



Presentation to

MWRA Board of Directors

***Quabbin Reservoir Communities System
Expansion Evaluation Update***

April 16, 2025



Study Communities

Community System Status

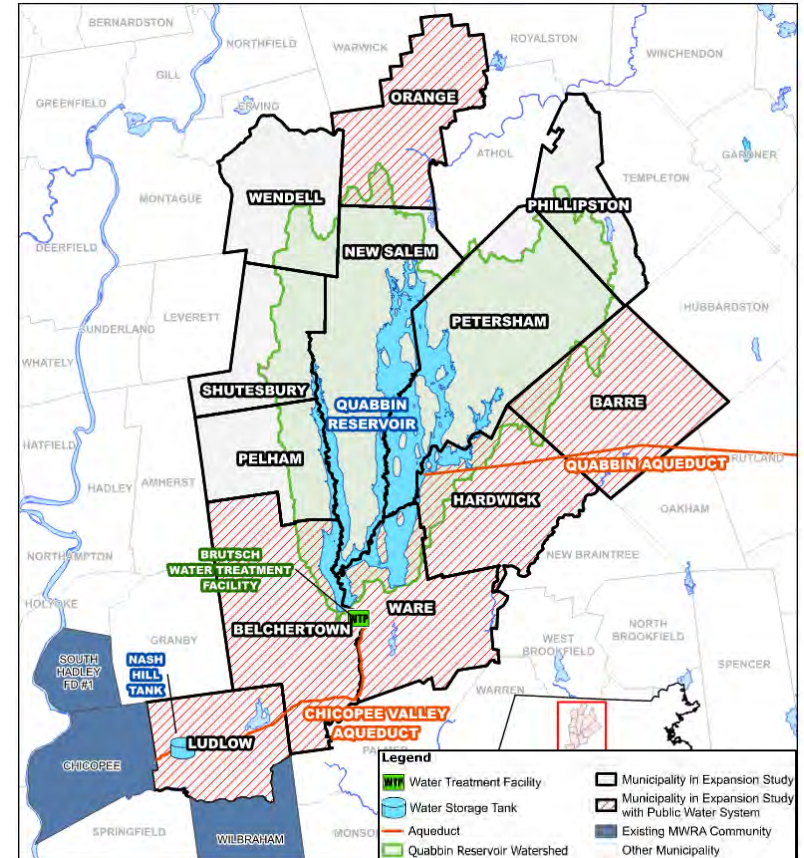
With Existing Community Public Water System

- Barre
- Belchertown
- Hardwick
- Ludlow¹
- Orange
- Ware

Without Existing Community Public Water System

- New Salem
- Pelham²
- Petersham
- Phillipston
- Shutesbury
- Wendell

1. Supplied mainly by Springfield
2. Partially supplied by Amherst





Study Objectives

- Planning level evaluation
- Similar methodology as prior studies
- Quantify available capacity to serve new customers
- Identify critical infrastructure needed
- Identify potential water supply alternatives
- High level cost estimates



Study Components

- **Analysis of Community Water Demands and System Assets**
 - Population and water demands
 - Water distribution infrastructure
 - Community expansion or development plans
 - Review Annual Statistical Reports
- **Evaluation of demands and preparation of conceptual alternatives for water supply**
 - Geography and topography considerations
 - Proximity to existing MWRA infrastructure
 - New intakes from Quabbin
 - New groundwater sources
 - Pumping, treatment, storage, and watermains



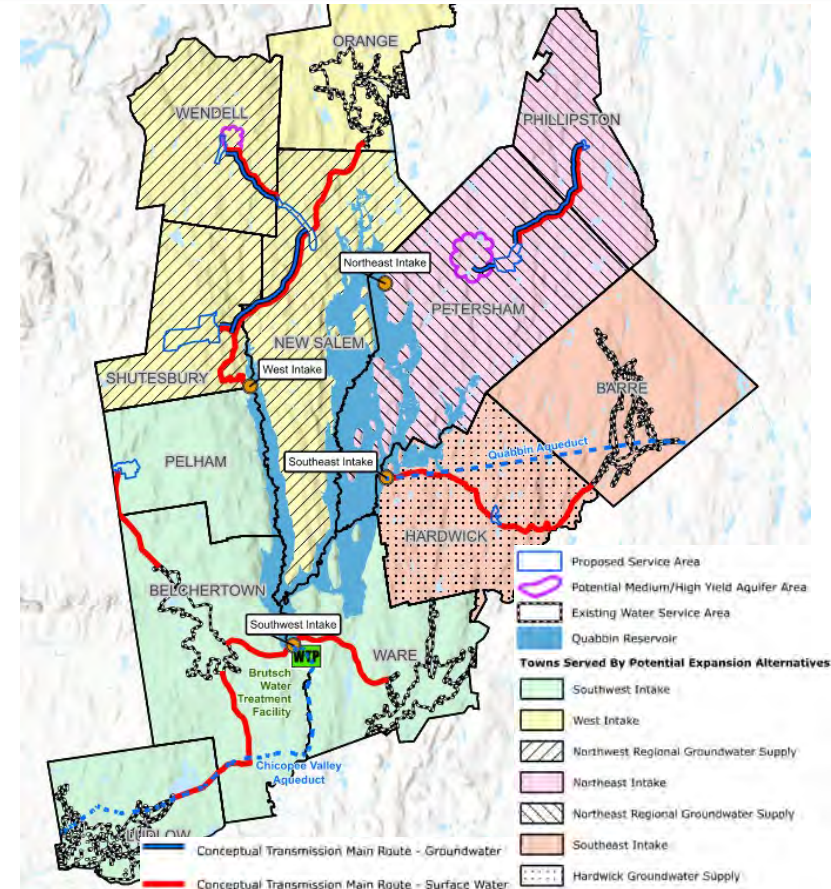
Service Area Assumptions

- **Service Area Determination for Towns with PWS**
 - Same service area as currently served
 - Considered minor expansion to include nearby Residences or Non-Community Water Systems
- **Service Area Determination for Towns without PWS**
 - Generally limited to Town Centers
 - Considered minor expansion to include nearby Residences or Non-Community Water Systems



Potential Expansion Alternatives

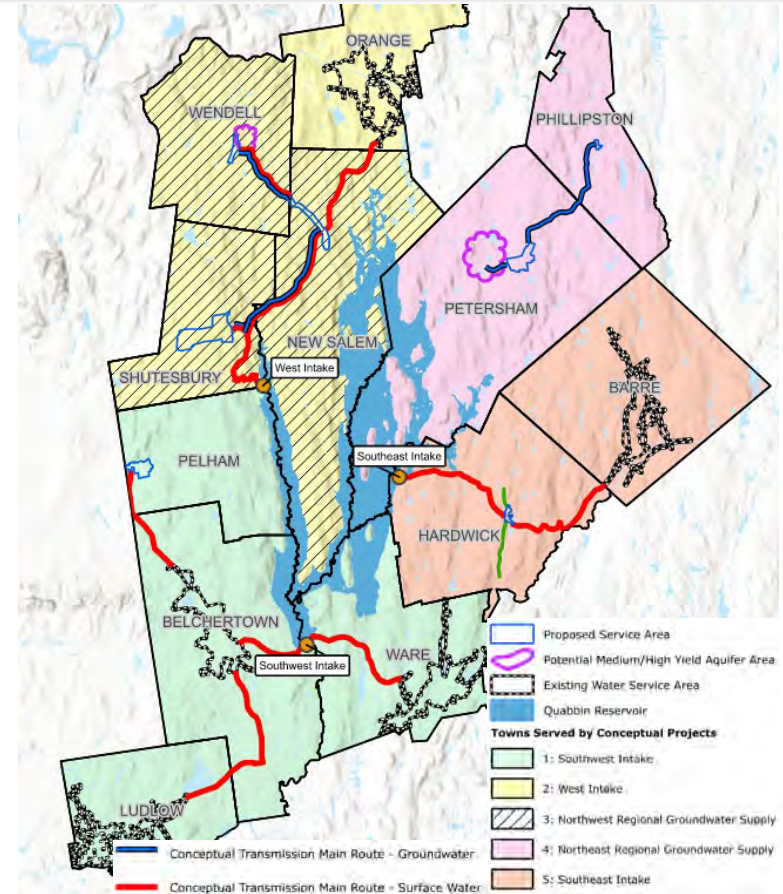
- **Potential Groundwater Supply Alternatives**
 - Regional (multi-community)
 - Decentralized (individual communities)
- **Potential Surface Water Alternatives**
 - Multiple locations around the reservoir
 - Depth of reservoir during drought a critical factor
- **Existing MWRA Water System Capacity**
 - Brutsch Water Treatment Facility and Chicopee Valley Aqueduct have no capacity.
 - Quabbin Aqueduct use not feasible.





