

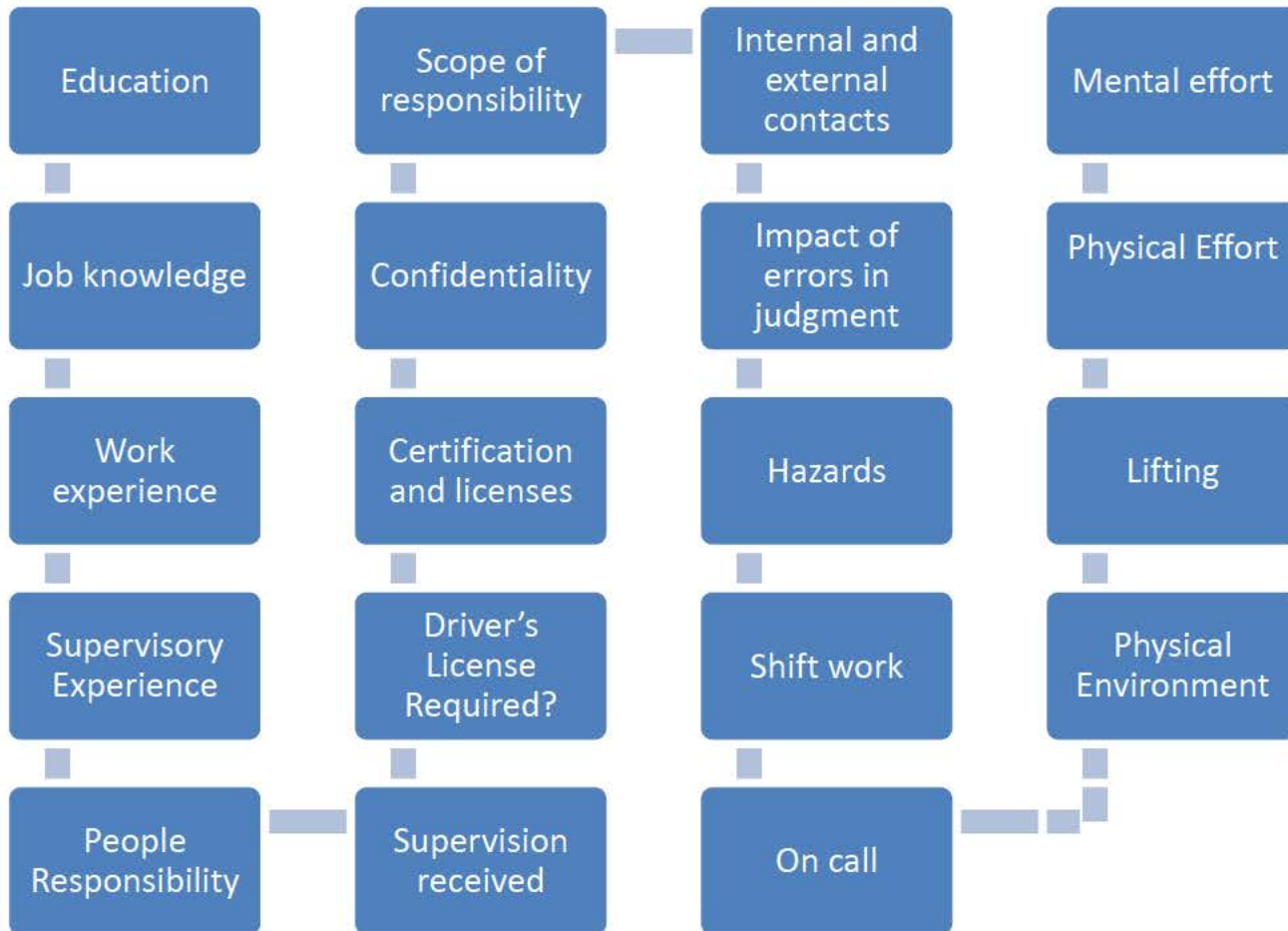


***Pay Equity Analysis for  
Bargaining Unit Positions***

November 16, 2022

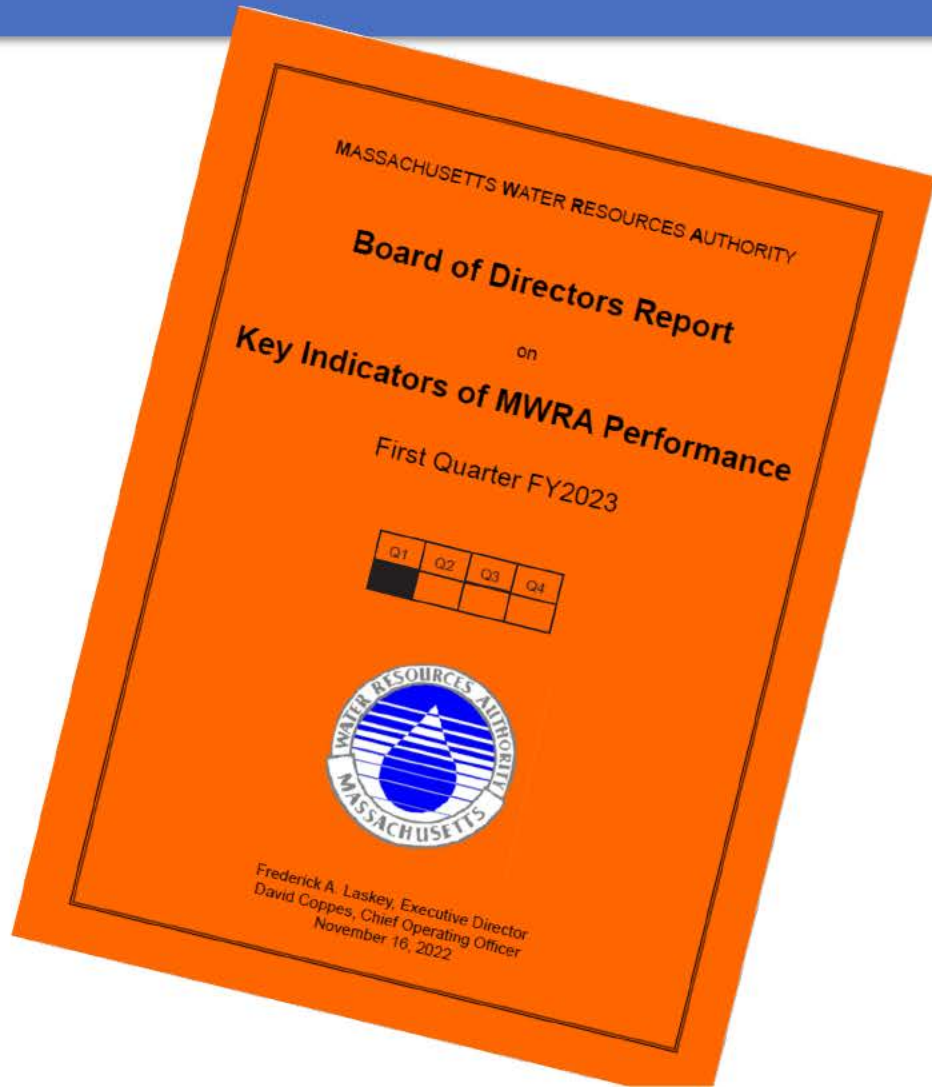


# Comparability Factors



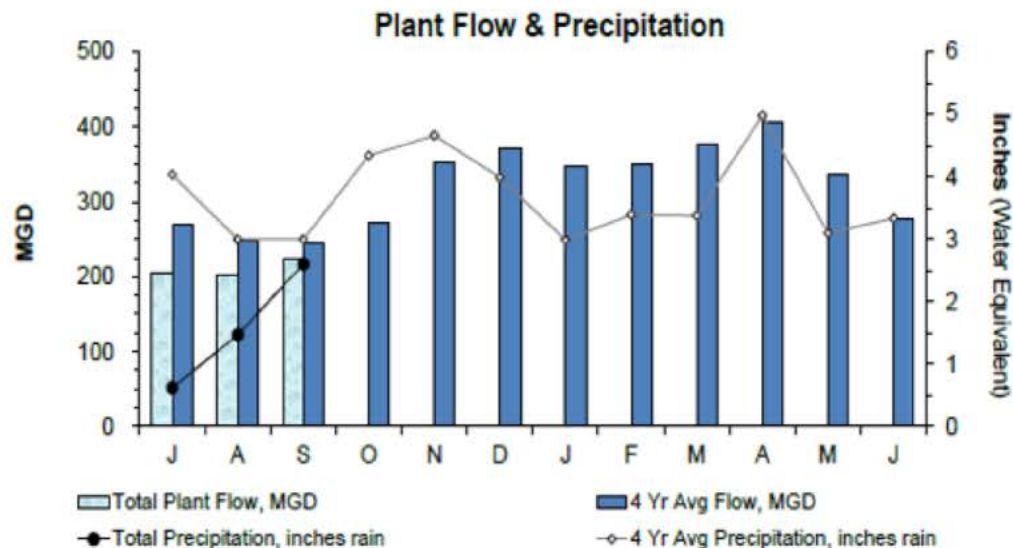


# Massachusetts Water Resources Authority





# Low Flows at Deer Island Treatment Plant



- Q1 flows were 17.3% below four-year average (210.2 mgd vs. 254.3 mgd)
- Deer Island set new low flow records in July and August
- All-time monthly low flow record in August: 201.73 mgd



