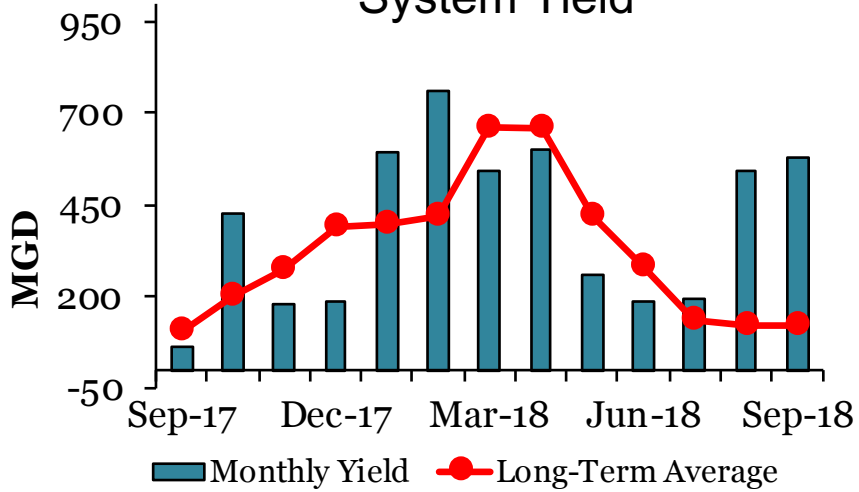
Month	Count of Blending Events	Count of Blending Events Due to Rain	Count of Blending Events Due to Non-Rain-Related Events	Secondary, as a Percent of Total Plant Flow	Total Hours Blended During Month
J	1	1	0	99.5%	6.02
A	1	1	0	99.9%	2.96
S	2	2	0	99.4%	7.81
O					
N					
D					
<b>Total</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>99.6%</b>	<b>16.79</b>



