
WATER RESOURCES AUTHORITY
MASSACHUSETTS

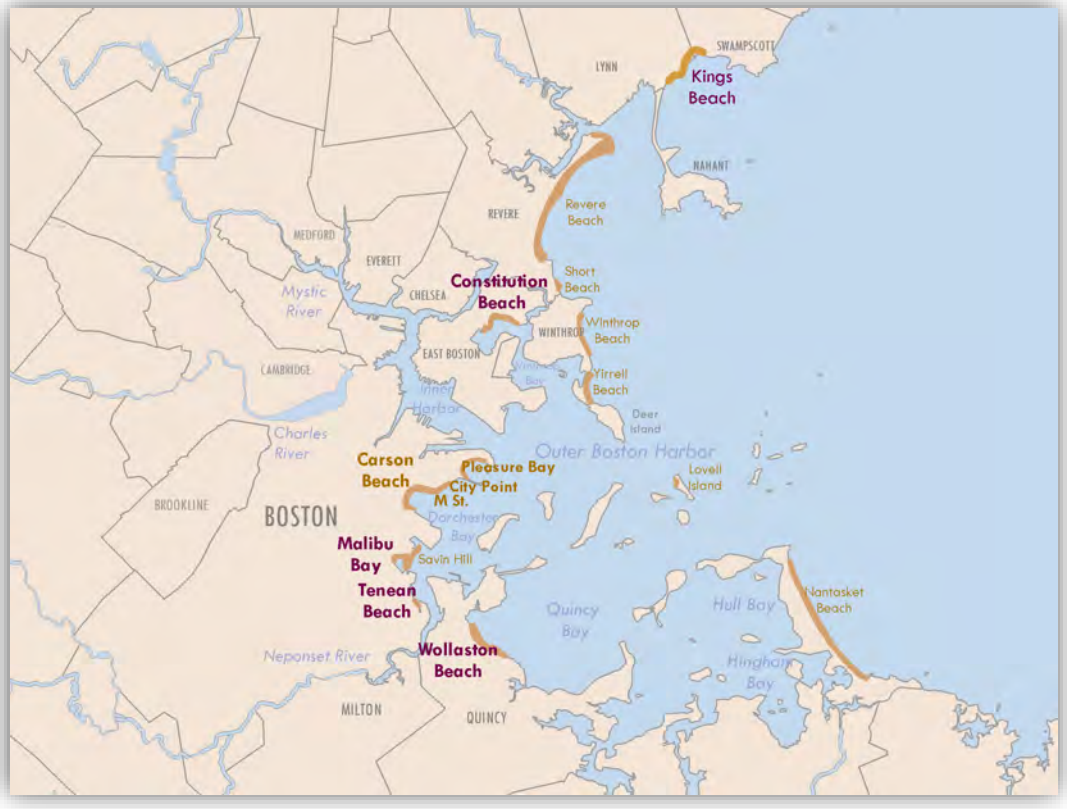
Beach Water Quality

July 19, 2023

Boston Harbor Beaches Monitoring

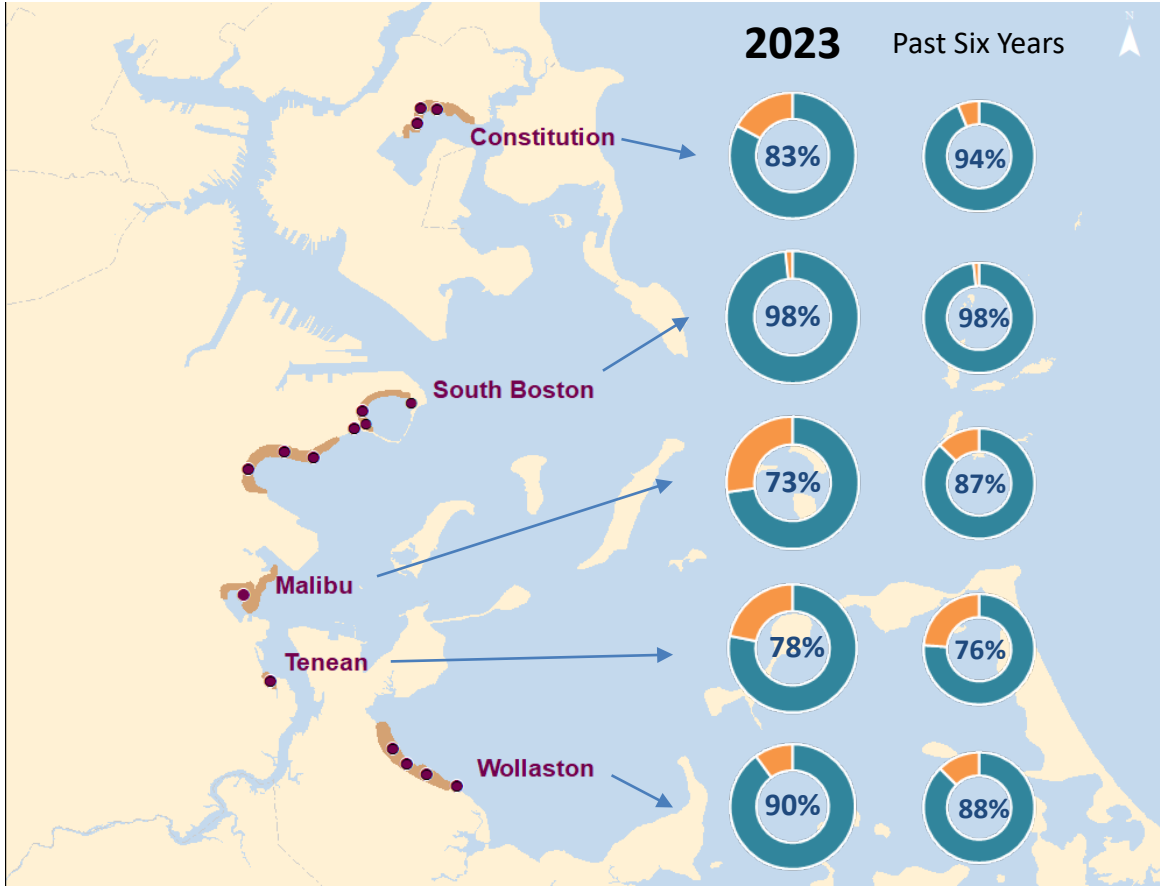
- Since 1996, MWRA has assisted in monitoring Boston Harbor beaches
- Daily monitoring/beach flagging program has been in place for more than ten years
- Beach postings based on:
  - Samples exceed 104 MPN/100 mL enterococcus
  - 5 sample geomean exceeds 35 MPN/100 mL
  - Rain threshold exceeded (precautionary)

Area Beaches Monitored By DCR



- Monitoring occurs at more than 10 DCR harbor beaches, some weekly and some daily
- State law requires at least weekly monitoring at all public beaches
- **Beaches labeled in purple are monitored daily**

Preliminary Boston Harbor Beach Data - 2023



- Through July 17, percent compliance is similar to or better than the past six year average at all South Boston beaches (Pleasure Bay, Castle Island, Carson, M St), Tenean, and Wollaston
- Constitution and Malibu compliance are lower than their past six year average, but plenty of season left

Save the Harbor Grades Show High Marks

- Independent evaluation by Save the Harbor/Save the Bay shows most beaches average above 90% meeting standards

- Results can be highly variable year-to-year based on rainfall totals and the timing of samples relative to storms