# Clinton Treatment Plant Permit Violations

## Four permit violations in Q1

NPDES Permit Limits

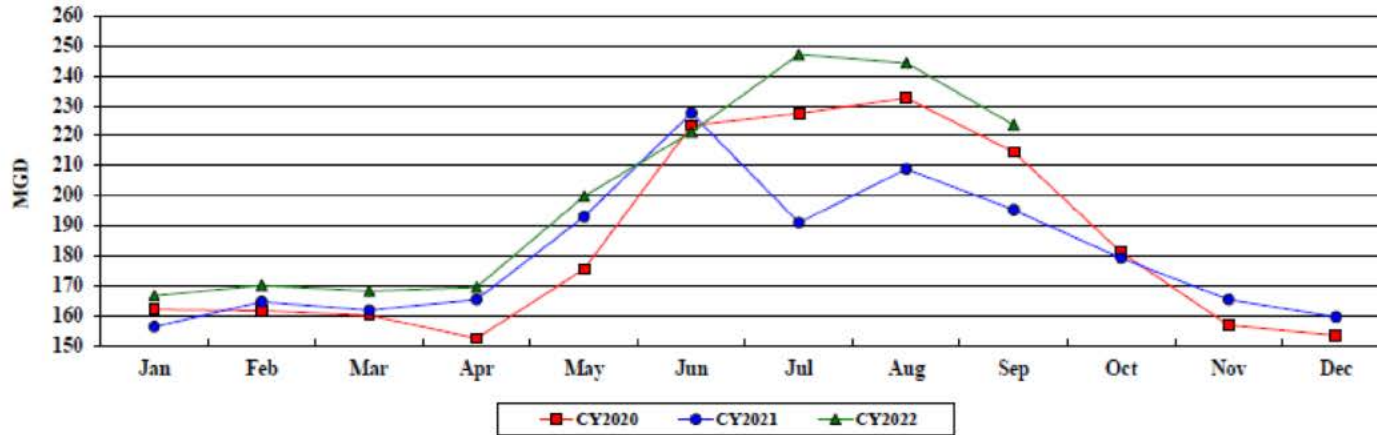
Effluent Characteristics		Units	Limits	July	August	September	1st Quarter Violations	FY23 YTD Violations
Flow:	12-month Rolling Average:	mgd	3.01	3.02	2.90	2.69	1	1
BOD:	Monthly Average:	mg/L	20	1.50	1.40	1.30	0	0
	Weekly Average:	mg/L	20	1.90	1.60	1.60	0	0
TSS:	Monthly Average:	mg/L	20	1.20	1.50	1.50	0	0
	Weekly Average:	mg/L	20	1.80	2.40	1.70	0	0
pH:		SU	6.5-8.3	7.3-7.8	7.2-7.8	7.3-7.8	0	0
Dissolved Oxygen:	Daily Average Minimum:	mg/L	6	8.10	8.10	8.30	0	0
E. Coli:	Monthly Geometric Mean:	cfu/100mL	126	5	5	5	0	0
	Daily Geometric Mean:	cfu/100mL	409	5	7	23	0	0
TCR:	Monthly Average:	ug/L	17.6	0.13	0.11	0.00	0	0
	Daily Maximum:	ug/L	30.4	4.00	3.33	0.00	0	0
Copper:	Monthly Average:	ug/L	11.6	12.45	12.25	9.82	2	2
	Daily Maximum:	ug/L	14.0	12.70	12.30	10.70	0	0
Total Ammonia Nitrogen: June 1st - October 31st	Monthly Average:	mg/L	2.0	0.00	0.00	0.01	0	0
	Daily Maximum:	mg/L	3.0	0.00	0.00	0.07	0	0
Total Phosphorus: April 1st - October 31st	Monthly Average:	ug/L	150	97	71	49	0	0
	Daily Maximum:	ug/L	RPT	173	183	150	0	0
Acute Toxicity*:	Daily Minimum:	%	≥100	N/A	N/A	>100	0	0
Chronic Toxicity*:	Daily Minimum:	%	≥62.5	N/A	N/A	12.5	1	1

- July and August copper monthly averages exceeded the permit limit due to dry conditions
- The quarterly chronic toxicity result of was below the minimum permit limit
- In July, plant flows exceeded the 12-month rolling average due to wet conditions from summer 2021



# Increase in Customer Water Use

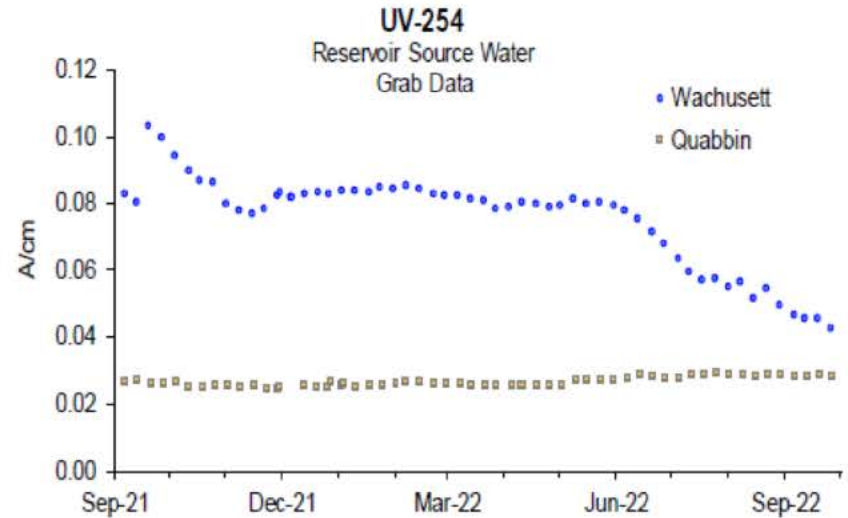
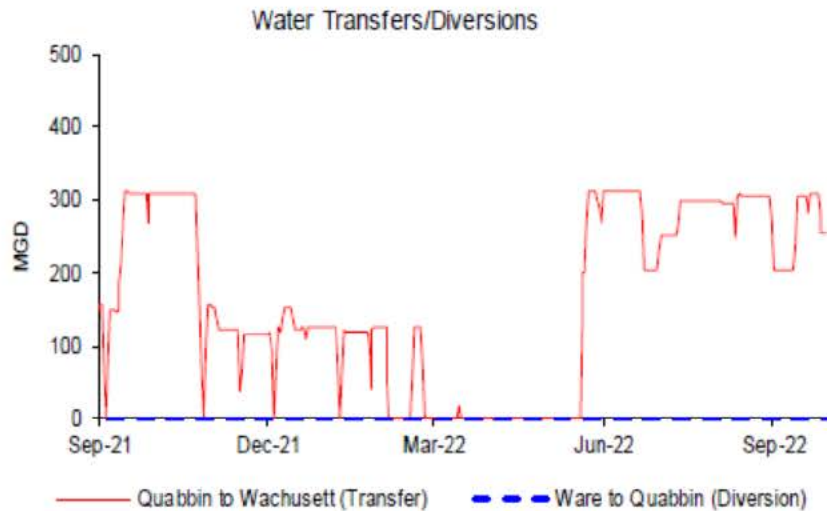
MWRA Water Supplied: All Revenue Customers