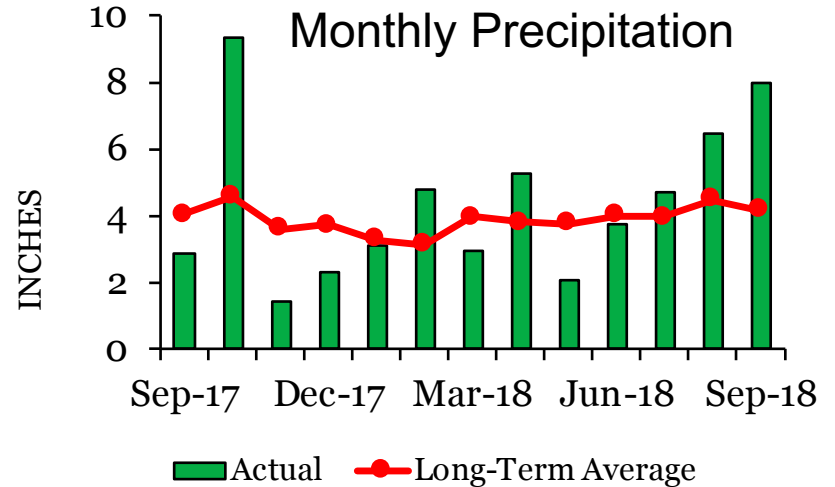


# Fall 2018 Was Much Wetter Than Average

## System Yield



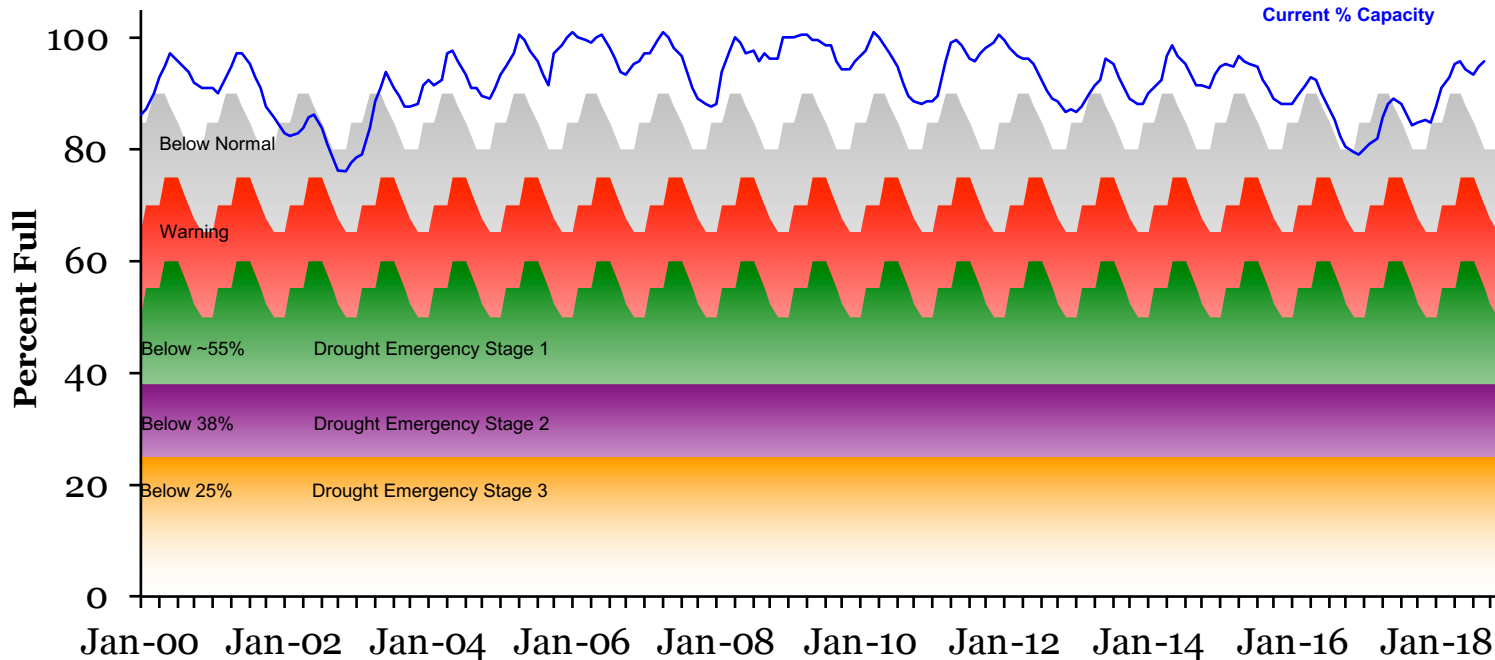
## Monthly Precipitation





# Quabbin is well within normal operating Range

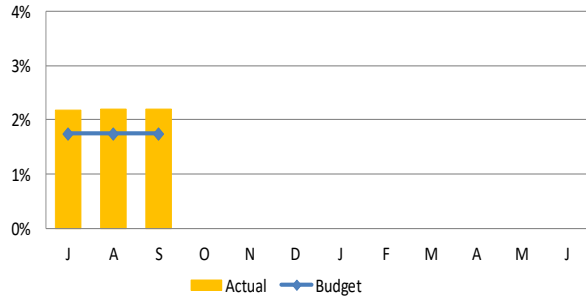
## Quabbin Reservoir Levels With Drought Emergency Planning Stages