Conceptual Projects Evaluated

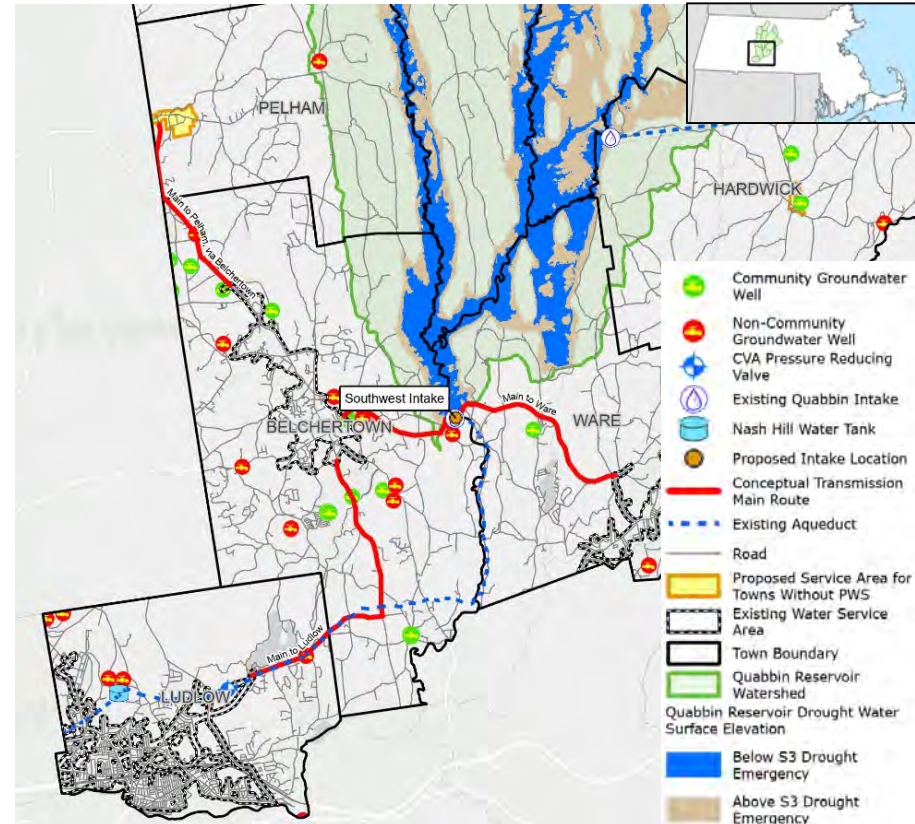
1. **Southwest Intake:** Belchertown, Ware, Ludlow and Pelham
2. **West Intake:** New Salem, Wendell, Shutesbury and Orange
3. **Northwest Regional Groundwater Supply:** New Salem, Wendell, and Shutesbury
4. **Northeast Regional Groundwater Supply:** Phillipston and Petersham
5. **Southeast Intake:** Hardwick and Barre





Conceptual Project 1: Southwest Intake

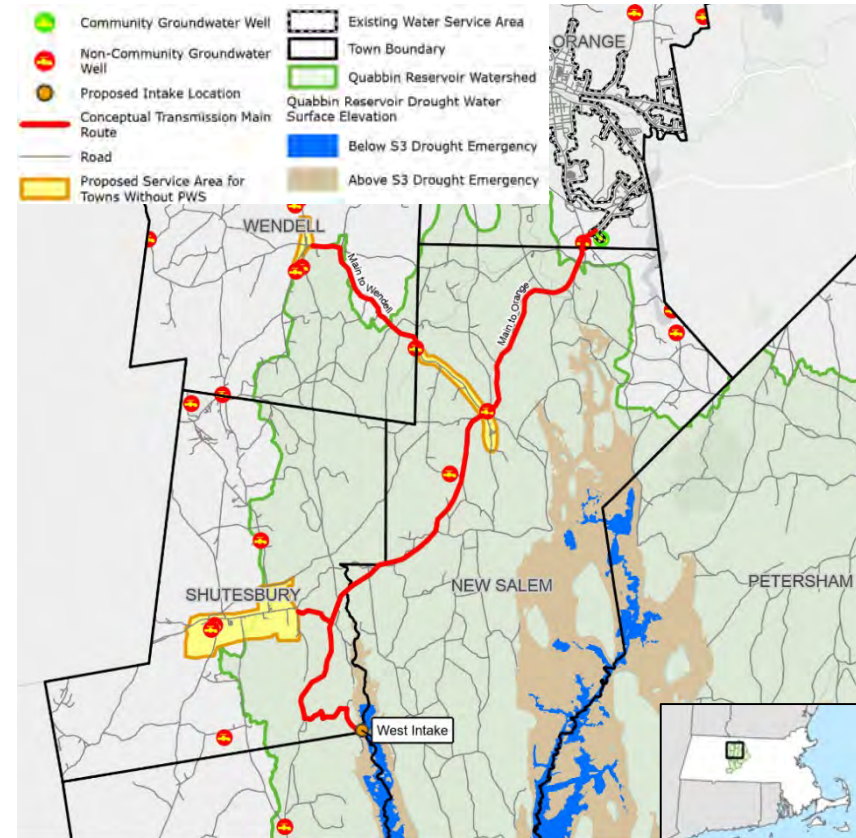
- Belchertown, Ludlow, Pelham, Ware
 - 2 elevated water storage tanks
 - 1 booster station
 - ~ 19 miles of transmission mains
 - ~ 2 miles of distribution mains
- 5 mgd Max Day
- Population Served: ~25,500 (53%)
- Opinion of Probable Cost: \$170 M (2029)





Conceptual Project 2: West Intake

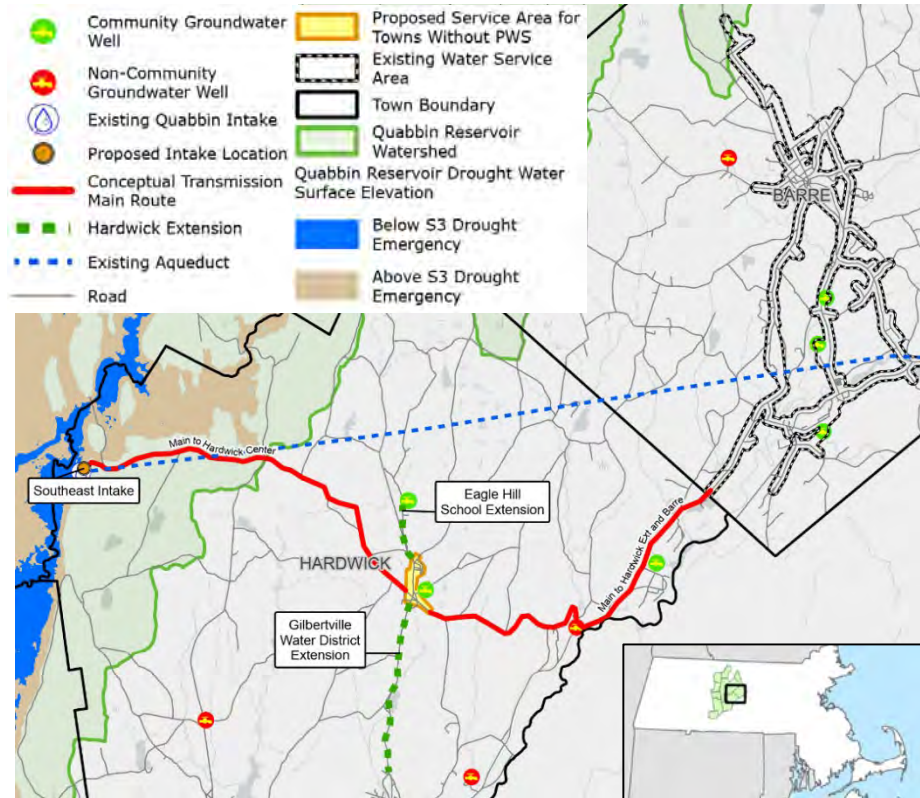
- Shutesbury, New Salem, Wendell and Orange
 - 7 water storage tanks (4 elevated; 3 ground with pump station)
 - 5 booster stations
 - ~17 miles of transmission mains
 - ~10 miles of distribution mains
- 1.3 mgd Max Day
- Population Served: ~7,000 (63%)
- Opinion of Probable Cost: \$215M (2029 dollars)





Conceptual Project 5: Southeast Intake

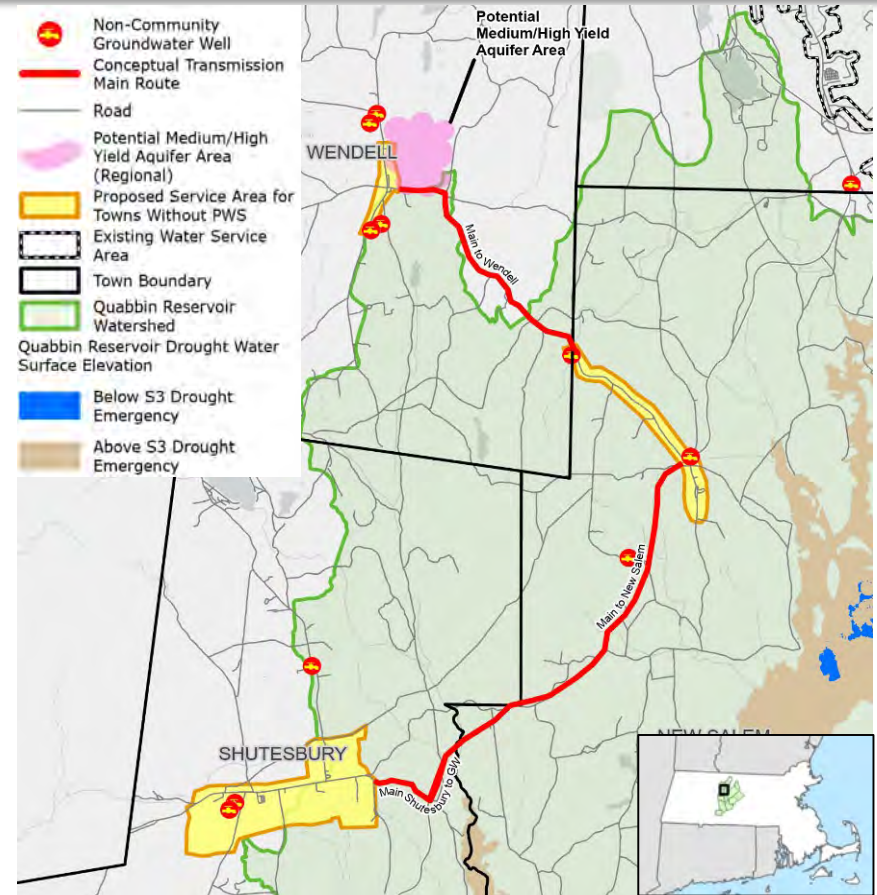
- Hardwick and Barre
 - 2 water storage tanks (1 elevated and 1 ground with pump station)
 - 3 booster stations
 - ~13 miles of transmission mains
 - ~1 mile of distribution mains
- 1.1 mgd Max Day
- Population Served: ~6,000 (74%)
- Opinion of Probable Cost: \$113M (2029 dollars)