- Cambridge normally does not receive MWRA water, but used 438.31 million gallons in Q1 after temporarily switching to 100% MWRA water in August due to PFAS contamination in their supply
- Similarly, Wellesley has significantly increased its use of MWRA water due to limitations on its use of its local sources affected by elevated levels of PFAS



# Improved Source Water Quality



- Reduced precipitation during this year's drought and reduced runoff into Wachusett Reservoir allowed staff to transfer larger quantities of Quabbin water to Wachusett
- UV254 (a measure of the reactive natural organic matter) was much lower this year, providing benefits of reduced chlorine demand and better disinfectant residuals throughout the system



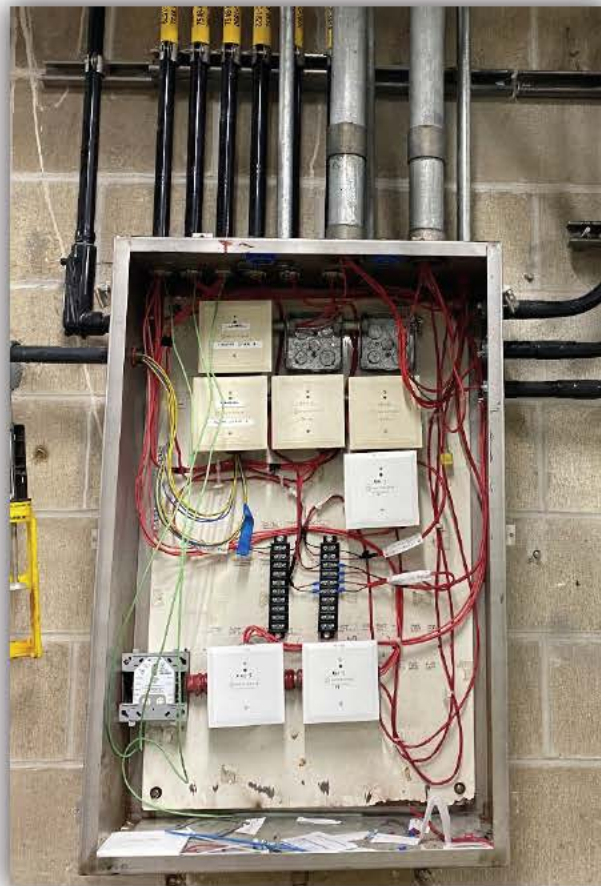
***Nut Island Headworks  
Odor Control and HVAC System Improvements  
Contract 7548 - Change Order 12***

November 16, 2022





# Nut Island Headworks: Fire Alarm System Integration





# Nut Island Headworks: Carbon Adsorber Demolition





# Nut Island Headworks: Topping Slab Demolition





# Nut Island Headworks: New Carbon Adsorbers





# Nut Island Headworks: New Carbon Adsorbers





# Nut Island Headworks: New Carbon Adsorbers





# Nut Island Headworks: New Air Handling Units





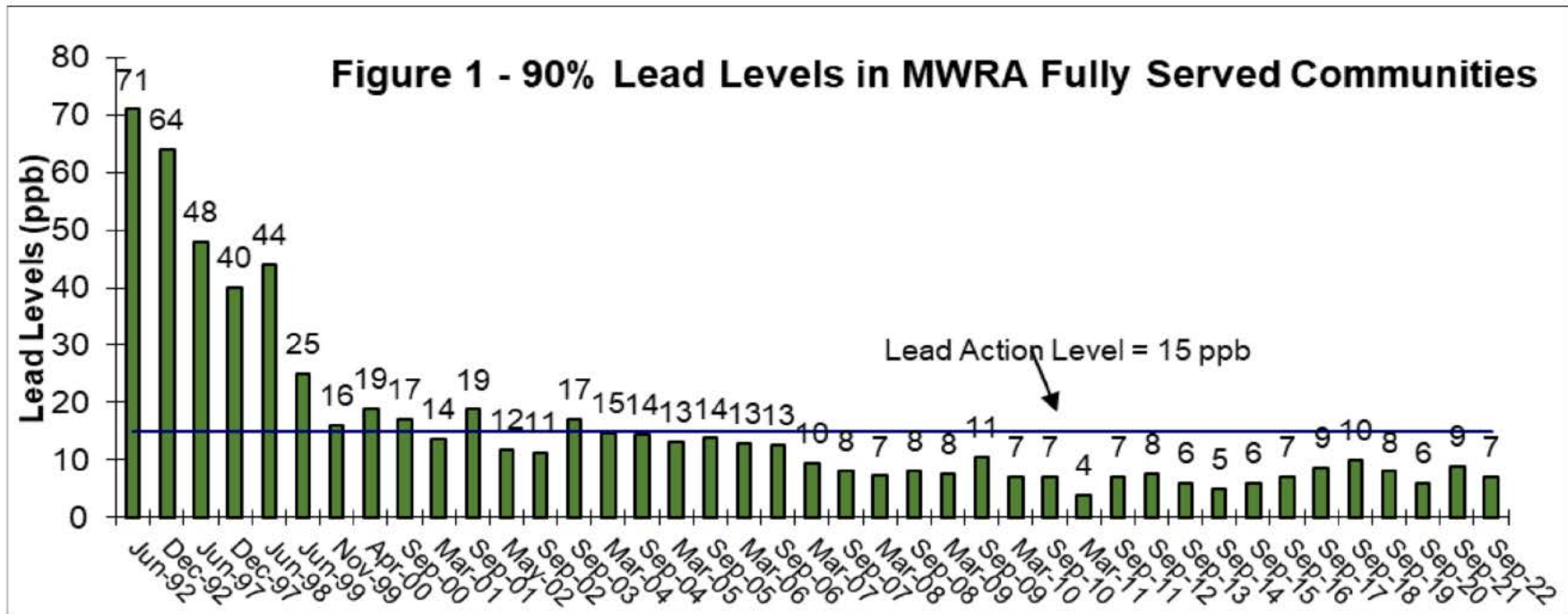
***Update on Lead and Copper Rule Compliance:  
Fall 2022***