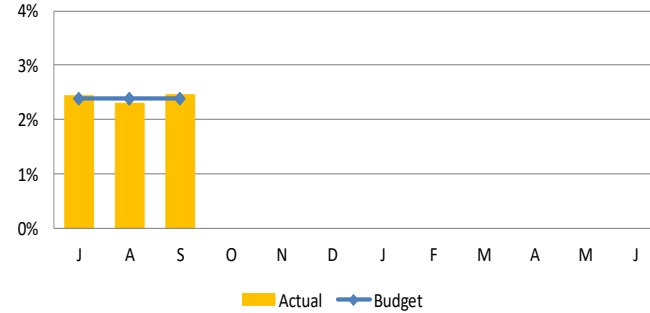


# First Quarter Investment Income Above Budget

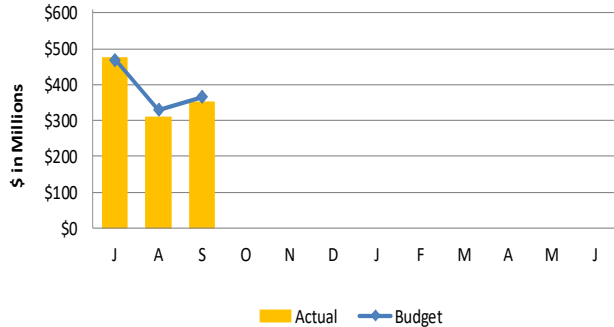
## Short -Term Interest Rates



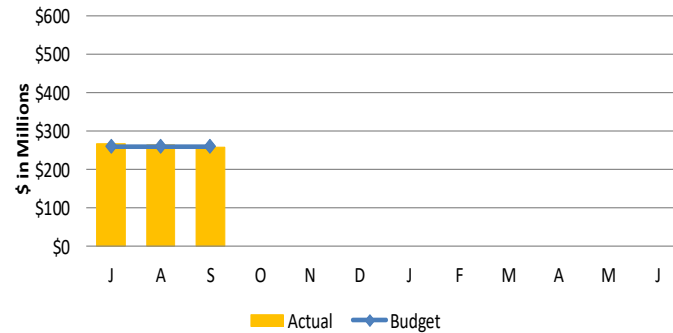
## Long -Term Interest Rates



## Short-Term Average Balances



## Long-Term Average Balances









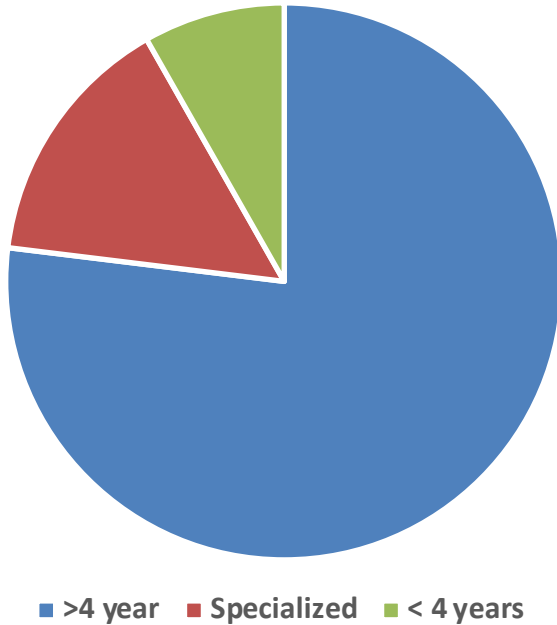
***Purchase of New Desktop PCs  
and Windows 10 Upgrade***

November 14, 2018



# Desktop Refresh and Windows 10

PC Install base



- Homogeneous environment
- Minimize risk of hardware failure and data loss due to aging hardware
- Compatibility with Windows10
- Supported OS through 2025
- Enhanced management and security features
- Smaller footprint







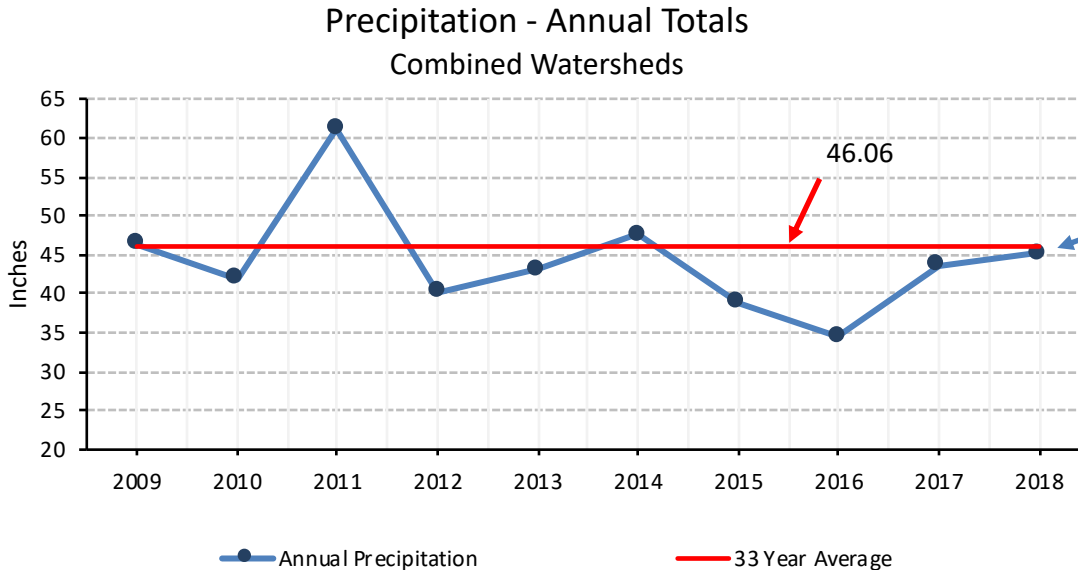
***Recent Weather Impacts on Water and  
Wastewater Operations***