Conceptual Project 3: Northwest Regional Groundwater Supply

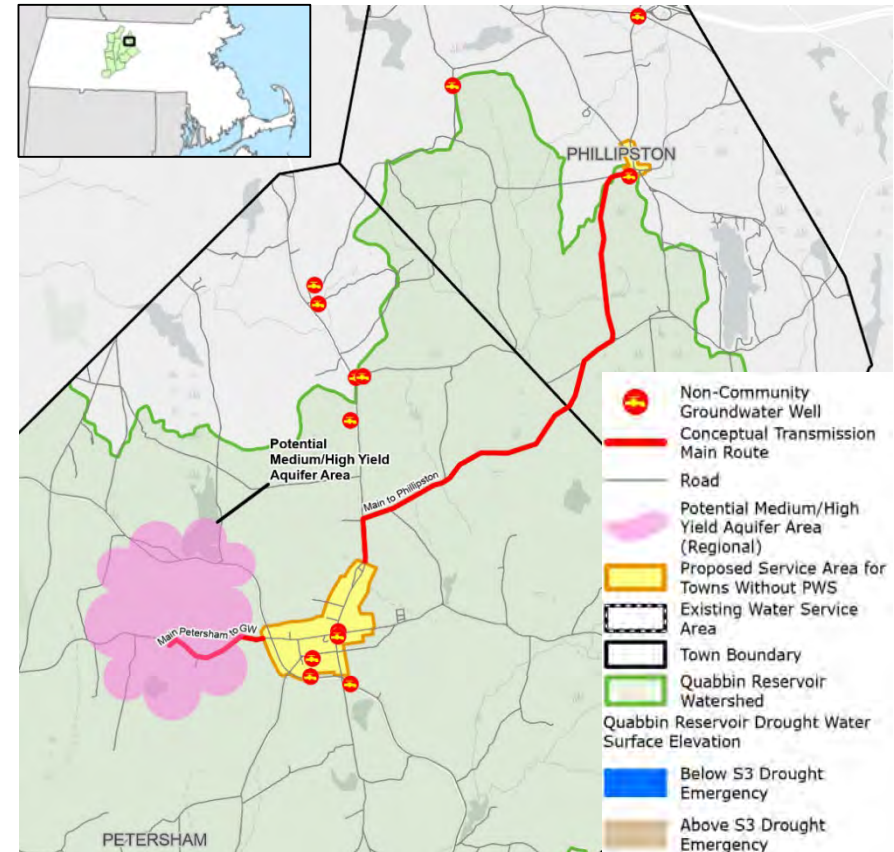
- New Salem, Wendell and Shutesbury
 - 3 elevated water storage tanks
 - 1 booster pump station
 - ~9 miles of transmission mains
 - ~10 miles of distribution mains
- 0.11 mgd Max Day
- Population Served: ~550 (15%)
- Opinion of Probable Cost: \$112 M (2029 dollars)





Conceptual Project 4: Northeast Regional Groundwater Supply

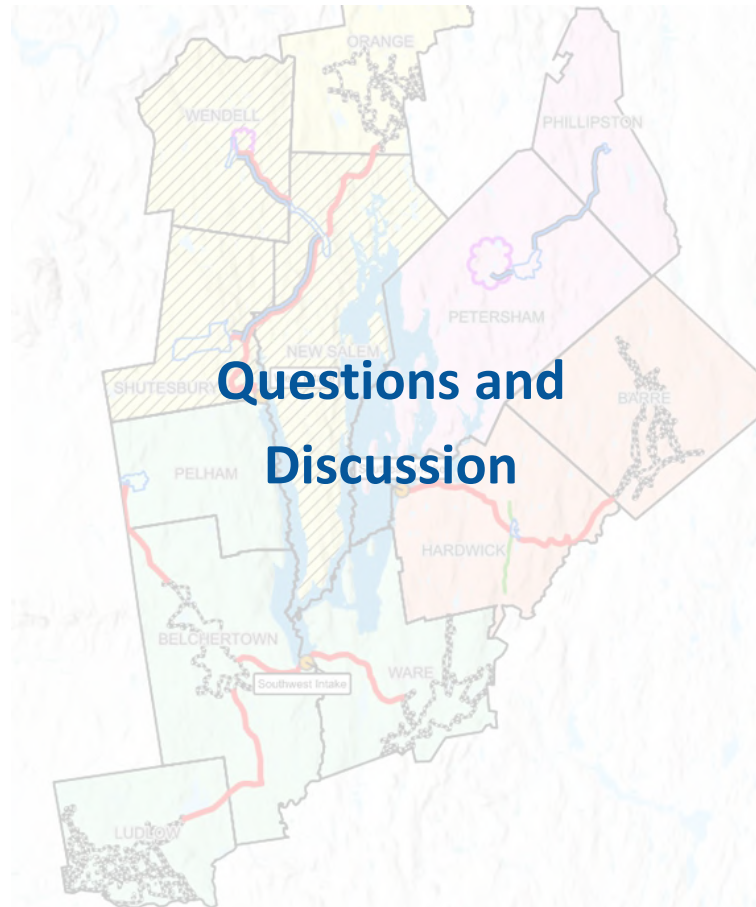
- Petersham and Phillipston
 - 3 water storage tanks (2 elevated and 1 ground with pump station)
 - 2 booster pump stations
 - ~6 miles of transmission mains
 - ~5 miles of distribution mains
- 0.06 mgd Max Day
- Population Served: ~315 (11%)
- Opinion of Probable Cost: \$70M (2029 dollars)





Next Steps

- Publish Report
- Public presentation of report findings





Presentation to

MWRA Board of Directors

***Local Water System Assistance Program
Annual Update***

April 16, 2025



MWRA Local Water System Assistance Program Funding Summary

MWRA LOCAL WATER SYSTEM ASSISTANCE PROGRAM ALLOCATION AND FUND UTILIZATION BY COMMUNITY AS OF DECEMBER 2024

Community	Total Allocation Phase 2 - 4	Total Distributed Phase 2 - 4	Percent Distributed	Total Remaining Funds
Arlington	\$23,473,000	\$12,100,000	52%	\$11,373,000
Ashland*	\$1,370,400	\$0	0%	\$1,370,400
Bedford *	\$9,304,000	\$2,418,000	26%	\$6,886,000
Belmont	\$10,462,000	\$6,977,000	67%	\$3,485,000
Boston	\$141,180,000	\$80,021,364	57%	\$61,158,636
Brookline	\$12,502,000	\$4,660,000	37%	\$7,842,000
Burlington*	\$1,951,400	\$0	0%	\$1,951,400
Canton *	\$8,824,000	\$5,716,000	65%	\$3,108,000
Chelsea	\$14,012,000	\$6,325,700	45%	\$7,686,300
Dedham/Westwood *	\$2,451,000	\$1,352,000	55%	\$1,099,000
Everett	\$16,187,000	\$7,991,200	49%	\$8,195,800
Framingham	\$26,221,000	\$10,057,900	38%	\$16,163,100
Lexington	\$21,715,000	\$4,915,015	23%	\$16,799,985
Lynnfield Water Dist.	\$4,685,000	\$2,926,800	62%	\$1,758,200
Malden	\$27,847,000	\$14,695,500	53%	\$13,151,500
Marblehead	\$14,061,000	\$5,259,400	37%	\$8,801,600
Marlborough	\$13,924,000	\$1,283,800	9%	\$12,640,200
Medford	\$27,899,000	\$14,497,000	52%	\$13,402,000
Melrose	\$17,390,000	\$8,793,500	51%	\$8,596,500
Milton	\$15,691,000	\$7,563,800	48%	\$8,127,200
Nahant	\$5,293,000	\$2,235,550	42%	\$3,057,450
Needham *	\$4,785,000	\$1,131,265	24%	\$3,653,735
Newton	\$54,012,000	\$19,833,100	37%	\$34,158,900
Northborough	\$4,516,000	\$986,053	22%	\$3,529,947
Norwood	\$15,417,000	\$9,431,800	61%	\$5,985,200
Peabody *	\$7,612,000	\$3,845,000	51%	\$3,767,000
Quincy**	\$36,322,000	\$23,331,800	64%	\$12,990,200
Reading	\$13,510,000	\$7,189,800	53%	\$6,320,200
Revere	\$15,343,000	\$7,160,000	47%	\$8,183,000
Saugus	\$25,331,000	\$10,123,414	40%	\$15,207,586
Somerville	\$28,483,000	\$13,008,234	46%	\$15,474,766
Southborough	\$5,151,000	\$0	0%	\$5,151,000
Stoneham	\$7,601,000	\$4,839,000	64%	\$2,762,000
Stoughton*	\$6,917,000	\$4,128,000	60%	\$2,789,000
Swampscott	\$14,046,000	\$6,049,468	43%	\$7,996,532
Wakefield *	\$8,538,000	\$5,325,000	62%	\$3,213,000
Waltham	\$40,061,000	\$11,755,561	29%	\$28,305,439
Watertown	\$15,353,000	\$5,661,000	37%	\$9,692,000
Wellesley *	\$9,904,000	\$1,813,569	18%	\$8,090,431
Weston	\$6,059,000	\$3,818,497	63%	\$2,240,503
Wilmington *	\$3,260,000	\$611,000	19%	\$2,649,000
Winchester *	\$3,692,000	\$775,000	21%	\$2,917,000
Wintrop	\$11,009,000	\$7,431,000	67%	\$3,578,000
Woburn *	\$10,982,000	\$6,091,000	55%	\$4,891,000
SUBTOTAL	\$764,346,800	\$354,148,090	46%	\$410,198,710
Chicopee	\$27,340,000	\$12,339,400	45%	\$15,000,600
South Hadley F.D. I	\$5,784,000	\$2,038,000	35%	\$3,746,000
Wilbraham	\$5,876,000	\$0	0%	\$5,876,000
SUBTOTAL	\$39,000,000	\$14,377,400	37%	\$24,622,600
TOTAL	\$803,346,800	\$368,525,490	46%	\$434,821,310.00