Beach	Six-year average safety rating (2017-2022)	2022	2021	2020	2019	2018	2017
Pleasure Bay	100%	100%	100%	100%	100%	100%	100%
City Point	99%	100%	100%	100%	100%	97%	94%
Nantasket	98%	94%	100%	98%	97%	100%	98%
M Street	97%	94%	94%	94%	100%	100%	100%
Carson	98%	100%	92%	100%	100%	93%	100%
Revere	96%	98%	94%	100%	87%	98%	98%
Winthrop	94%	94%	100%	100%	78%	100%	94%
Constitution	94%	97%	91%	98%	90%	94%	95%
Nahant	91%	81%	77%	96%	93%	100%	100%
Short	91%	94%	89%	94%	88%	100%	80%
Wollaston	88%	88%	82%	85%	87%	93%	92%
Savin Hill	88%	94%	70%	89%	79%	100%	94%
Malibu	87%	95%	73%	91%	83%	91%	91%
King's	76%	74%	68%	70%	79%	75%	92%
Tenean	76%	89%	63%	79%	67%	78%	81%
All Beaches	92%	93%	86%	93%	89%	95%	94%
Rainfall (in)	39.28	23.95	50.38	38.54	38.04	51.94	32.85

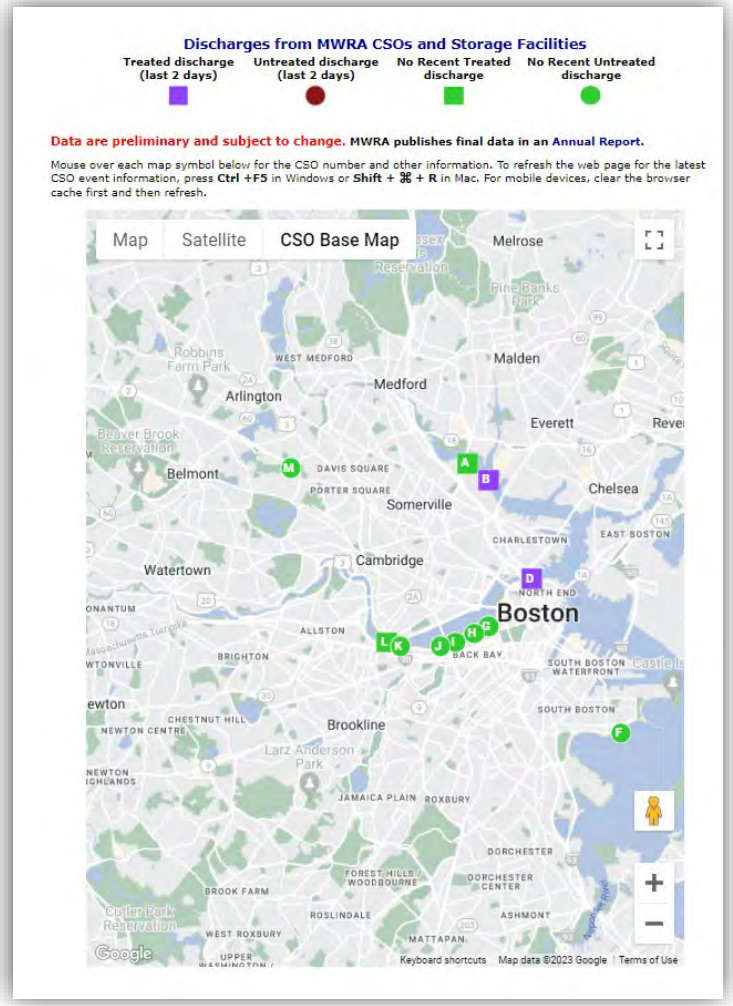
Beach Media Coverage

- Coverage focused on statewide issues with bacteria exceedances following July 4th holiday and rainy start to July (4.5" through July 17)
- Often generalized the issue as 'sewage' or 'fecal' contamination.
- Massachusetts tests more beach locations than any other state. Protective of the public but can lead to more total exceedances.

Projects under the Boston Harbor Project and CSO Long-Term Control Plan by MWRA and member communities have effectively eliminated overflows to beaches

Sewage Notification Law

- Notification Requirements to Promote Public Awareness of Sewage Pollution (314 CMR 16.00) has required notification of CSO and SSO discharges since July 2022
- Preliminary data show since Memorial Day weekend, 636 CSO discharge events have been reported through the Mass DEP Portal statewide. 42 from MWRA and MWRA CSO Communities
- The public reporting and notification to news agencies may lead to conflating the issue with beach water quality

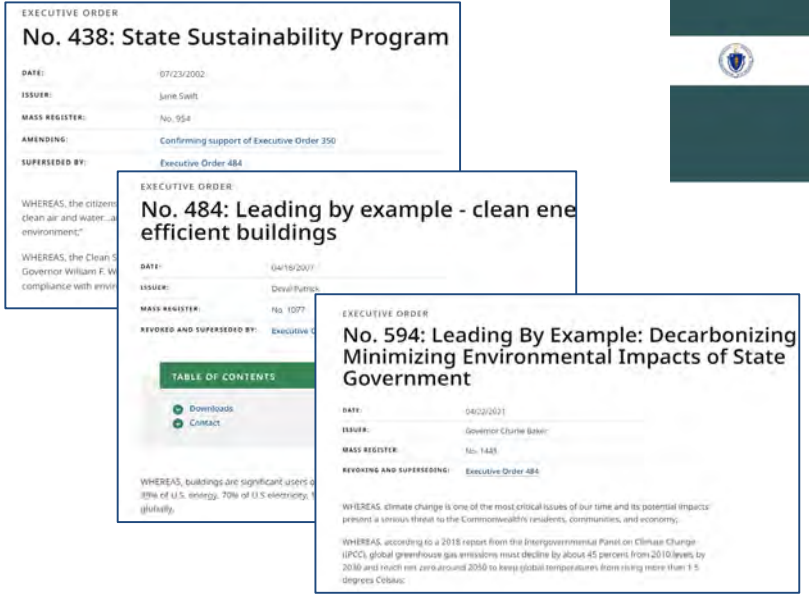


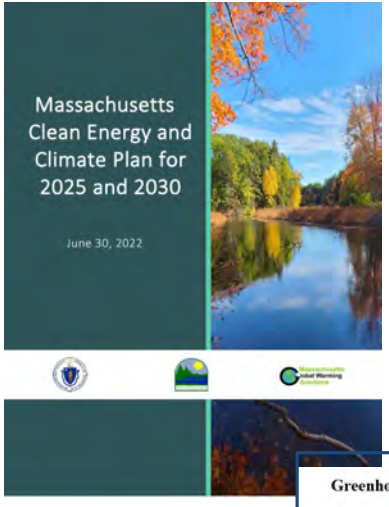
Energy and Sustainability Program Overview

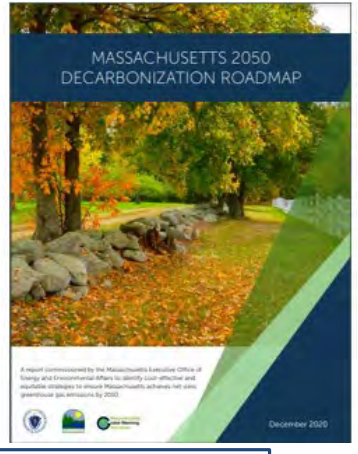
July 19, 2023

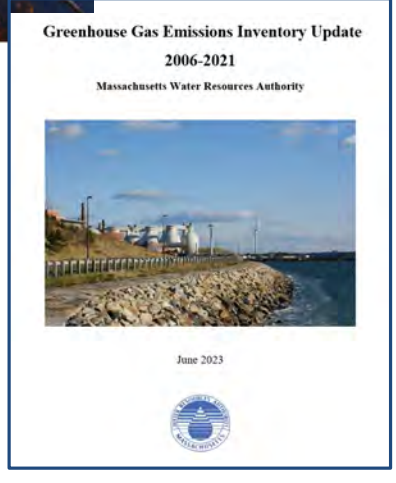
Energy Management Drivers

- State Climate Goals
- Executive Orders
- Environmental agency
- Fiscal responsibility