November 14, 2018



# Higher Than Average Rainfall

## 2018 – will close as a wetter than normal year



Through the end of  
October 2018

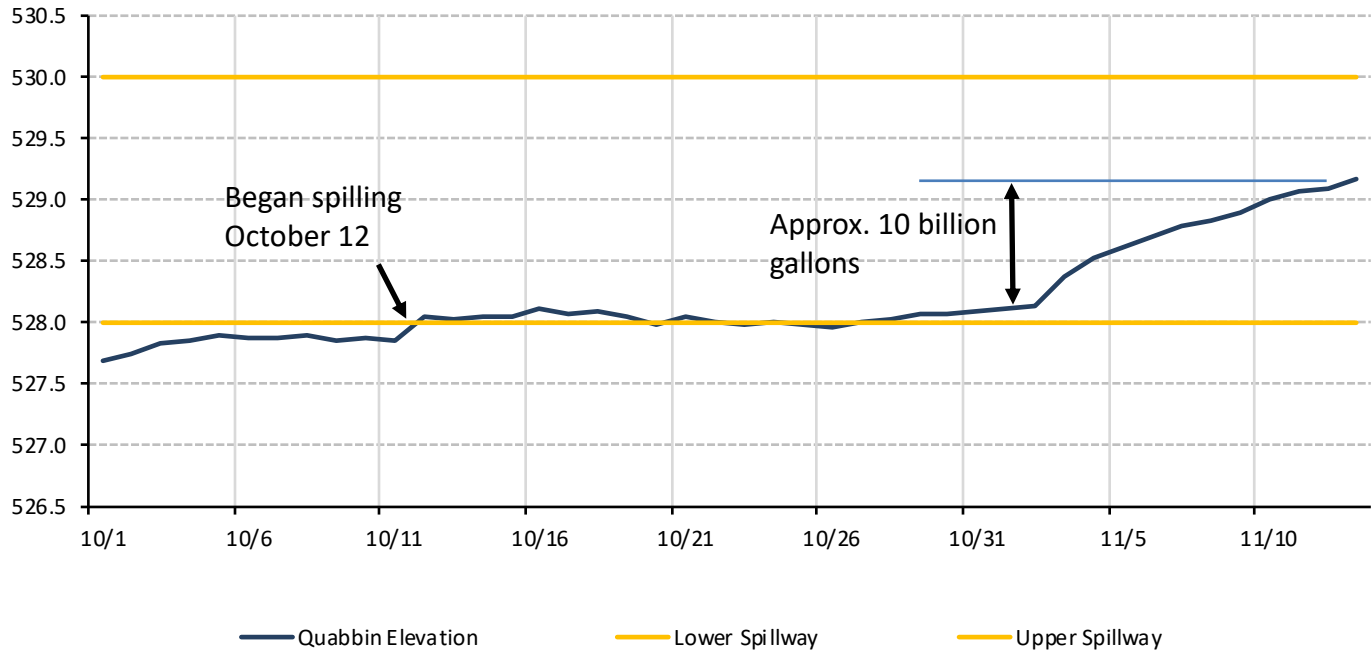
Wachusett received 5.38" so far in November and Quabbin has received 4.12"