November 16, 2022





# Lead Levels Below Action Level: 7.3 ppb vs 15 ppb





## Other Lead Programs

- Lead Service Line Replacement Loans:
  - \$34 million to 14 communities to date
  - 3,500 lead service lines replaced; 1,100 in 2022
- School and Child Care Testing
  - Over 40,000 tests in 557 facilities in 44 communities
- Continuing preparation for corrosion control treatment evaluation





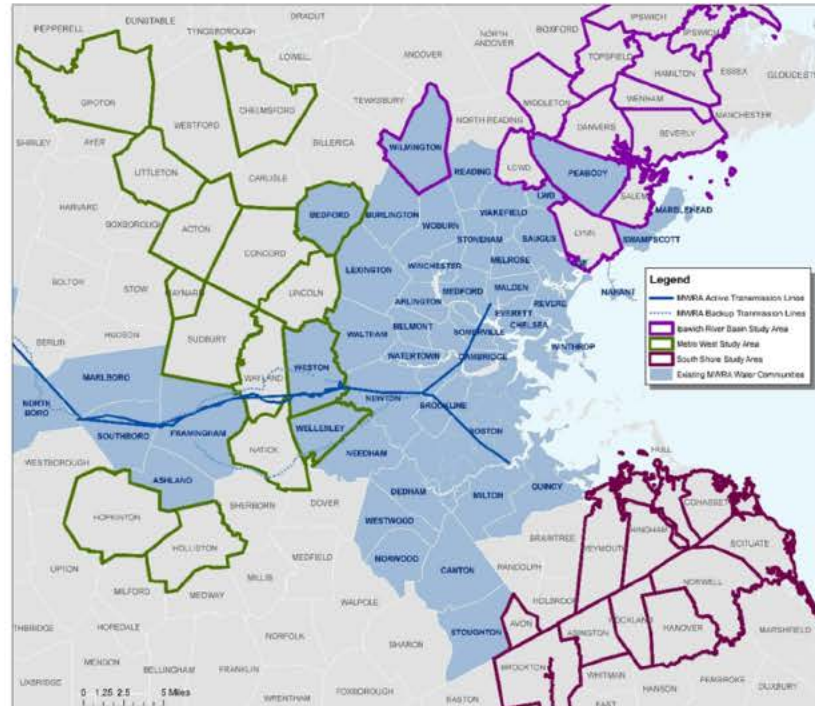
## *Water System Expansions Studies*

November 16, 2022



# Study Areas

- Ipswich River Basin (12 Communities, Demand  $\approx$  42.1 MGD)
- South Shore Area (10 Communities, Demand  $\approx$  40.5 MGD)
- Metro West (15 Communities, Demand  $\approx$  35.1 MGD)



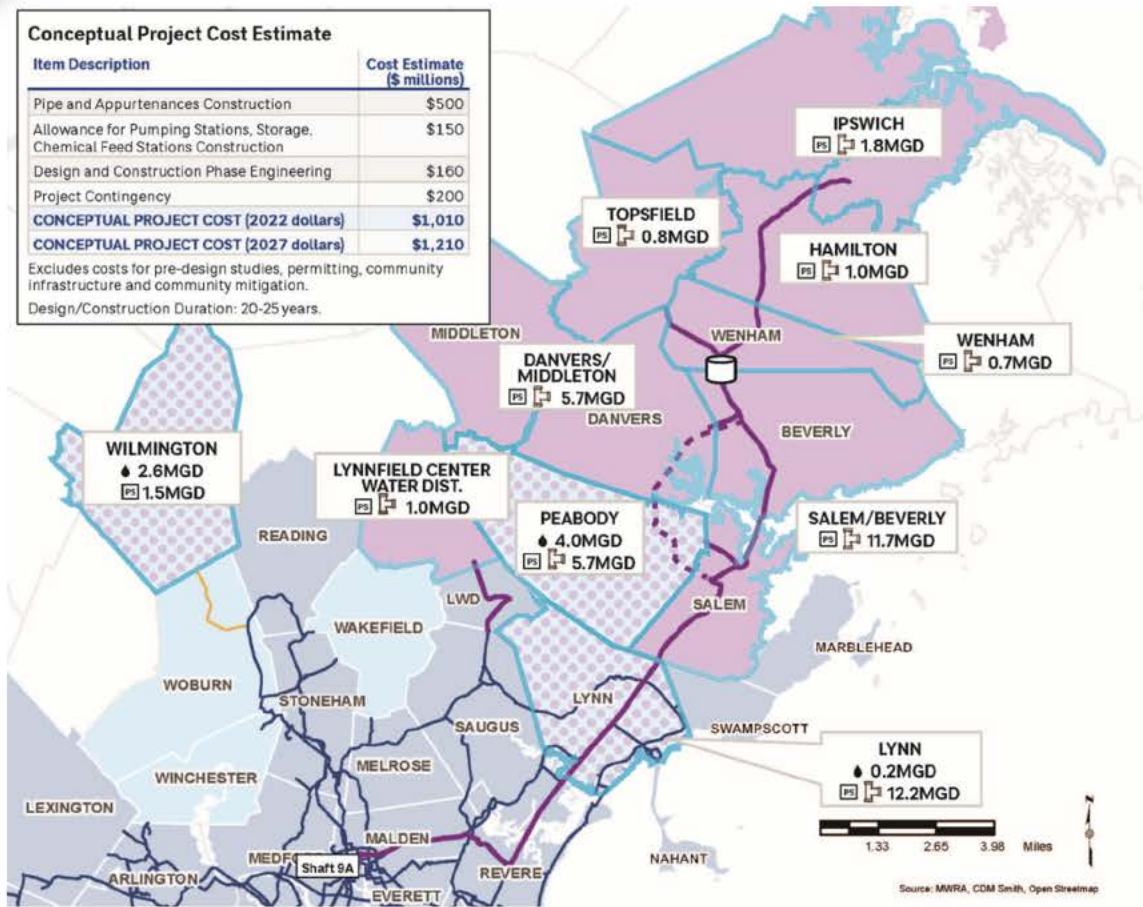
Note: Total demands in all three study areas exceed MWRA's available water supply