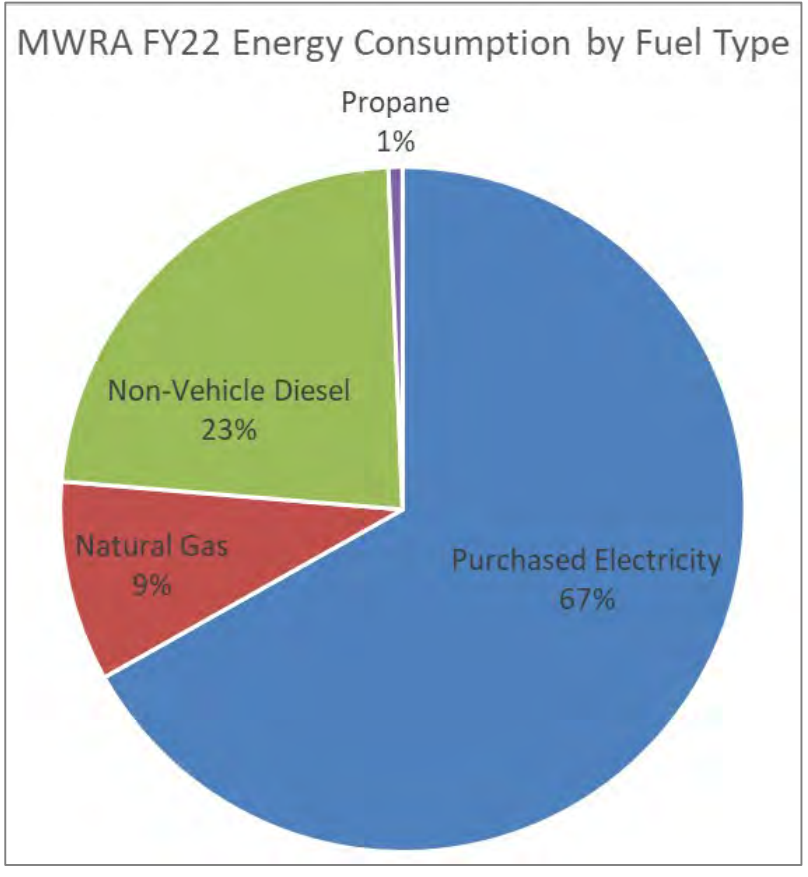


Energy Intensive Operations

Total Energy Used in FY22

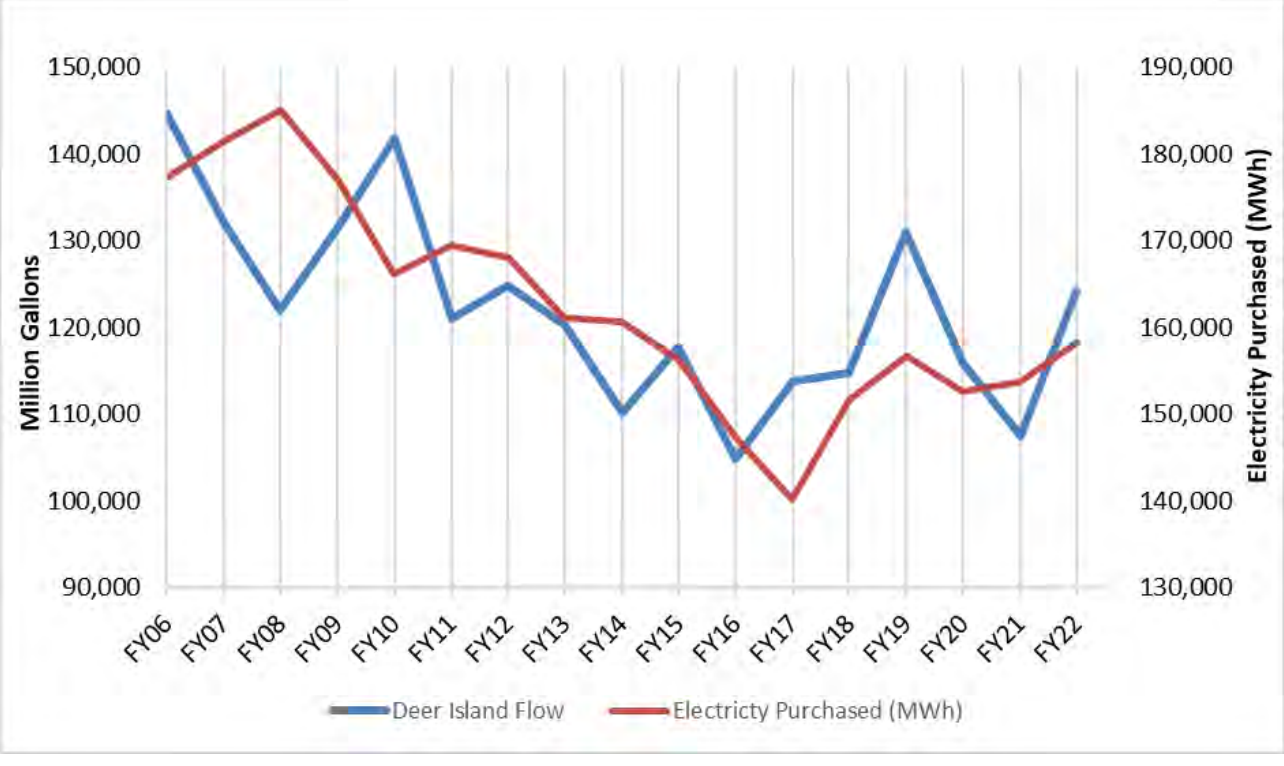
- **Electricity**
  - 158,700 MWh
  - $29.4 million
- **Fuel Oil**
  - 1.26 million gal
  - $3.5 million
- **Natural Gas**
  - 700,000 therms
  - $984,000

This is the equivalent of over 16,000 homes' energy use for one year.