* Partially Served Communities

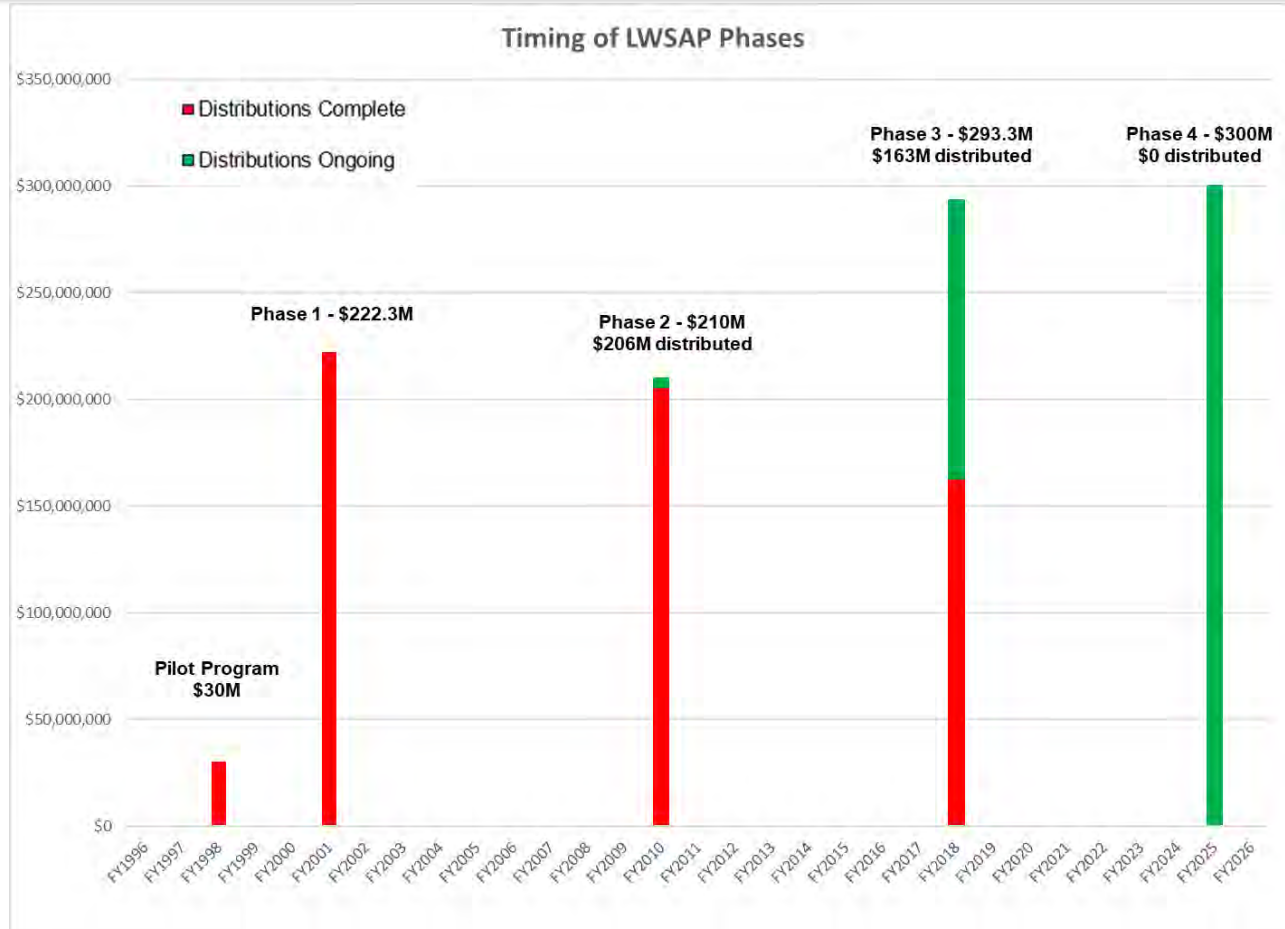
** Exempt per Board Approval

* Per Board Approval, years 4, 9 and 10 allocations were distributed in June 2020

- \$1.025 Billion approved in four (4) phases
- \$621M distributed (FY01 - December 2024)
- \$435M loans repaid to MWRA
- 44 communities participating
- Community allocation based on % share water charge and % share unlined pipe
- 624 local projects funded
- 559 projects complete / 65 ongoing
- \$27.8M distributed to 8 communities in CY24



MWRA's Long-Term Commitment to Fund Local Water System Rehabilitation





MWRA Funding for Local Water Projects



Tuberculated Water Main

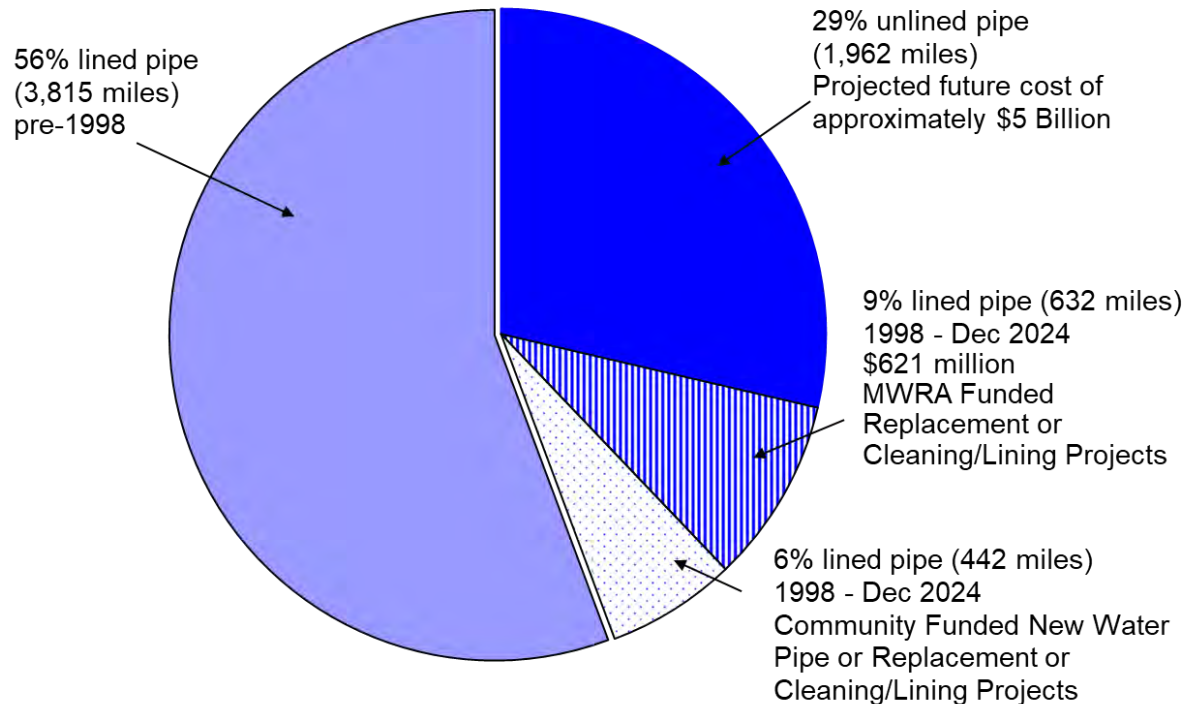


**Water Main Replacement
Construction**



MWRA Has Funded a Nine Percent Reduction in Unlined Cast Iron Mains

Regional Water System Lined and Unlined Pipe
6,851 Miles of Community Water Mains
Updated through December 2024