# Fully Serving the Ipswich River Basin Communities

Conceptual Project Cost Estimate	
Item Description	Cost Estimate (\$ millions)
Pipe and Appurtenances Construction	\$500
Allowance for Pumping Stations, Storage, Chemical Feed Stations Construction	\$150
Design and Construction Phase Engineering	\$160
Project Contingency	\$200
<b>CONCEPTUAL PROJECT COST (2022 dollars)</b>	<b>\$1,010</b>
<b>CONCEPTUAL PROJECT COST (2027 dollars)</b>	<b>\$1,210</b>

Excludes costs for pre-design studies, permitting, community infrastructure and community mitigation.  
Design/Construction Duration: 20-25 years.



## Option for Full 42.1 MGD Northern Expansion

Full Maximum Day Demand

**LEGEND**

- Study Community
- Study Community (partially MWRA served)
- MWRA Member Community
- MWRA Partially Served Community
- Expanded MWRA Service Area
- Existing Community Connection to MWRA
- Existing MWRA system
- Proposed Pipe Route
- Option to avoid harbor crossing
- Proposed Community Pipe Connection
- Proposed Community Pump Station
- Existing MWRA Service Volume
- Proposed MWRA Storage (approx.)

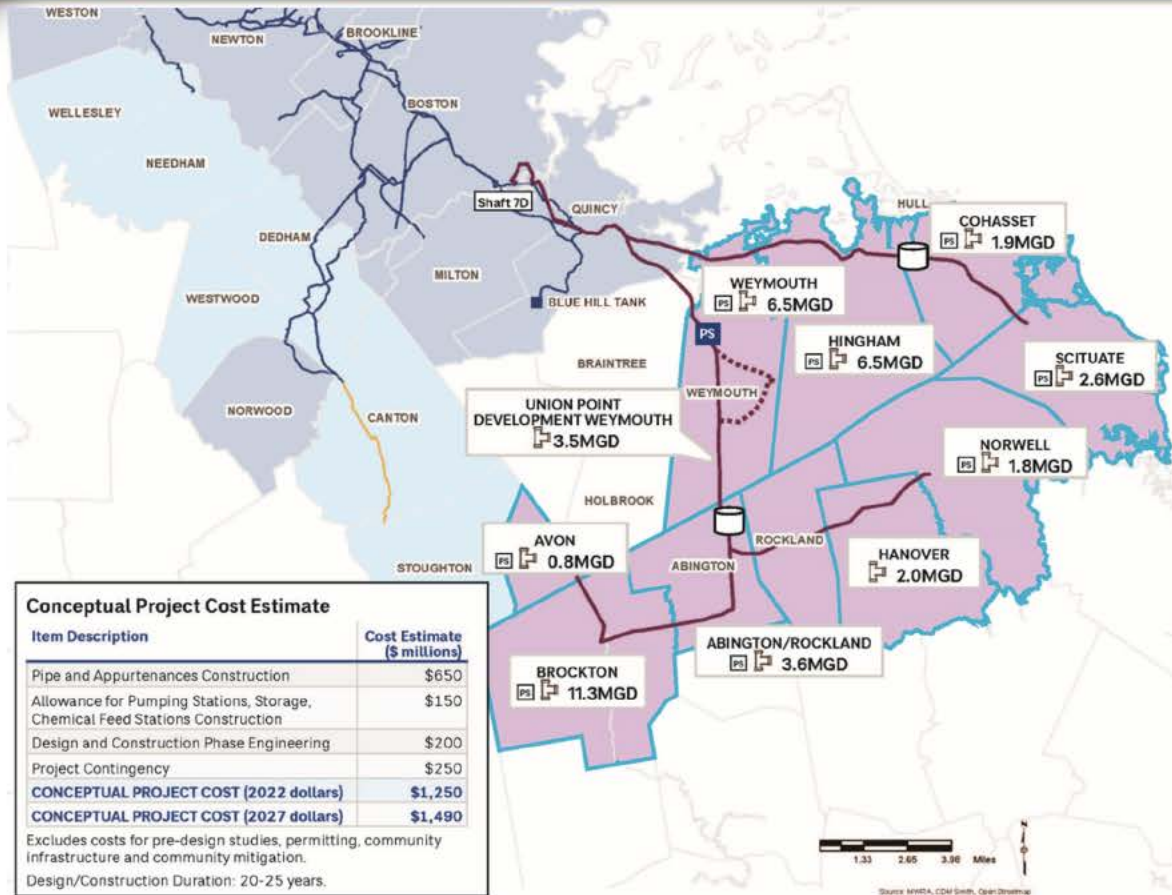
Note: Maximum Daily Demand is based on 2019 or 2020 Annual Statistical Reports.