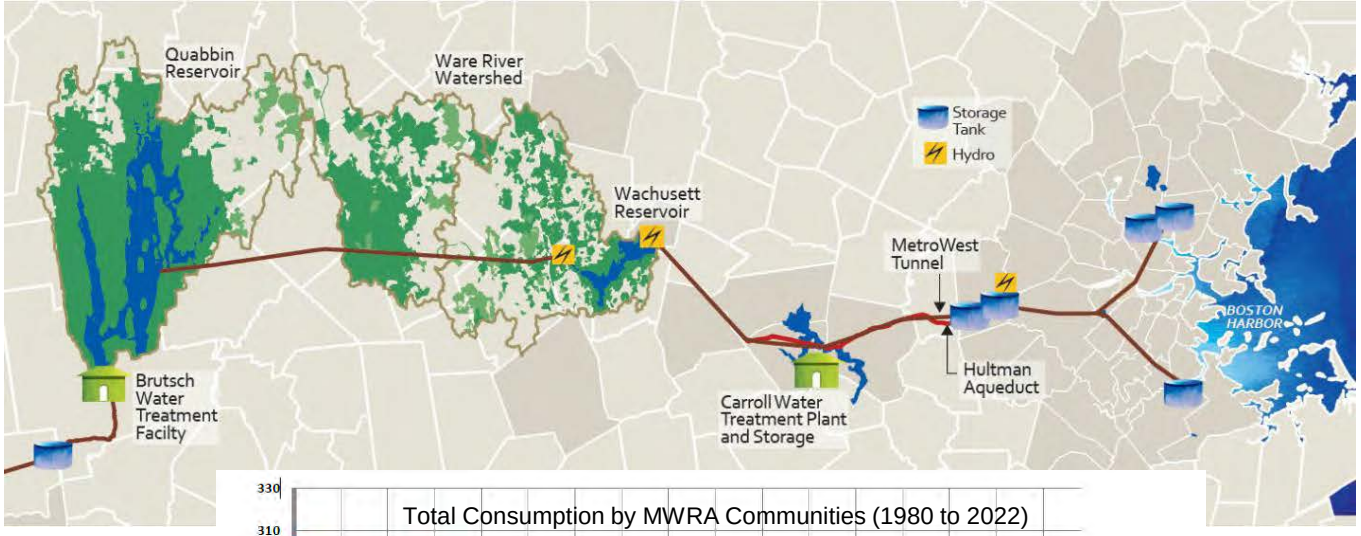


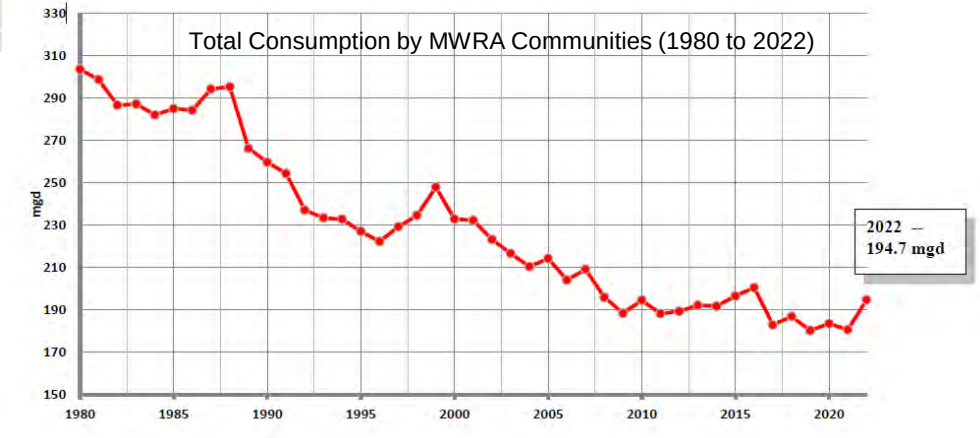
Wastewater Flow Impacts on Energy Demand

Deer Island Total Flow & Annual Electricity Purchases (FY06-FY22)

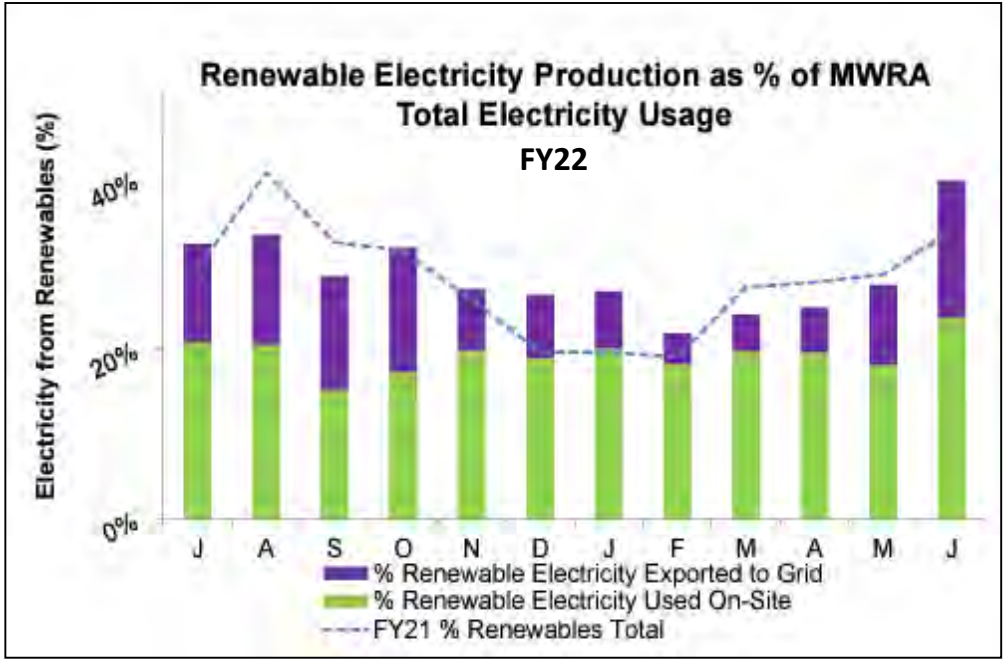


Water Treatment and Transport



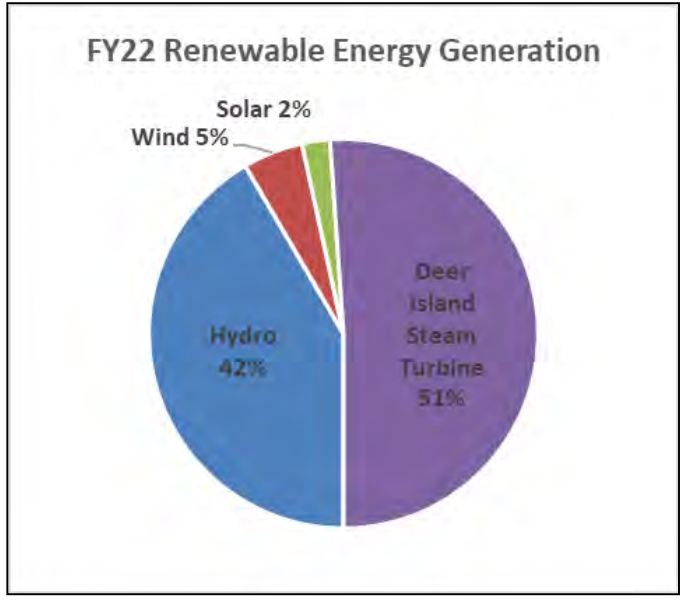


Renewable Energy

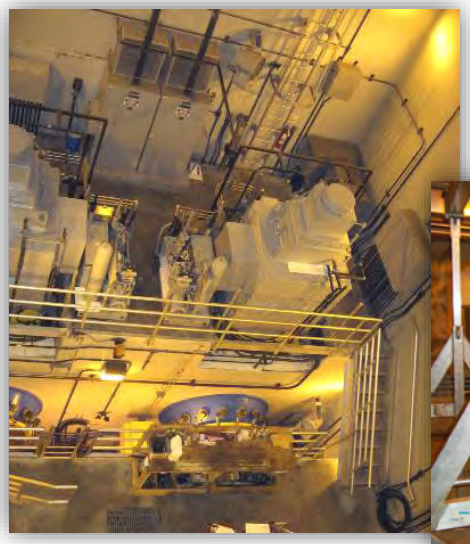


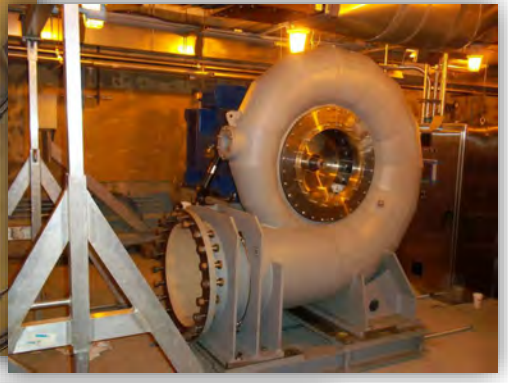
Renewable Energy Statistics

Using biomass, wind, solar, and hydroelectric, MWRA generated about 57 million kWh in FY22, at a value of nearly **$8 million** in avoided purchased energy costs.