Presentation to

MWRA Board of Directors

***Lead Service Line Replacement
Program Update***

April 16, 2025



MWRA Lead Loan Program

- Launched in 2016 - \$100 M for community projects
- 10 year interest-free loans
- Must replace **ALL** lead pipe within a service line - **BOTH** public and private portions
- If any portion of service is lead or brass, entire service is eligible for replacement
- 17 communities received \$43.8 M to fund 46 projects
- MWRA's water programs have funded more than **7,900 LSL** replacements & **1,400 lead gooseneck** replacements





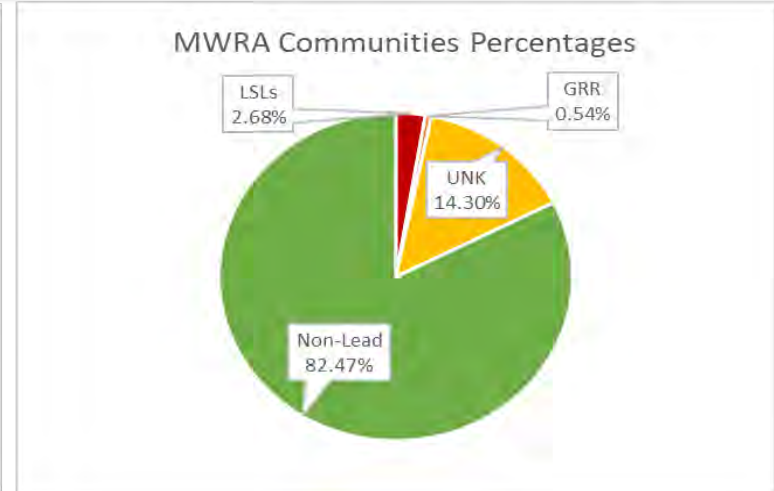
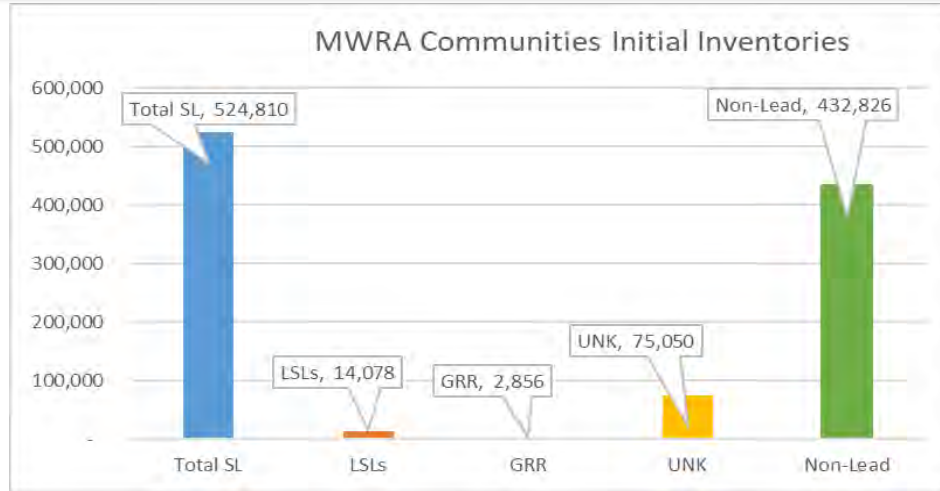
Revisions to the Program: Lead Replacement Program

- In 2024, the Board of Directors authorized an additional \$100 million and inclusion of a 25% grant.
- Replacing the private side at no cost to the homeowner is required to receive the 25% grant. Communities that do not fully fund the private side can still apply for 0% interest loan.
- Eligible projects include: LSL Replacements, Investigations, and Related Services.

$$\begin{array}{c} \$100 \\ \text{M} \end{array} - \begin{array}{c} \$44 \\ \text{M} \end{array} + \begin{array}{c} \$100 \\ \text{M} \end{array} = \begin{array}{c} \$156 \\ \text{M} \end{array}$$



Approved Initial Inventory Findings



- 524,810 total service lines reported by MWRA communities
- Lead Service Lines 14,078 (2.68% of total)
- Galvanized Requiring Replacement 2,856 (0.54% of total)
- Unknowns 75,050 (14.30% of total)
 - Many are in communities that do not expect to find lead



Community Participation

- Significant outreach to every community
- Four distributions were completed in the third quarter of FY25
 - Chelsea: \$800,000 (Grant/Loan)
 - Winthrop: \$980,000 (Grant/Loan)
 - Watertown: \$300,000 (Loan)
 - Brookline: \$2,000,000 (Loan)
- Several Communities are expected to request funding in the fourth quarter of FY25
 - Everett
 - Malden
 - Marblehead
 - Marlborough
 - Medford
 - Milton
 - Revere
 - Winchester





Presentation to

MWRA Board of Directors

***Saugus River Crossing Section 56 Pipeline
Replacement Contract 7486***

April 16, 2025



Project Overview





Site Photos

Point of Pines Yacht Club
Revere



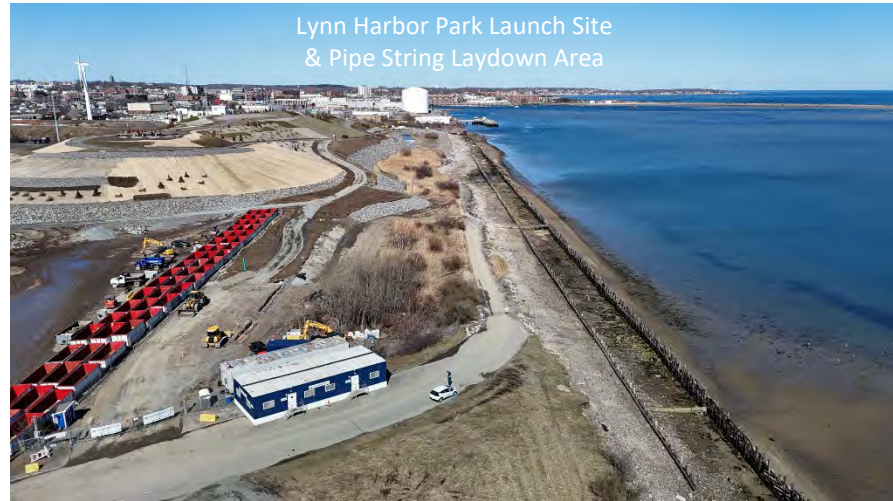
POPYC Looking North to Lynn



Lynn Harbor Park Launch Site
Looking South



Lynn Harbor Park Launch Site
& Pipe String Laydown Area





Bid Results

<u>Bidders</u>	<u>Bid Amount</u>
BOND Civil & Utility Construction, Inc.	\$9,484,846.99
McCourt Construction Company	\$9,850,000.00
P. Gioioso & Sons Inc.	\$10,775,000.00
R. Zoppo Corp.	\$10,848,000.00
RJV Construction Corp.	\$11,650,000.00
<i>ENGINEER'S ESTIMATE</i>	<i>\$12,208,294.00</i>
Albanese D&S, Inc.	\$13,224,000.00
Albanese Bros. Inc.	\$14,440,800.00
MAS Building & Bridge, Inc.	\$15,450,000.00

Staff recommend award to BOND Civil & Utility Construction, Inc.



Presentation to

MWRA Board of Directors

***2023 Greenhouse Gas Inventory Update &
Progress on Emissions Reduction***

April 16, 2025



MWRA's Commitment to Energy Savings and Emissions Reduction

- Nearly 20 years of measured emissions reduction
 - Energy efficiency
 - Electrification
 - Renewables
- Selected for the 2023 Leading by Example Award
- Released first inventory in 2016
- Guided by State climate goals

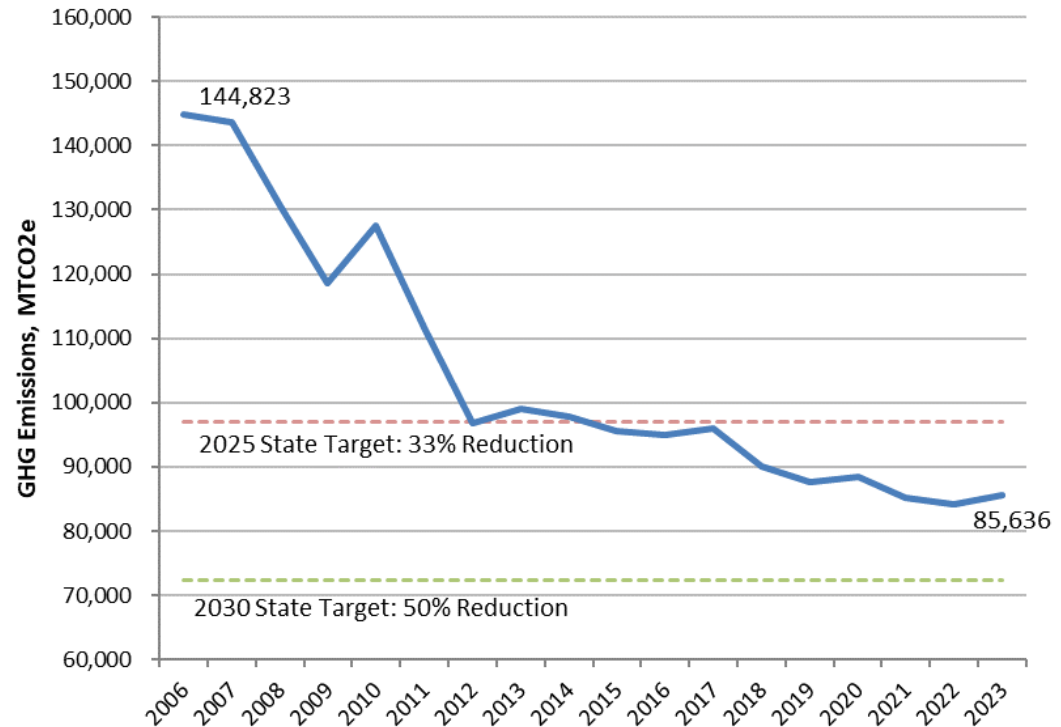




Major Reductions Over the Past Two Decades

- 41% reduction since 2006
 - ~60,000 MTCO₂e = 13,000 vehicles off the road/year
- Slight rise in emissions in 2023
 - Higher precipitation, leading to nearly 30% more flows at DI