Source: MWRA, CDM Smith, Open Streetmap



# Fully Serving the South Shore Area Communities



## Option for Full 40.5 MGD Southern Expansion

Full Maximum Day Demand

**LEGEND**

- Study Community
- MWRA Member Community
- MWRA Partially Served Community
- Expanded MWRA Service Area
- Existing Community Connection to MWRA
- Existing MWRA system
- Proposed Pipe Route
- Proposed Community Pipe Connection
- Proposed Community Pump Station
- Proposed MWRA Storage (approx.)
- Proposed MWRA Pump Station

Note: Maximum Daily Demand is based on 2019 or 2020 Annual Statistical Reports.



**Conceptual Project Cost Estimate**

Item Description	Cost Estimate (\$ millions)
Pipe and Appurtenances Construction	\$650
Allowance for Pumping Stations, Storage, Chemical Feed Stations Construction	\$150
Design and Construction Phase Engineering	\$200
Project Contingency	\$250
<b>CONCEPTUAL PROJECT COST (2022 dollars)</b>	<b>\$1,250</b>
<b>CONCEPTUAL PROJECT COST (2027 dollars)</b>	<b>\$1,490</b>

Excludes costs for pre-design studies, permitting, community infrastructure and community mitigation.  
Design/Construction Duration: 20-25 years.



## Study Update and Next Steps

- **Ipswich River Basin Study: Complete**
- **South Shore Study: Complete**
- **Metro West Study: On-going**
  - Acton, Bedford, Chelmsford, Concord, Groton, Holliston, Hopkinton, Lincoln, Littleton, Maynard, Natick, Sudbury, Wayland, Wellesley, Weston
  - Beginning to explore pipeline options
- **Next Steps:**
  - Outreach to Legislators, Communities, and Regional Organizations
  - Advisory Board Workshop on December 5, 2022
  - Funding Opportunities?



***Wachusett Dam Lower Gatehouse Pipe and Boiler  
Replacement Construction  
Contract 7380***

November 16, 2022





# Wachusett Dam Lower Gatehouse





## Benefits of Contract 7380 Work

- Remove damaged equalizer pipe
- Extend life of cast iron pipes in dam by interior relining
- Restore ability for routine and emergency release from Wachusett Reservoir to Nashua River
- Improve reliability of release to Wachusett Aqueduct Pumping Station
- Extend building life through replacement of heating system, new bathroom facility and hazardous materials abatement





# Pipe and Valve Replacement

## Isolation Valves

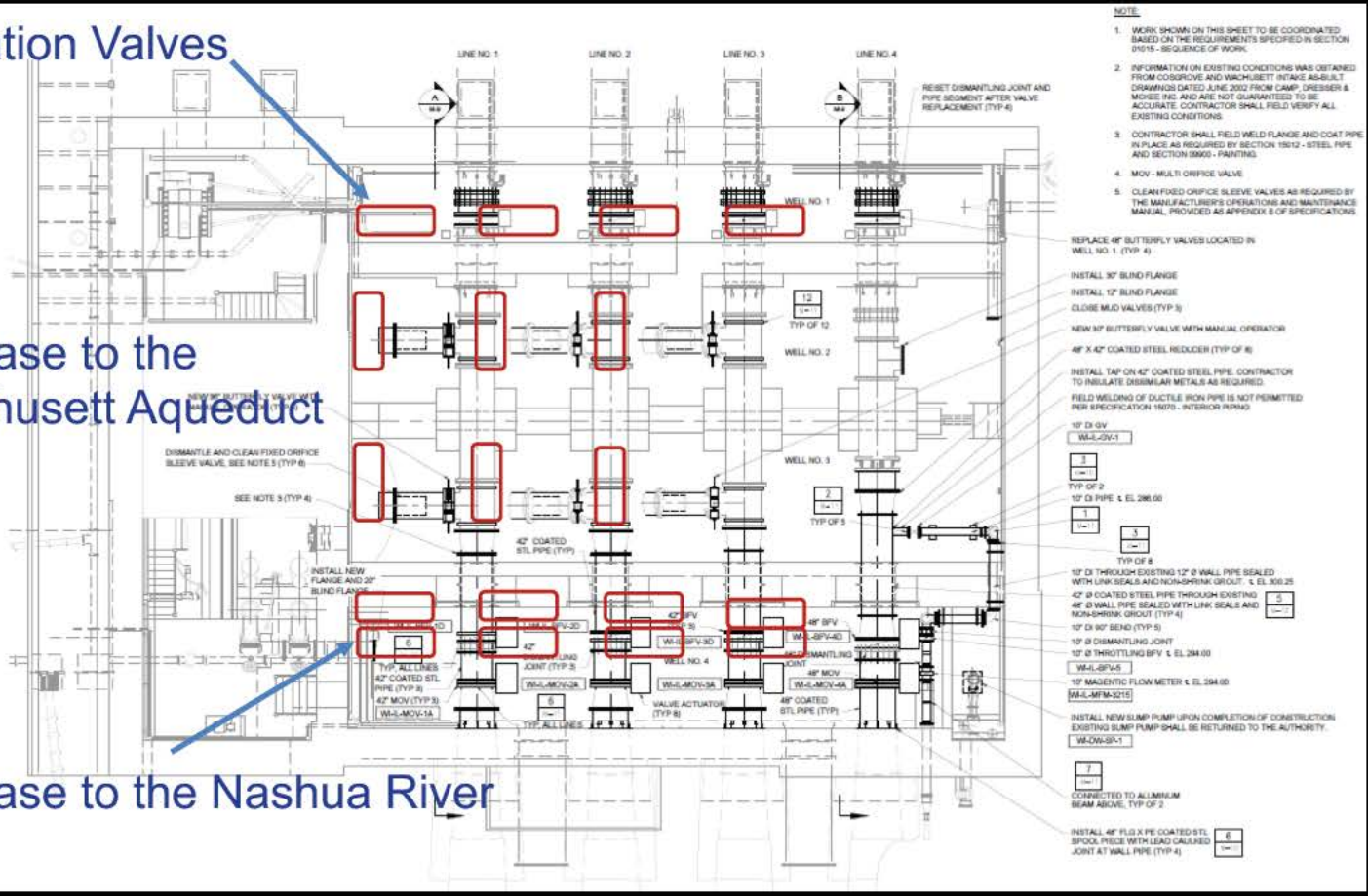
(4)