Hydroelectric Power

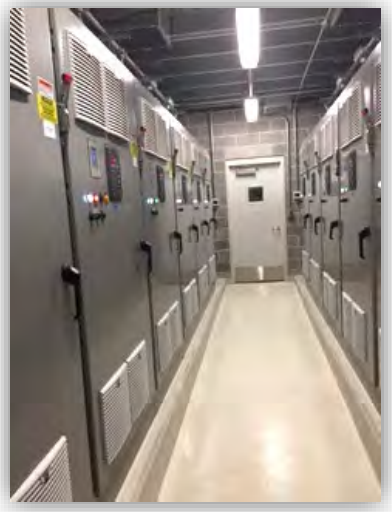




Wind Power

Solar Power

Energy Efficiency



Road Toward Net Zero

- Building Electrification
- Clean Transportation
- Combined Heat and Power Optimization
- Greenhouse Gas Emissions Tracking and Reduction Goals
- Innovation and Resiliency

Building Electrification

Wachusett Aqueduct Pump Station Geothermal Heat Pump *During* Construction

Wachusett Aqueduct Pump Station *After* Construction

Spot Pond Pumping Station Heat Pumps

Clean Transportation

What are the benefits of electric vehicles?

- Fewer GHG Emissions
- Better Air Quality
- Less Maintenance
- Lower Fuel Costs
- Fun To Drive!

Electric Vehicle Charging Infrastructure

Existing EV Chargers

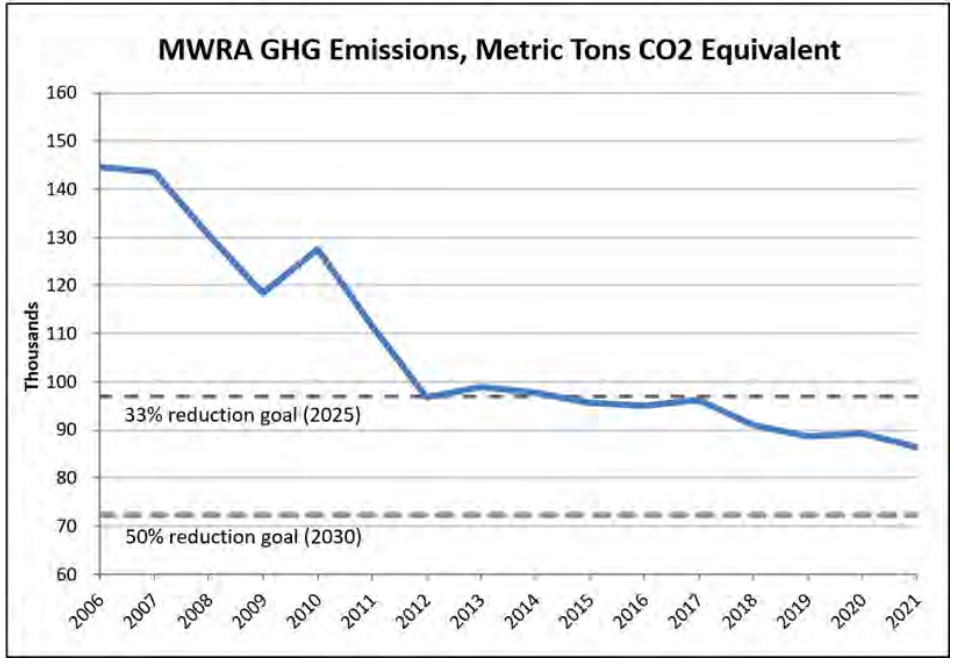
Proposed Chargers at Chelsea Facility

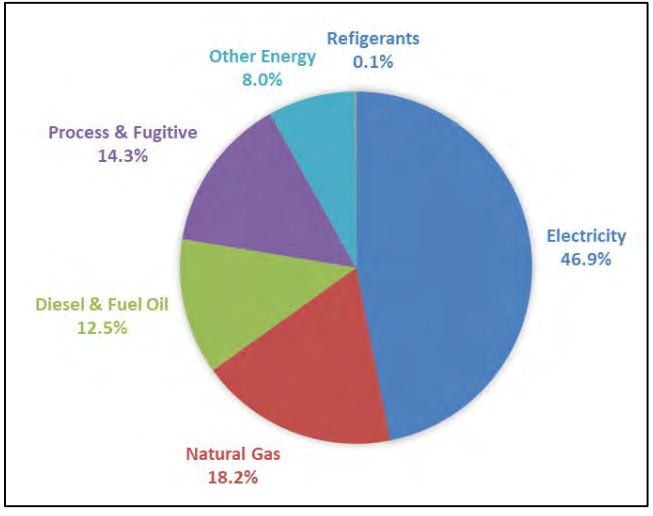
Combined Heat and Power Optimization

	Existing CHP	Proposed CHP
Electricity from Combined Heat and Power (CHP)	21%	48%
Combined Heat and Power (CHP) Efficiency	52%	68%
Energy from On-site Resources	~60%	~75%

Energy Performance Metrics for Existing and New CHP

Greenhouse Gas Emissions



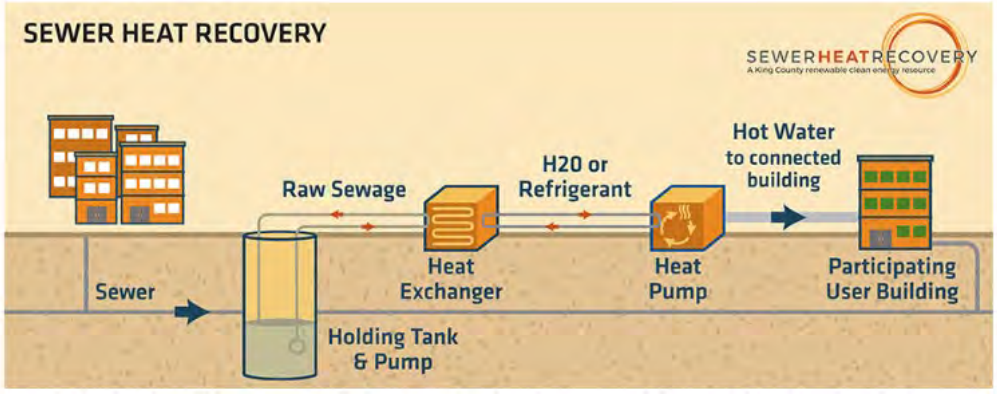


FY22 MWRA Green House Gas Emissions Sources

Resiliency and Innovation

- Battery Storage
- Heat Recovery

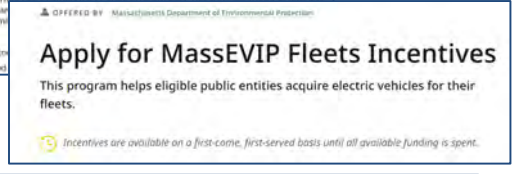
Battery Pilot Projects - Chelsea Admin Building
and Brattle Court Pumping Station

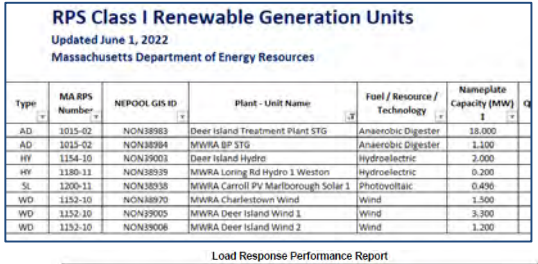


Wastewater Heat Recovery schematic (*image from King County*)