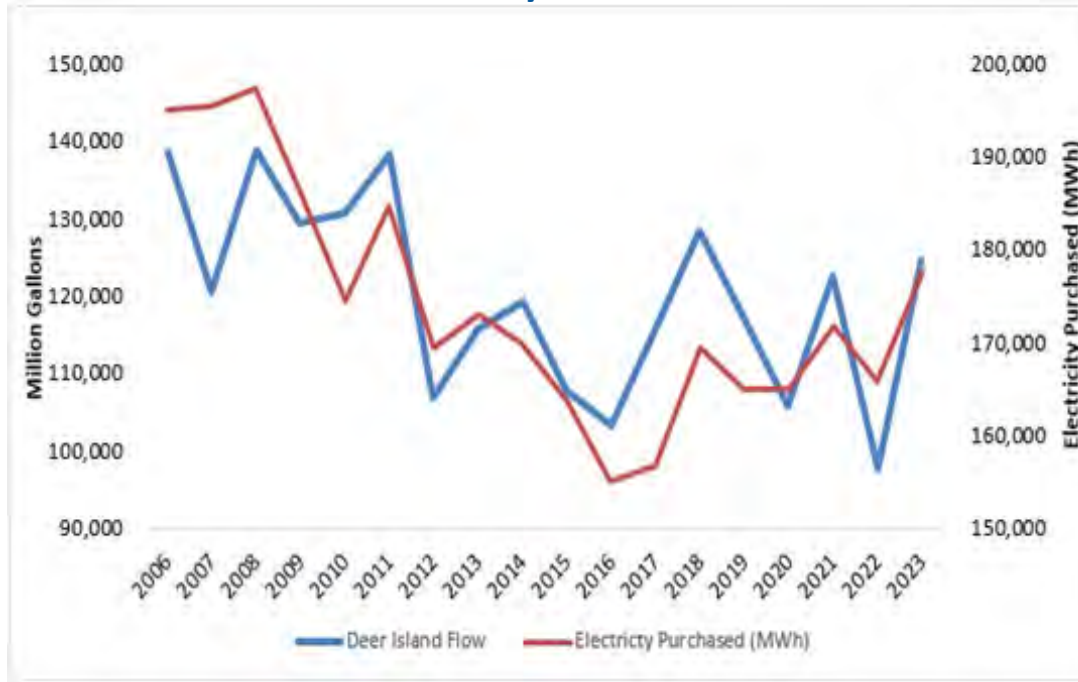
GHG Emissions - Metric Tons of CO₂ Equivalent (2006 – 2023)





Energy Demand and Emissions are Dependent on Precipitation

Relationship between Deer Island Flow and Electricity Purchased



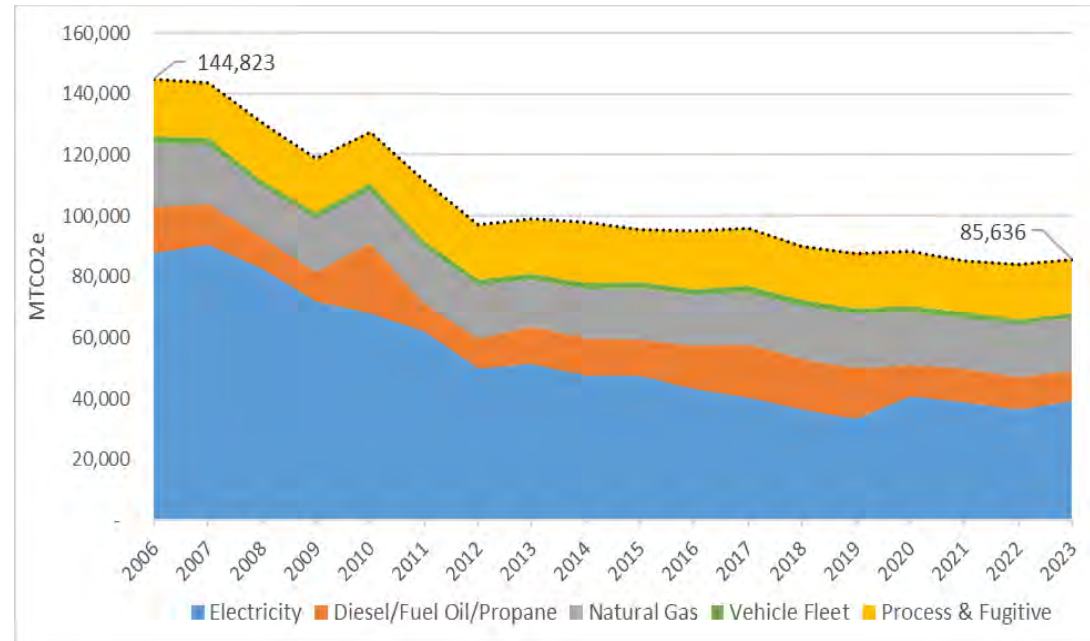
- Wastewater accounts for nearly 90% of MWRA emissions
- Emissions linked to precipitation and flow
- More rain → more wastewater to pump → more electricity → higher emissions



Five Categories of GHG Emissions

- **Electricity: 45.4%**
- **Process and fugitive: 20.4%**
 - CH₄, N₂O, CO₂ emissions from biochemical reactions of wastewater treatment
- **Natural gas: 20.2%**
 - Dryers at pellet plant and heating
- **Diesel/fuel oil/propane: 12.1%**
 - Emergency generators and heating
- **Vehicle fleet: 1.9%**

MWRA GHG Emission Sources, 2006-2023

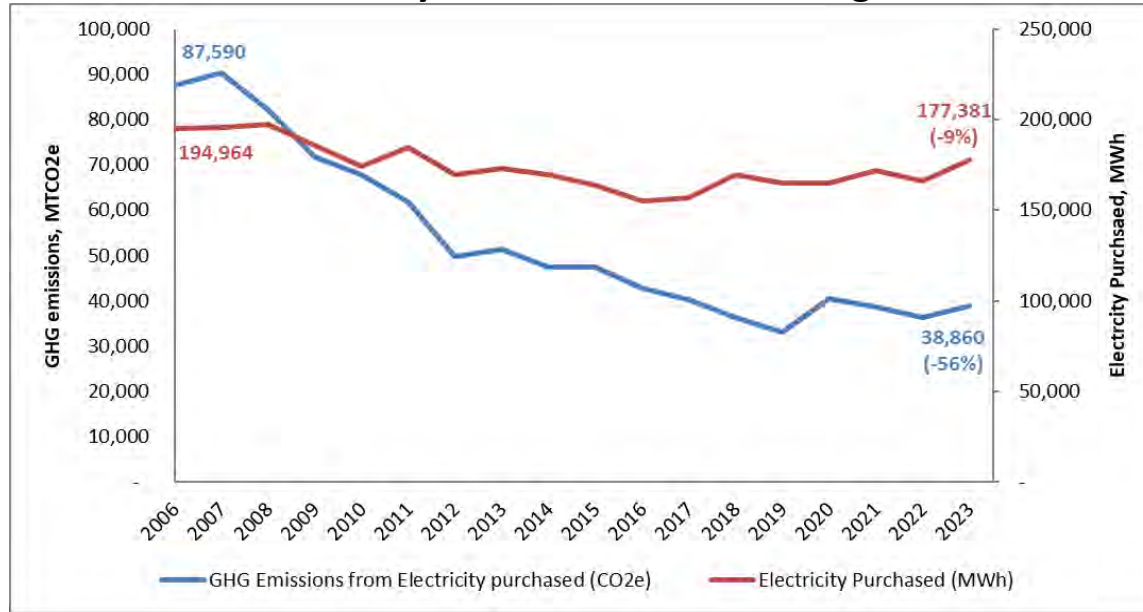




Majority of Emissions Reductions are Associated with Electricity

- Over 80% of MWRA's overall reductions are from electricity
 - 56% reduction since 2006
 - 7% increase from 2022 to 2023 due to higher rainfall
- Heavily linked to greener grid
- Emphasizes the importance of electrification