# Quabbin Reservoir Level

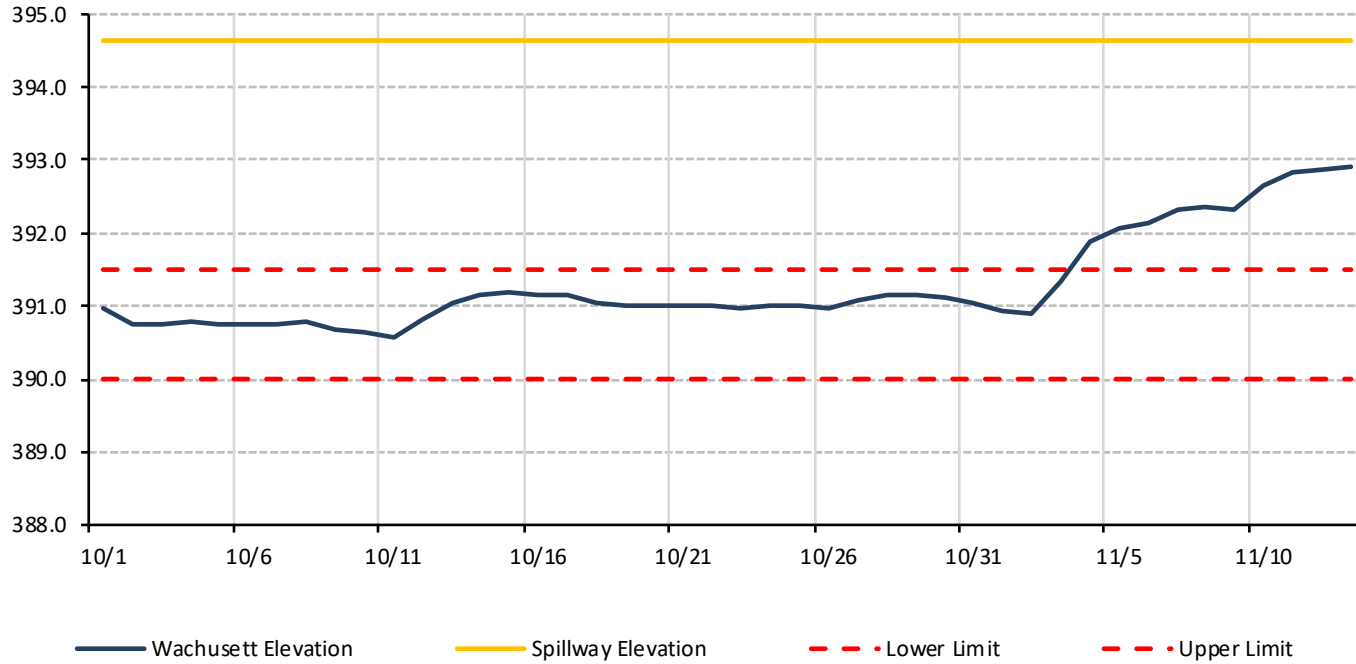
Quabbin Reservoir





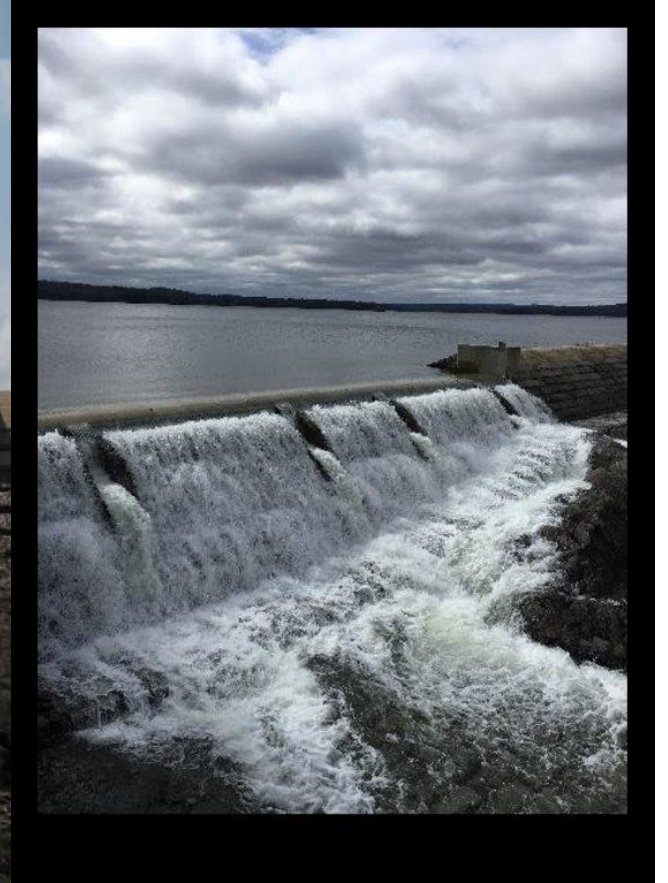
# Wachusett Reservoir Level

Wachusett Reservoir





# Crest Gate release to Nashua River

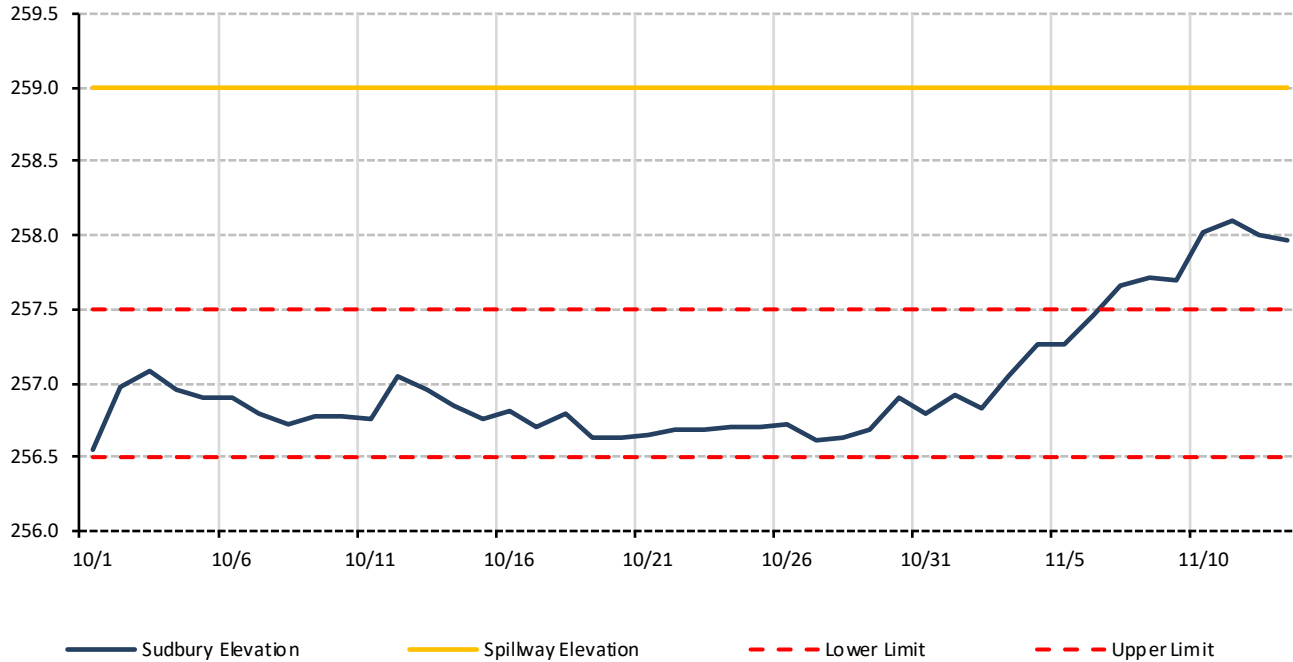






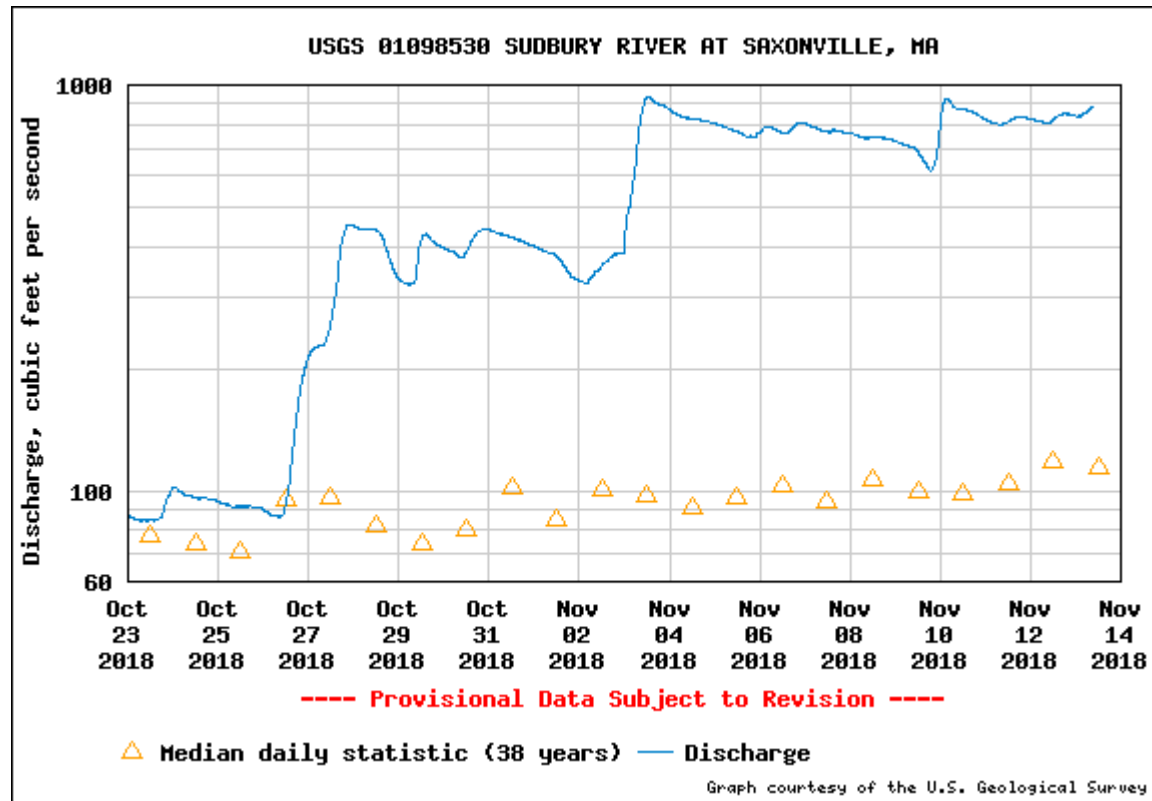
# Sudbury Reservoir Level

## Sudbury Reservoir





# Sudbury River Flow





# Wastewater Impacts

- Five storms since October 27, 2018:
  - Chelsea Creek = 8.51 inches
  - Columbus Park = 8.59 inches
  - Ward Street = 8.34 inches
- No issues operating MWRA's Combined Sewer Overflow facilities
- 'Real Time' Reporting of CSOs on MWRA Website
- No Sanitary Sewer Overflows occurred

Harbor and Bay
School Program
About MWRA
Doing Business with MWRA
Contact MWRA

## MWRA CSO Reporting

Combined sewer systems, which capture both sewage waste and stormwater flows, are found in many older cities. Boston, Cambridge, Chelsea and Somerville have combined systems that connect to MWRA's system. During most rainstorms, these systems deliver combined flows to the Deer Island Wastewater Treatment Plant in Winthrop. However, the capacity of the sewer system can become overwhelmed during big storms causing a combined sewer overflow (CSO). During a CSO the excess combined flow is diverted into a nearby water body to avoid its backing up into homes and businesses. Through the efforts of MWRA and its communities, **annual combined flow has been reduced by 87% since 1987.**