Funding Sources

- Clean Transportation
  - MassEVIP
  - Utility EV Make Ready
  - MOR-EV Trucks
- Energy Efficiency
  - Mass Save
  - MassDEP GAP Clean Energy Results
- Renewable Energy
  - Renewable Portfolio Standard
  - Energy Policy Act of 2005
- Capacity and Demand Management
- Power Sales
- Federal
  - Investment and Jobs Act
  - Inflation Reduction Act



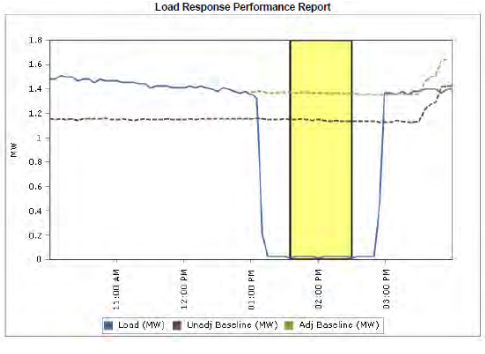


RPS Class I Renewable Generation Units

Updated June 1, 2022

Massachusetts Department of Energy Resources

Type	MA RPS Number	NEPOOL GIS ID	Plant - Unit Name	Fuel / Resource / Technology	Nameplate Capacity (MW) 1
AD	1015-02	NON38983	Deer Island Treatment Plant STG	Anaerobic Digester	18.000
AD	1015-02	NON38984	MWRA BP STG	Anaerobic Digester	1.100
HY	1154-10	NON39001	Deer Island Hydro	Hydroelectric	2.000
HY	1180-11	NON38939	MWRA Loring Rd Hydro 1 Weston	Hydroelectric	0.200
SL	1200-11	NON38938	MWRA Carroll PV Marlborough Solar 1	Photovoltaic	0.496
WD	1152-10	NON38970	MWRA Charlestown Wind	Wind	1.500
WD	1152-10	NON39005	MWRA Deer Island Wind 1	Wind	3.300
WD	1152-10	NON39006	MWRA Deer Island Wind 2	Wind	1.200



Next Steps

- Roadmap and goal setting
- Integrate roadmaps into existing plans and protocols
- Pilot projects to full scale
- Identify and acknowledge implementation challenges
- Investing equitably in the future

Deer Island Treatment Plant Residuals Facility Rehabilitation

July 19, 2023

Residuals Facility Rehabilitation

Contract No. 7052 includes:

- Design
- Bidding Phase Assistance
- Engineering Services During Construction
- Total duration: 99 Months

Residuals Facility includes:

- Twelve 3-million gallon anaerobic digesters and two 3-million gallon gas and sludge storage tanks

Major Replacements

Sludge Heat Exchanger Replacement

- Existing Heat Exchangers are heavily corroded and maintenance intensive
- 22 Heat and Exchangers and associated pumps, piping and instrumentation will be replaced

Pipe and Valve Replacement

- Extensive internal and external corrosion
- Many valves do not provide isolation

- Digested Sludge, Digested Sludge Overflow, Circulated Sludge Rings and Gravity Thickener Force Main systems will be replaced

Major Replacements

Pump Replacement

- Existing pumps are becoming maintenance intensive
- Over 50 pumps in 5 different systems will be replaced.
- Various improvements will be evaluated and incorporated into the design.

Digester Internal Inspection and Repair

- Detailed internal inspections
- Interior will be recoated and internal piping replaced.

Major Replacements

Scum Screening Modifications

- Existing system has reached the end of its useful life
- Multiple operational improvements will be evaluated and incorporated into the design.

Instrumentation and Control Modifications

- Replacement of obsolete I&C equipment
- Evaluation of new technologies to determine suitability for Deer Island.

Procurement and Recommendation

- One step RFQ/P

Proposer	Proposed Cost	Proposed Hours
AECOM	$9,348,153	51,939
CDM Smith	*$9,985,050*	*47,489*
Brown and Caldwell	$10,588,434	54,845
Engineer's Estimate	$6,942,446	34,737

Nut Island Headworks
Odor Control and HVAC System Improvements
Contract 7548 - Change Order 15