Release to the Wachusett Aqueduct

(6)

Release to the Nashua River

(8)



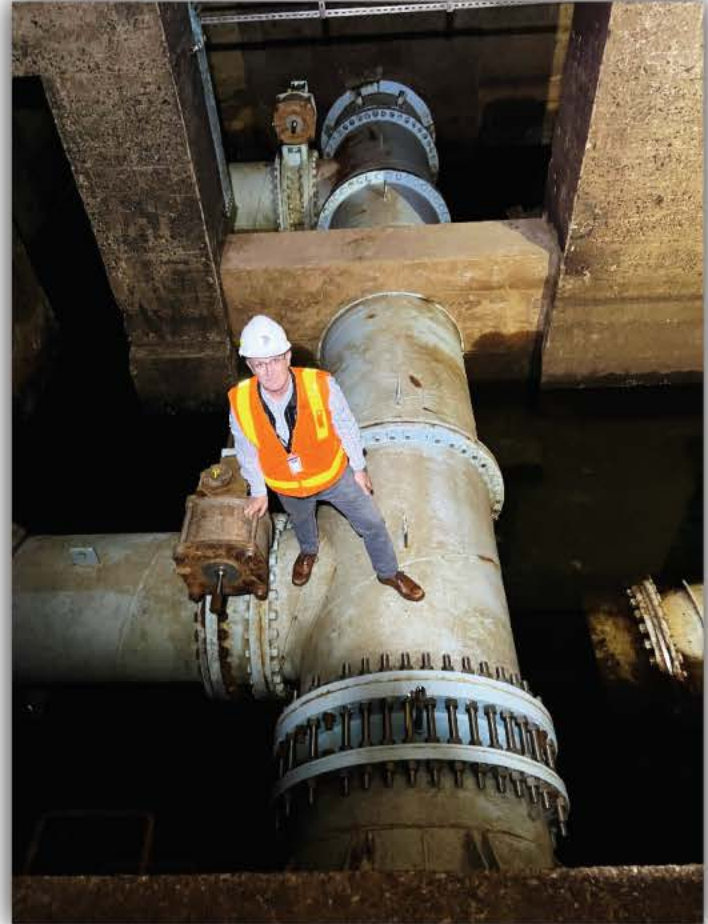


# Well 1 Isolation Valve Installation



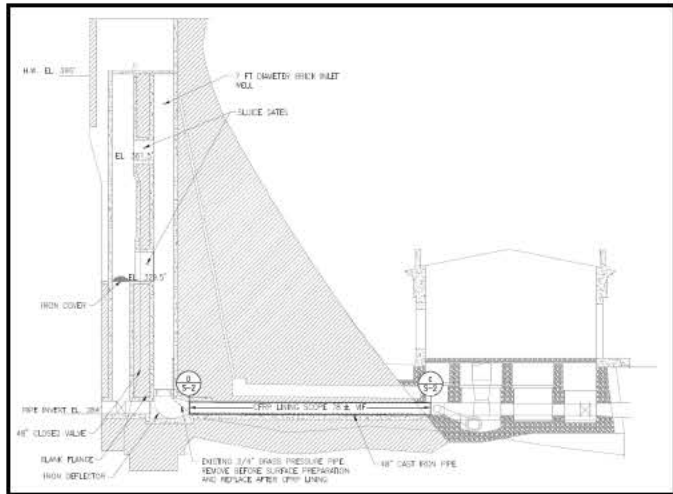


# Well 2 and 3 Valve/Pipe Installation





# Carbon Fiber Reinforced Polymer Lining



The CFRP liners provide full structural strength without contribution from the host cast iron pipe





# Boiler, Heating Units and New Bathroom





# Hazardous Materials Abatement







# Procurement Process

One Bid Received October 21, 2022:

Contractor	Bid Amount
<b>J.F. White</b>	<b>\$19,333,573</b>
<i>Engineer's Estimate</i>	<i>\$11,606,000</i>

Contract duration is 18 months