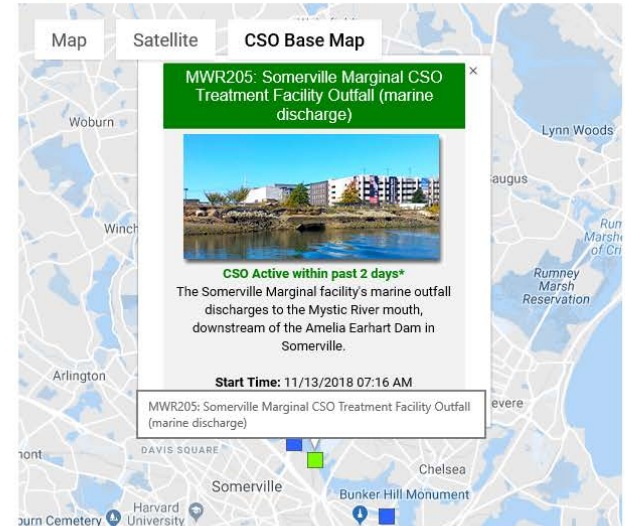
**CSO Storage and Treatment:** Most of the remaining CSO flow discharged in the MWRA service area receives treatment at MWRA facilities that provide screening, disinfection, and dechlorination of combined flow prior to discharge through CSO outfalls. In addition, two storage facilities capture CSO flow, pumping it to the treatment plant after the storm passes; there may be discharges from these facilities in the largest storms. **Map of active and closed CSO outfalls in MWRA's service area.**

**Public Health Information:** Because large storms can trigger CSOs in Boston Harbor, the Charles and Mystic Rivers and Alewife Brook, public health officials recommend avoiding contact with water bodies during rainstorms and for 48 hours afterwards, as there may be increased health risks due to bacteria or other pollutants associated with urban stormwater runoff and CSO discharges.

### Map of Discharges from MWRA's treated CSOs and Storage Facilities

On the map below, squares represent CSO facility outfalls. Click on each square to view more detail about the facility, including start and stop times for each recent discharge.

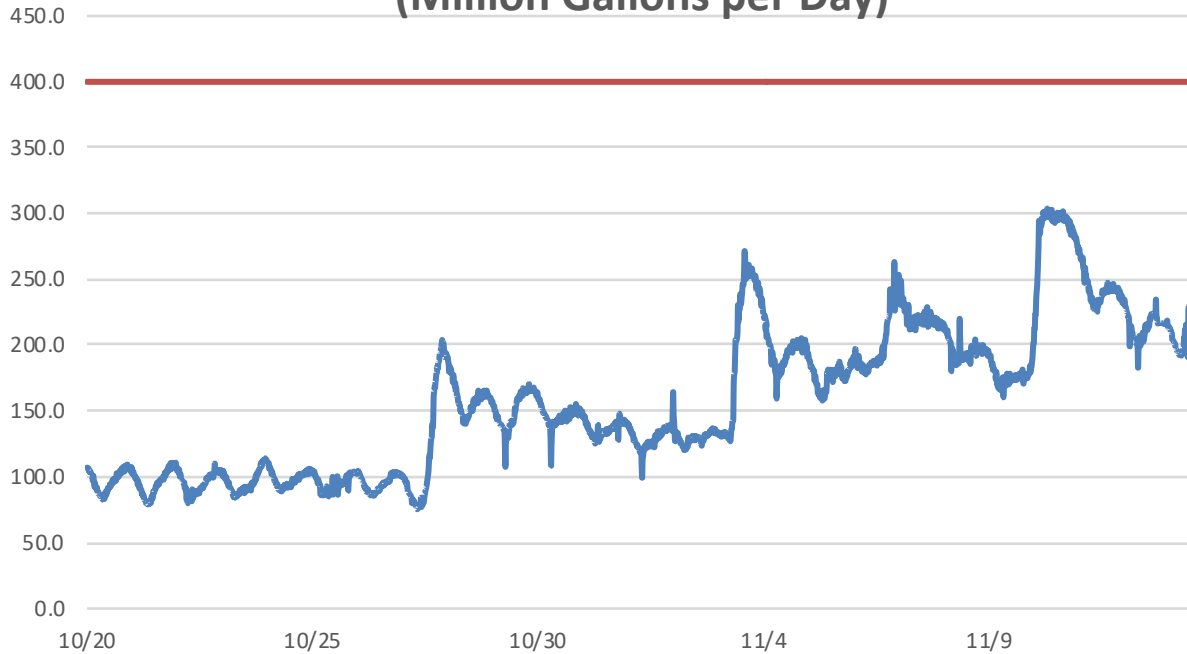
Green ■ shows that the facility has discharged in the past two days. Blue ■ means no discharge.