July 19, 2023

Odor Control Duct Installation

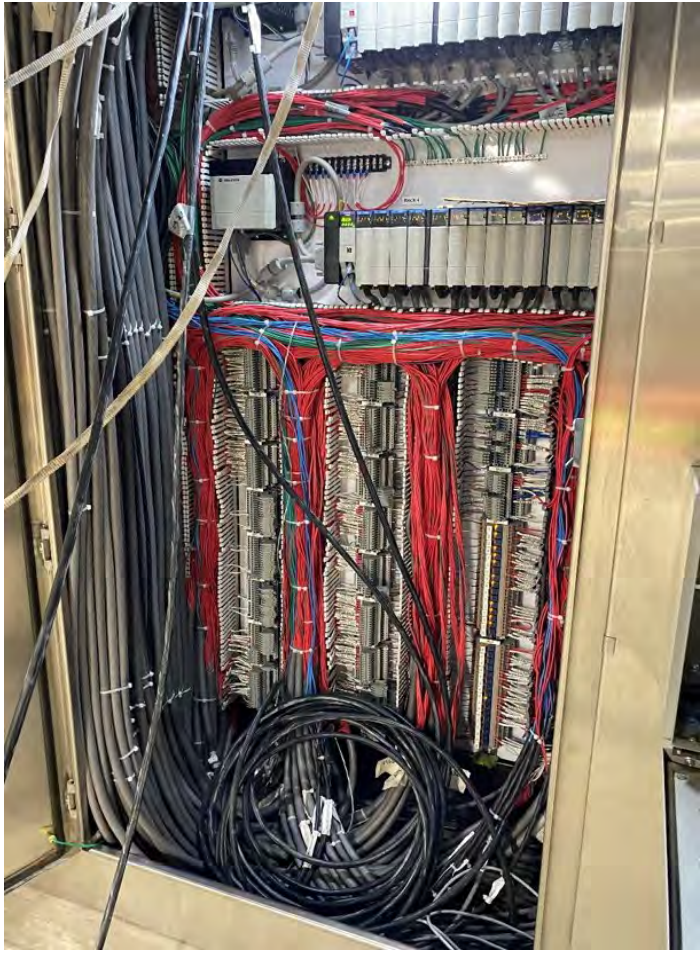
Odor Control Duct Field Joints

Carbon Adsorber Delivery

Carbon Adsorber Duct Field Joints

Odor Control Room

Carbon Adsorber Controls and Wiring

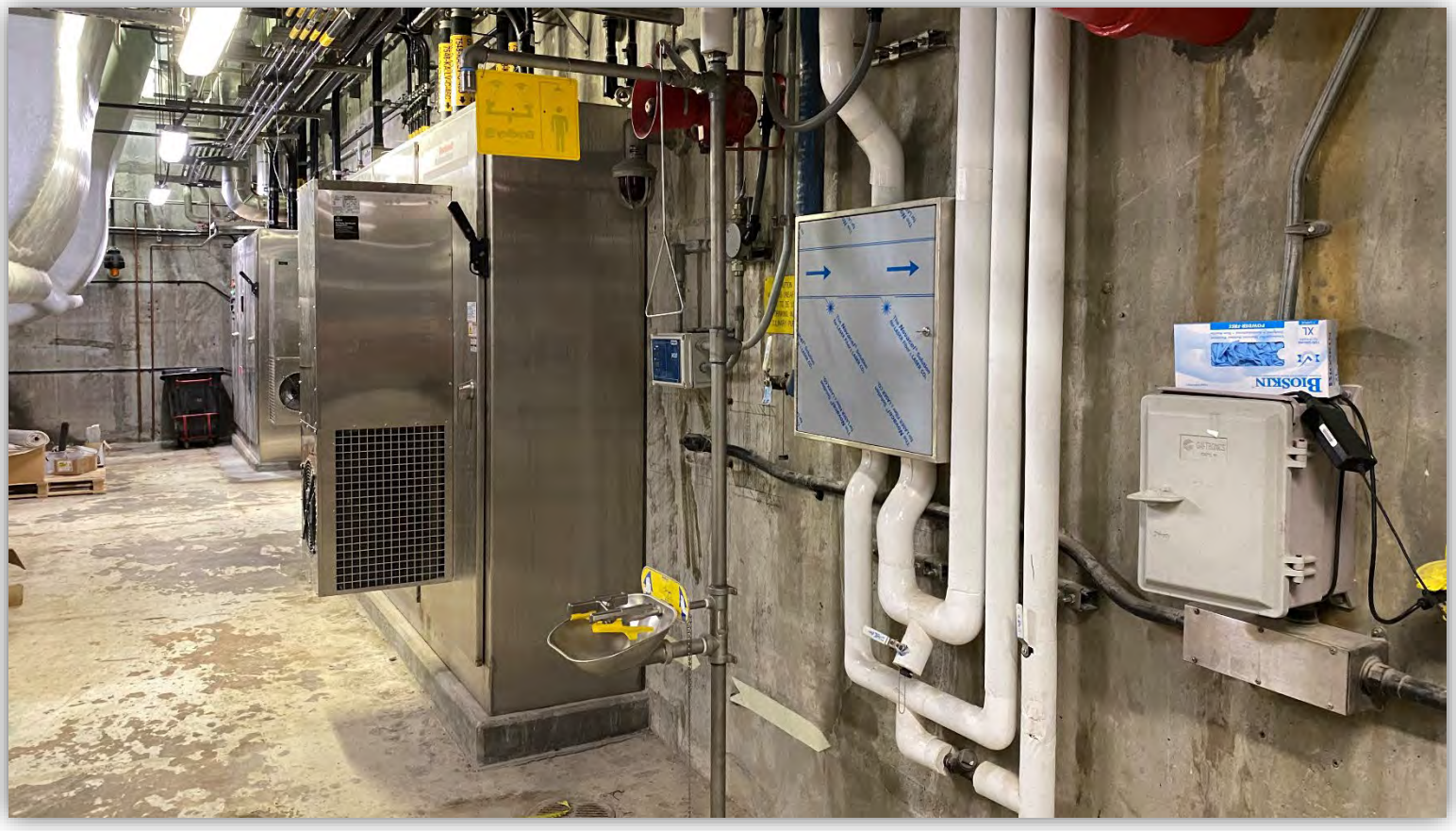


Deluge Solenoid Control Valve

: Roofing System Modifications

Conflicts in Odor Control Room

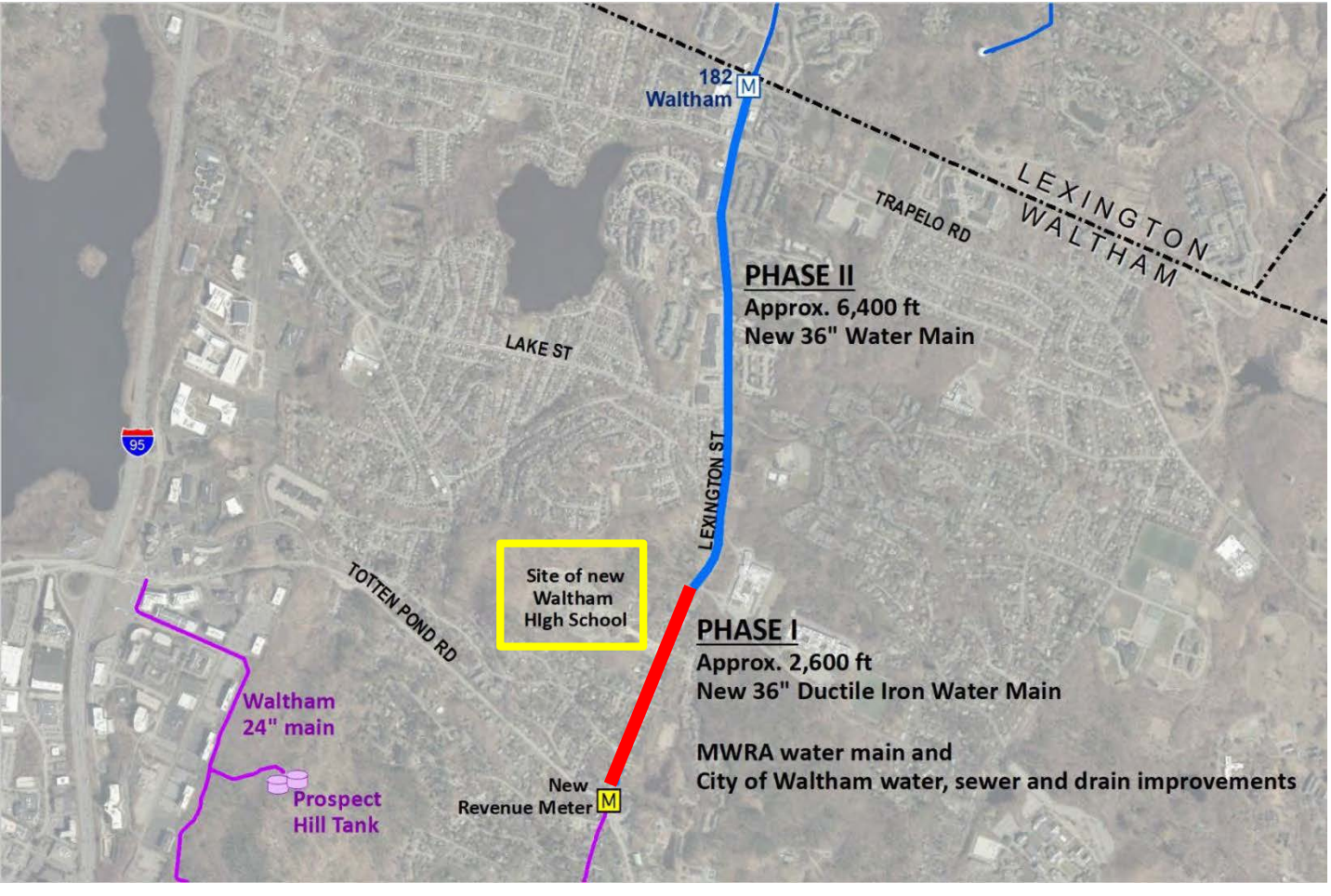
Emergency Eyewash Shower Stations



Update on Section 101 Extension Waltham

July 19, 2023

Contract 7457 Project Overview



Baltazar Contractors Inc.