MWRA Electricity Purchases and Resulting Emissions





Varying Rates of Reduction for Other Sources

Process & Fugitive

- Relatively static
- Population dependent
- Challenging to reduce

Natural Gas

- 18% reduction since 2006
- 80% of emissions from pellet plant

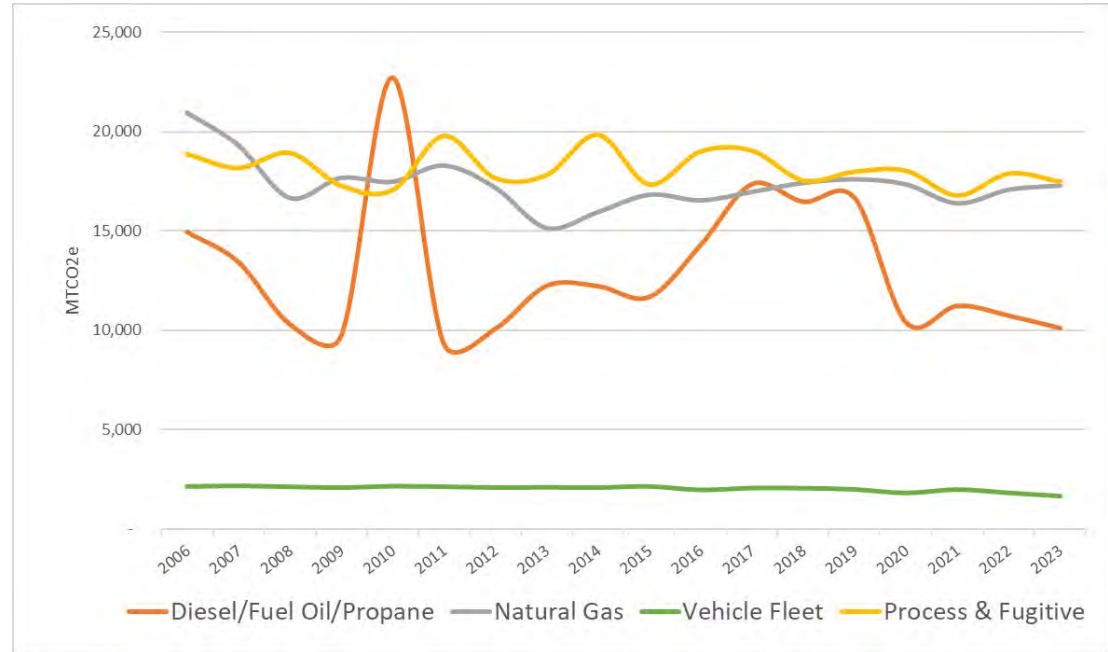
Diesel/Fuel Oil/Propane

- 32% reduction since 2006
 - Conversion from oil to gas and electricity for heating
- 8% decrease from 2022 to 2023 due to milder winter

Fleet

- 23% reduction due to hybrid and EV purchases

Emissions from Natural Gas, Diesel & Fuel Oil, Process & Fugitive, & Fleet





Energy Efficiency Progress & Plans

Accomplishments

- Dozens of energy audits led to process, lighting, and equipment efficiencies over 10+ years

Plans

- Currently designing a new combined heat and power facility at Deer Island
 - More than double existing electricity generation
 - 75% less fuel required
- Energy and electrification audits at six pump stations ongoing



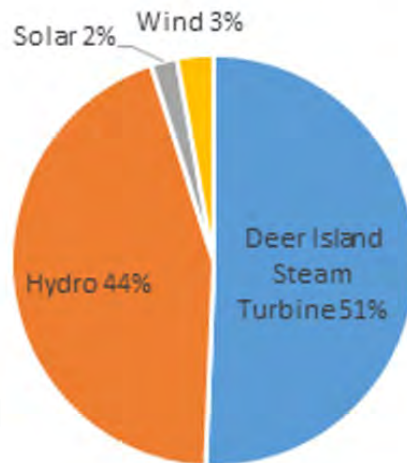
Accomplishments

- Renewable portfolio:
 - 5 hydro turbines
 - 2 wind turbines
 - 5 solar PV
 - DI steam turbines
- Over 60% used onsite:
 - ~20% of MWRA electricity usage
 - Avoiding over 5 million gallons of fuel oil

Plans

- State Climate Mitigation grant (\$20M):
 - Solar at Norumbega Storage
 - Solar canopy and rooftop at DI
 - Replacement of wind turbine at DI

2023 Renewable Energy Generation: 57,252 MWh





Electrification Progress & Plans

Accomplishments

- Geothermal heat pump at Wachusett Aqueduct PS
- Water heat pump at Spot Pond
- Air heat pumps at Norumbega
- 30 alternative fuel vehicles and 16 chargers

Plans

- Heat pump installation
- Investigating wastewater energy recovery systems
- Feasibility study for large scale battery system at Deer Island
- 60 additional EV chargers and fleet expansion





Next Steps



- Continue multi-pronged approach
 - Energy efficiency
 - Electrification
 - Renewables
- Explore innovative reduction strategies
- Develop broader GHG Reduction Plan



Presentation to

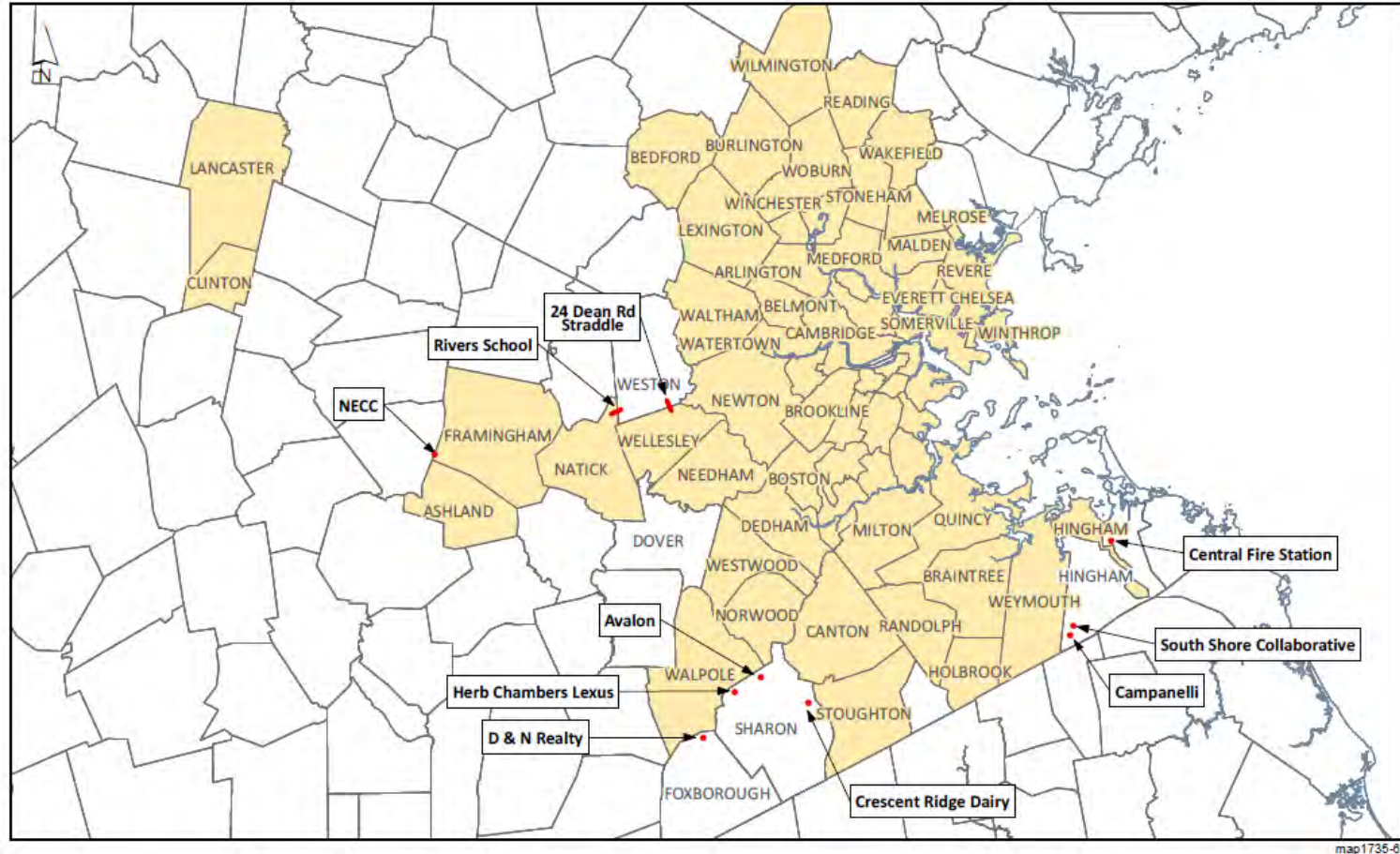
MWRA Board of Directors

***2024 Annual Report Update on
New Connections to the MWRA System***

April 16, 2025



New Sewer Connections Since 2002







Communities Pursuing Admission (OP.10) – Short Term

- Lynnfield Center Water District: Supplemental supply via Wakefield
 - Environmental approvals complete – waiting on legislation
 - Anticipated 2025 admission
- Natick: Supplemental supply from new connection
 - Beginning MEPA process Spring 2025
- Wayland: Partial supply from MWRA Tunnel System
 - Beginning MEPA process Spring 2025
- Weymouth/SWNAS: Supply from new connection
 - In MEPA process