# Flow Increasing

## South System Flow to Deer Island (Million Gallons per Day)



— South System Flow, MGD

— South System Design Max, MGD







***Update on Aqueduct Trails Program***

November 14, 2018



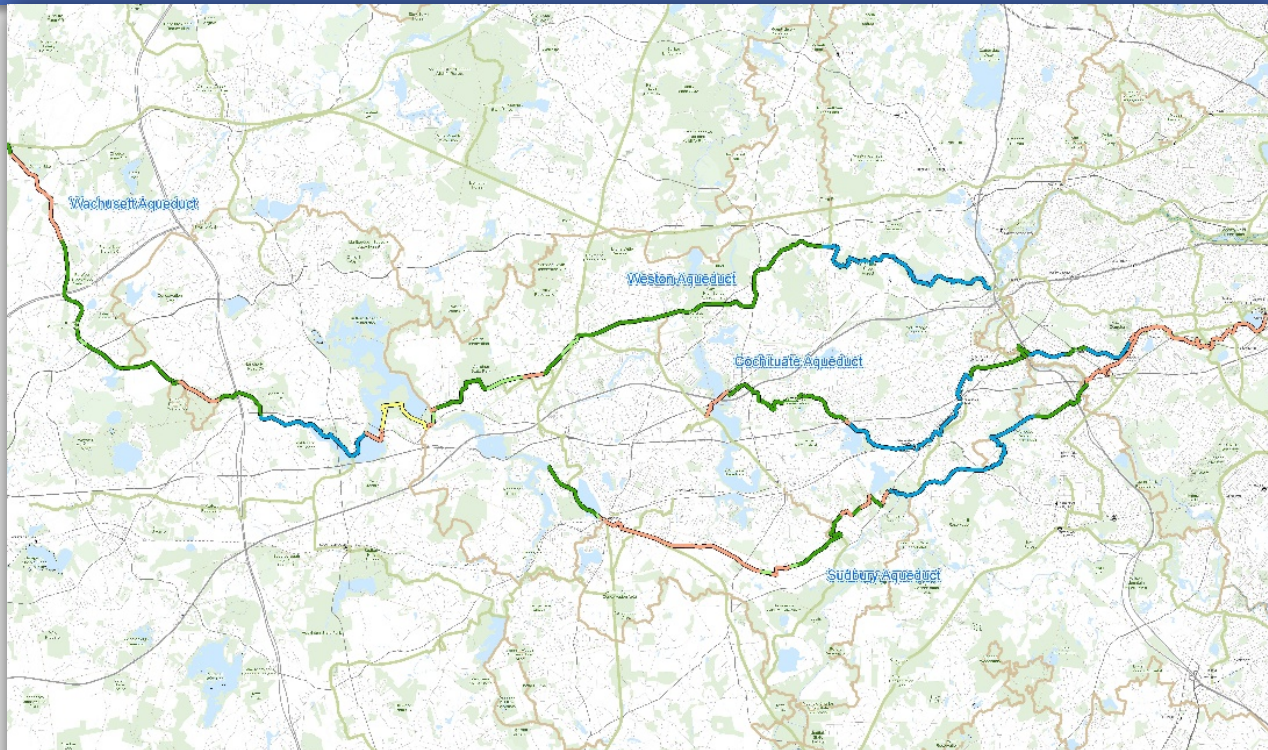
# Status of Aqueduct Trails Program



Aqueduct	Communities	Total Miles Permitted	Miles Opened
Wachusett Aqueduct	Northborough	4.7 miles	4.5 miles
	Southborough	2.2 miles	2.2 miles
Weston Aqueduct	Framingham	4.3 miles	1.7 miles
	Weston	1.5 miles	1.5 miles
	Wayland	4.3 miles	4.3 miles
Sudbury Aqueduct	Framingham	.6 miles	.6 miles
	Natick	2.1 miles	1.5 miles
	Wellesley	2.5 miles	2.5 miles
	Needham	1.4 miles	1.4 miles
Cochituate Aqueduct	Natick	2.2 miles	0 miles
<b>TOTAL</b>		<b>27 miles</b>	<b>21 miles</b>



# Aqueduct Trails and Connections



## Aqueduct Trail Network Trail Development Status

Source: MAPC, Town of Weston, City of Newton,  
MassGIS, MassDOT, OpenStreetMap

November 2018



Aqueduct Segments	
	Signed trail
	Open to the public, not signed
	Permitted, not yet open
	Premarketing in progress
	Proposed - route not confirmed
Total Trail System Length	

Trail and Road Segments	
Signed Trail	21.0 miles
Open to the public, not signed	29.1 miles
Open for construction	2.1 miles
Design proceeding	1.7 miles
Proposed - route not confirmed	16.8 miles
Total Trail System Length	



Existing and Proposed

- Greenway Corridor (Shared Use)
- Regional Foot Trail







# Update Meeting With Communities Last Week

- MAPC hosted a meeting with trails communities





# Echo Bridge – Sudbury Aqueduct - Newton







# Sudbury Aqueduct - Needham







# Sudbury Aqueduct – Wellesley







# Sudbury Aqueduct - Framingham





# Weston Aqueduct - Framingham







# Sudbury Aqueduct - Natick







# Weston Aqueduct - Wayland







# Wachusett Aqueduct – Northborough





# Recreational Trails Grant

- MWRA recently received a grant from DCR
- \$100,000 for Aqueducts Trails Enhancements
- Purchase of a new tractor
- Granite markers for trails