$31,900,000

MWRA Work:

Water: 9,000’ (36”)

Waltham Work:

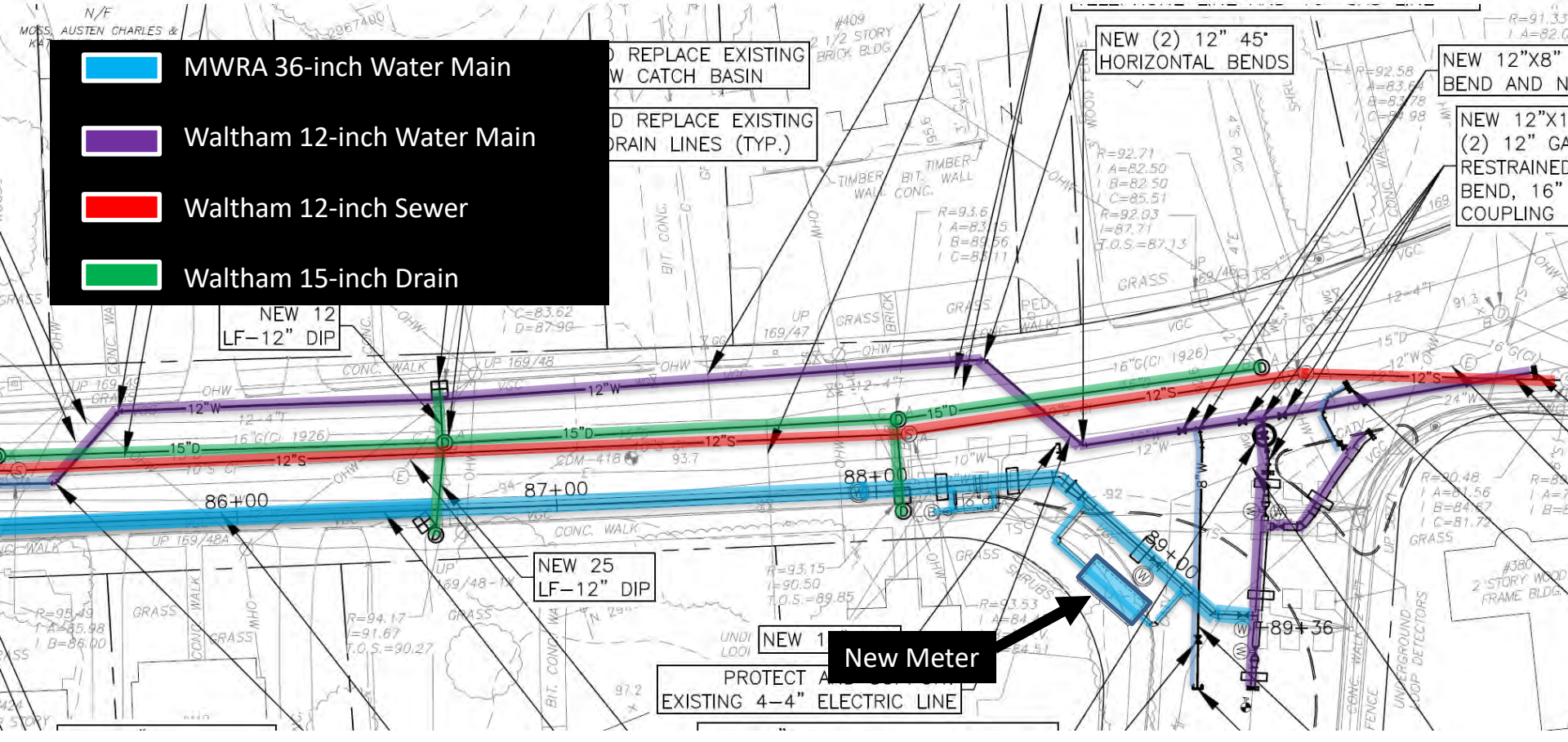
Water: 5,500’ (12”)

Sewer: 2,700’ (12”)

Drain: 1,420’ (36”&15”)

Lexington Street between Totten Pond Road and Lincoln Street

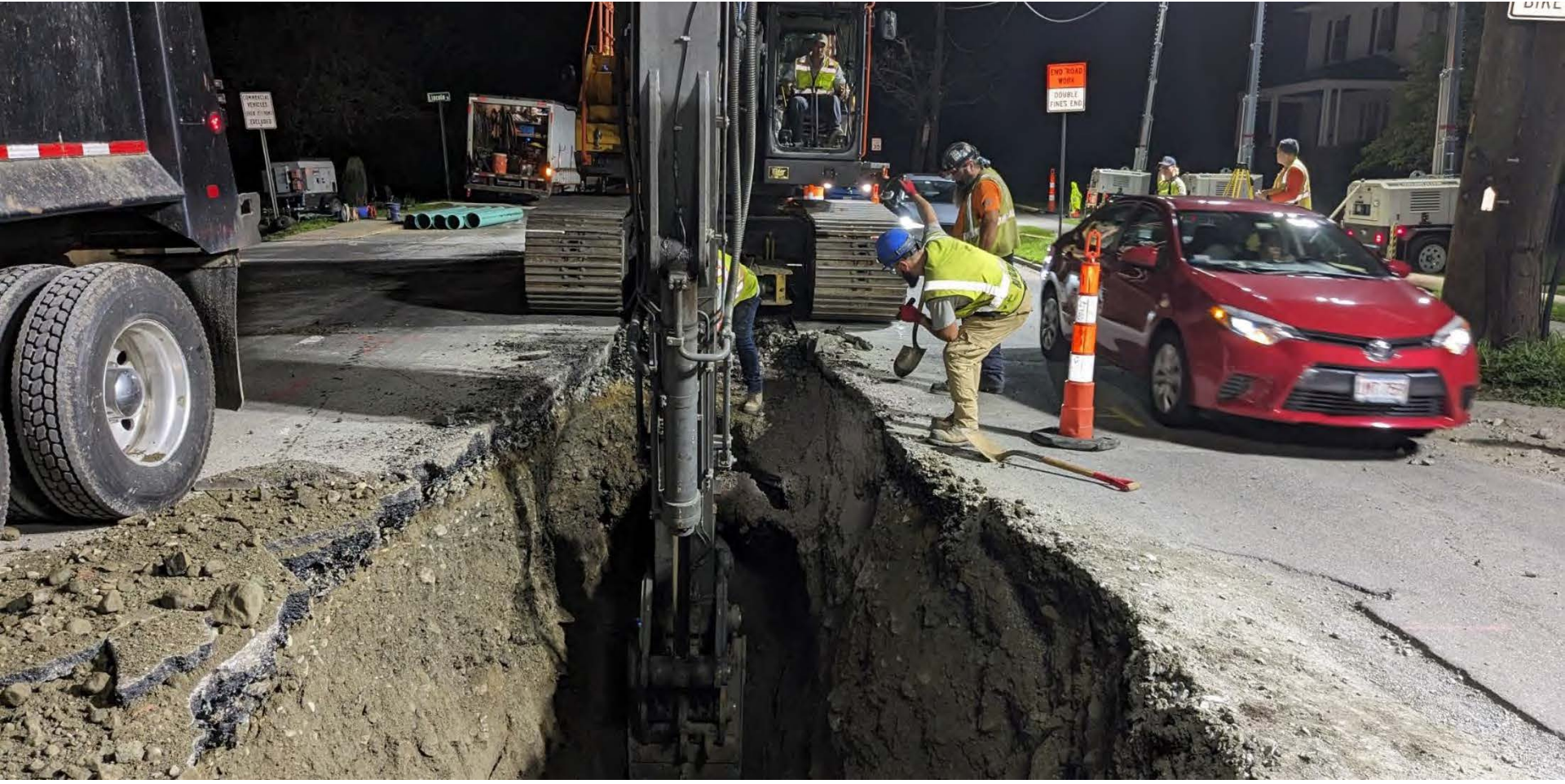
New Work at Lexington Street and Totten Pond Road



Morning Traffic at Totten Pond Road and Lexington Street

Night Work at Totten Pond Road and Lexington Street

Sewer Installation (One Lane of Traffic)



Sewer and Drain Structures