Presentation to

MWRA Board of Directors

***Infiltration/Inflow Local Financial Assistance
Program Annual Update***

April 16, 2025



MWRA I/I Local Financial Assistance Program

- Program initiated in May 1993
- Goal: Rehabilitation of local sewer systems and long-term reduction of I/I

Infiltration/Inflow (I/I)



Infiltration

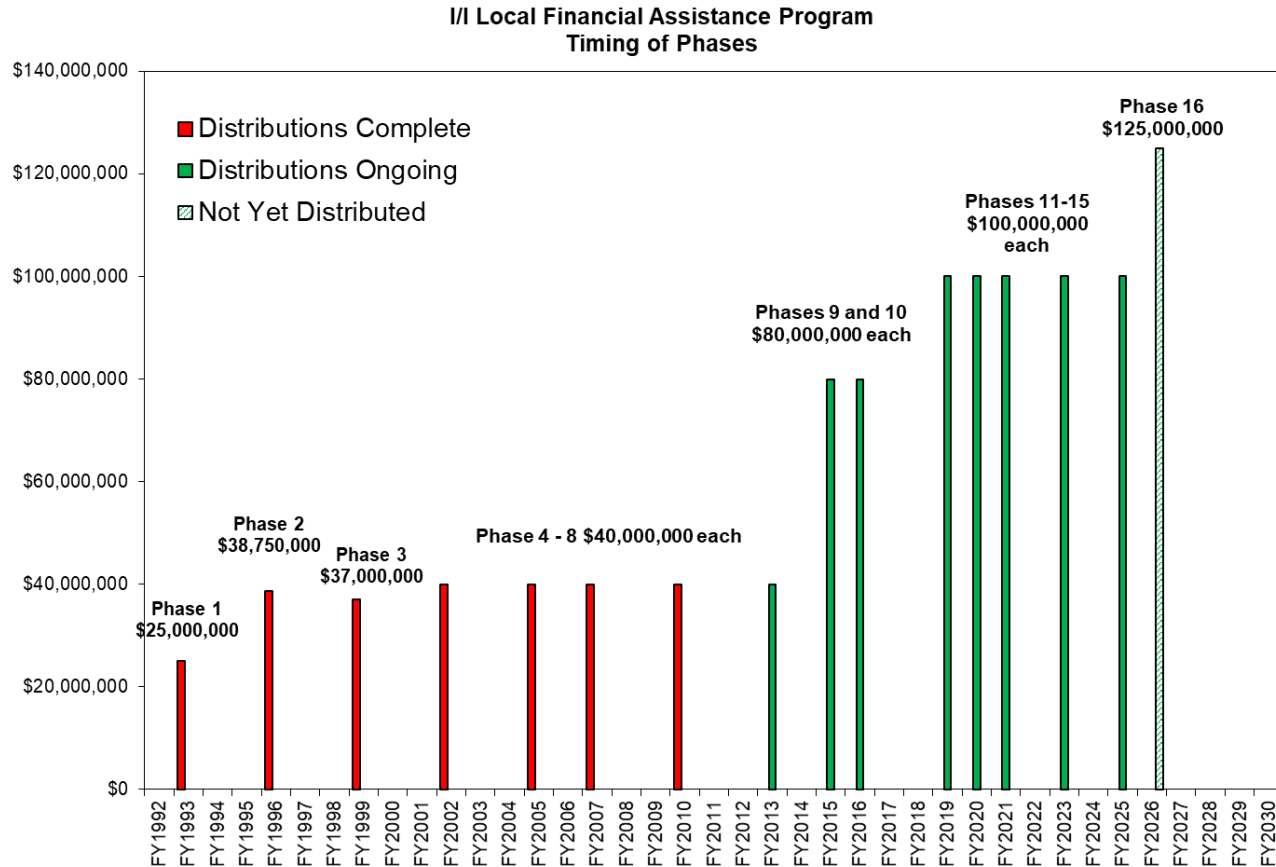
(Groundwater via physical defects)

Inflow

(Stormwater via direct connections)



MWRA's Long-Term Commitment to Fund I/I Reduction





MWRA I/I Local Financial Assistance Program Funding Summary

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM COMMUNITY FUNDING SUMMARY THROUGH DECEMBER 2024

Community	Total Allocations (Phases 1 - 16)	Total Distributions (Phases 1 - 16)	Percent Distributed	Funds Remaining
*Arlington	\$19,408,000	\$13,015,900	67%	\$6,392,100
Ashland	\$5,579,500	\$2,928,860	52%	\$2,650,640
Bedford	\$7,955,600	\$3,109,158	39%	\$4,846,442
Belmont	\$11,690,100	\$5,135,100	44%	\$6,555,000
Boston	\$309,135,200	\$127,275,449	41%	\$181,859,751
Braintree	\$20,901,000	\$12,272,977	59%	\$8,628,023
*Brookline	\$29,698,200	\$19,666,200	66%	\$10,032,000
*†Burlington	\$12,215,800	\$8,522,800	70%	\$3,693,000
Cambridge	\$57,507,100	\$28,830,100	50%	\$28,677,000
Canton	\$9,701,900	\$4,464,250	46%	\$5,237,650
*†Chelsea	\$17,586,100	\$13,510,100	77%	\$4,076,000
*†Dedham	\$13,051,000	\$9,240,000	71%	\$3,811,000
*Everett	\$19,511,500	\$11,611,500	60%	\$7,900,000
Framingham	\$29,111,000	\$13,671,000	47%	\$15,440,000
*†Hingham	\$4,105,500	\$2,812,500	69%	\$1,293,000
Holbrook	\$4,016,600	\$1,349,600	34%	\$2,667,000
*†Lexington	\$17,476,300	\$12,155,300	70%	\$5,321,000
Malden	\$29,486,900	\$6,725,900	23%	\$22,761,000
Medford	\$27,868,600	\$7,961,600	29%	\$19,907,000
*†Melrose	\$14,357,300	\$10,106,300	70%	\$4,251,000
*†Milton	\$12,904,500	\$10,164,500	79%	\$2,740,000
Natick	\$13,248,600	\$6,832,600	52%	\$6,416,000
Needham	\$14,302,600	\$4,018,600	28%	\$10,284,000
*†Newton	\$49,302,400	\$39,277,400	80%	\$10,025,000
Norwood	\$17,124,400	\$6,879,400	40%	\$10,245,000
*Quincy	\$46,608,000	\$32,325,000	69%	\$14,283,000
Randolph	\$14,423,800	\$4,971,058	34%	\$9,452,742
*Reading	\$10,964,100	\$6,709,100	61%	\$4,255,000
Revere	\$24,325,900	\$6,302,900	26%	\$18,023,000
Somerville	\$36,621,800	\$18,995,800	52%	\$17,626,000
*†Stoneham	\$11,422,900	\$7,829,900	69%	\$3,593,000
*†Stoughton	\$11,353,900	\$8,962,900	79%	\$2,391,000
*†Wakefield	\$13,953,900	\$9,836,900	70%	\$4,117,000
Walpole	\$8,876,000	\$5,141,050	58%	\$3,734,950
Waltham	\$31,278,400	\$19,214,560	61%	\$12,063,840
*Watertown	\$14,457,800	\$8,865,800	61%	\$5,592,000
Wellesley	\$13,282,700	\$6,889,700	52%	\$6,393,000
Westwood	\$6,268,300	\$3,091,300	49%	\$3,177,000
Weymouth	\$27,667,900	\$15,548,584	56%	\$12,119,316
Wilmington	\$6,184,000	\$2,462,000	40%	\$3,722,000
*Winchester	\$9,822,000	\$5,923,000	60%	\$3,899,000
*Winthrop	\$7,963,400	\$5,083,400	64%	\$2,880,000
*†Woburn	\$23,029,500	\$16,515,500	72%	\$6,514,000
Totals	\$1,085,750,000	\$566,205,546	52%	\$519,544,454

Note: Through December 2024, eleven communities have used their entire Phase 14‡ funding allocation,
five communities have used their entire Phase 13† funding allocation and
20 communities have used their entire Phase 12* funding allocation.

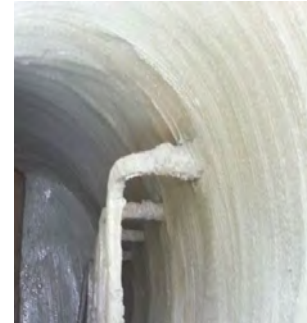
* Phase 12 used
† Phase 13 used
‡ Phase 14 used

- \$1.086 Billion approved (16 Phases)
- Community allocation based on percent share sewer charge
- All 43 communities participating
- \$566M distributed
- 688 local projects funded
- 601 projects complete / 87 projects ongoing
- \$14.8M distributed to 11 communities in CY24



I/I Funding Results of Local Projects

- CCTV Inspection of Sewers: 2,614 Miles
- CIPP Liner Installed: 365 Miles
- Sewer Spot Repairs Performed: 3,415
- Manholes Inspected: 70,535
- Manholes Rehabilitated / Sealed: 24,994
- Manhole Covers Replaced: 4,126
- Sump Pumps Redirected: 551
- Downspouts/Area Drains Disconnected: 5,389





MWRA Long-Term Regional Flow Data – Gradual Decrease in Flow

MWRA Long-Term Regional Flow Data
NOAA Annual Rainfall at Logan Airport

