Presentation to

MWRA Board of Directors

Deer Island Treatment Plant Combined Heat and Power System

July 24, 2024

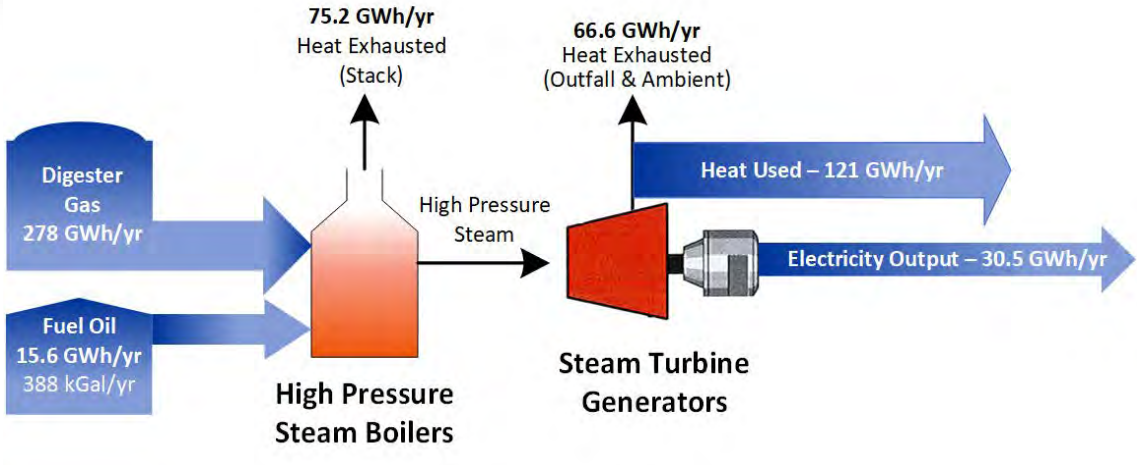
Contract 6730 Scope

- Develop a detailed design for a new combined heat and power (CHP) plant at Deer Island

- Includes:
  - Preliminary Design
  - Final Design
  - Bidding Phase Assistance
  - Engineering Services During Construction

- Total Contract Duration: 100 Months

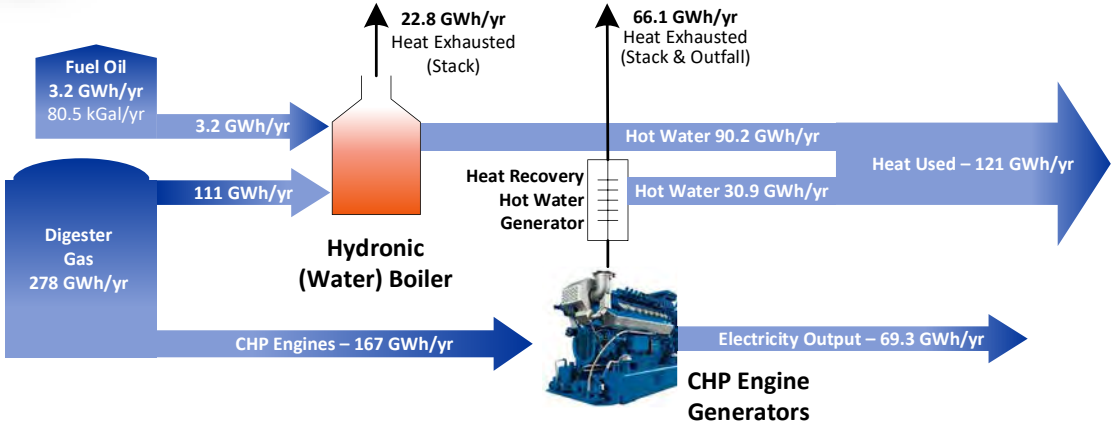
Existing Combined Heat and Power System



- Placed into operation in mid 1990's
- Steam boiler based system
- Heat generated first then electricity

	Percent electricity from CHP	CHP Efficiency	Percent energy from onsite sources
Key Metrics	21%	52%	~60%

New Combined Heat and Power System



Predicted to save 12,800 metric tons CO2/yr in Greenhouse Gas Emissions or 32.5 million car miles

- Array of five (5) reciprocating engines rated 15-17.5 MW
- Generates electricity and then extracts heat from exhaust
- Water boilers to meet heat demand

	Percent electricity from CHP	CHP Efficiency	Percent energy from onsite sources
Est. performance	48%	68%	~75%

Procurement Process, Project Cost and Recommendation

- One step RFQ/P

Proposer	Proposed Cost	Proposed Hours
Burns & McDonnell	$18,610,776*	82,090
Engineer's Estimate	$16,700,000	74,955

* Award amount was adjusted to $18,377,091 based on Internal Audit review.

- Appropriate level of effort
- Strong team including CDM Smith, Green Environmental, JK Muir & Epsilon
- Extensive Combined Heat and Power design experience

- **Staff recommend award to Burns & McDonnell**

Presentation to

MWRA Board of Directors

Design, ESDC, and RE Services for Cottage Farm CSO Facility PCB Abatement Weston and Sampson Engineers, Inc. Contract 7392

July 24, 2024

Cottage Farm CSO Facility, 660 Memorial Drive, Cambridge

Cottage Farm CSO Facility

Project Scope

Procurement Process & Schedule

Summary of Proposals Received – Deadline June 12, 2024

Proposer	Proposed Contract Cost	Level of Effort (Hours)	Variance from Engineer's Estimate		Final Ranking
			Cost (%)	Level of Effort (%)	
Engineer's Estimate	*$3,123,842.08*	*18,350*			
Weston & Sampson	$3,757,000.41	18,161	20.3%	-1.0%	1
GEI Consultants	$5,609,040.57*	25,854	79.6%	40.9%	2

*Adjusted value due to mathematical error

Schedule – 52 months from NTP

- Anticipate contract period from September 2024 through January 2029 (includes 12 month warranty period)

Presentation to

MWRA Board of Directors

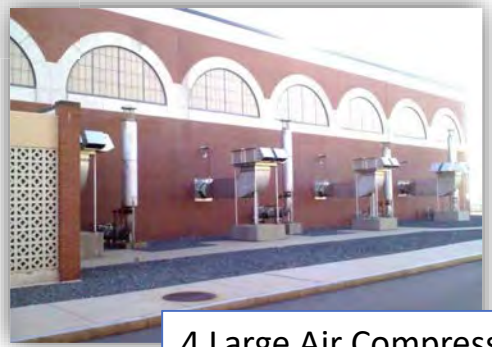
Oxygen Generation Facility Services Contract S619

July 24, 2024

DITP – Cryogenic Oxygen Generation Facility

- Provides oxygen to microorganisms in secondary treatment (97% Purity)
- Critical to core mission of NPDES permit compliance
- Specialized knowledge required for maintenance
- Hundreds of instruments requiring calibration for efficient operation

DITP – Cryogenic Oxygen Generation Facility



4 Large Air Compressors (2 @ 2,000hp, 2 @ 2500 hp)

2 Molecular Sieves

2 Cold Boxes

1,000 Ton Liquid Oxygen Storage

Instrumentation & Controls

Procurement Process

- Limited qualified contractors bid in past
- Advertised Chapter 149 Contract combining capital repairs and maintenance
  - One bid at 366% of Engineer's Estimate
- Rebid as Non-professional services maintenance contract
  - Capital work removed from scope (to be bid separately)
  - Received one bid: Solutionwerks at $3,512,500

- Staff recommend award to Solutionwerks
  - Bid reasonable and complete
  - Successful past performance

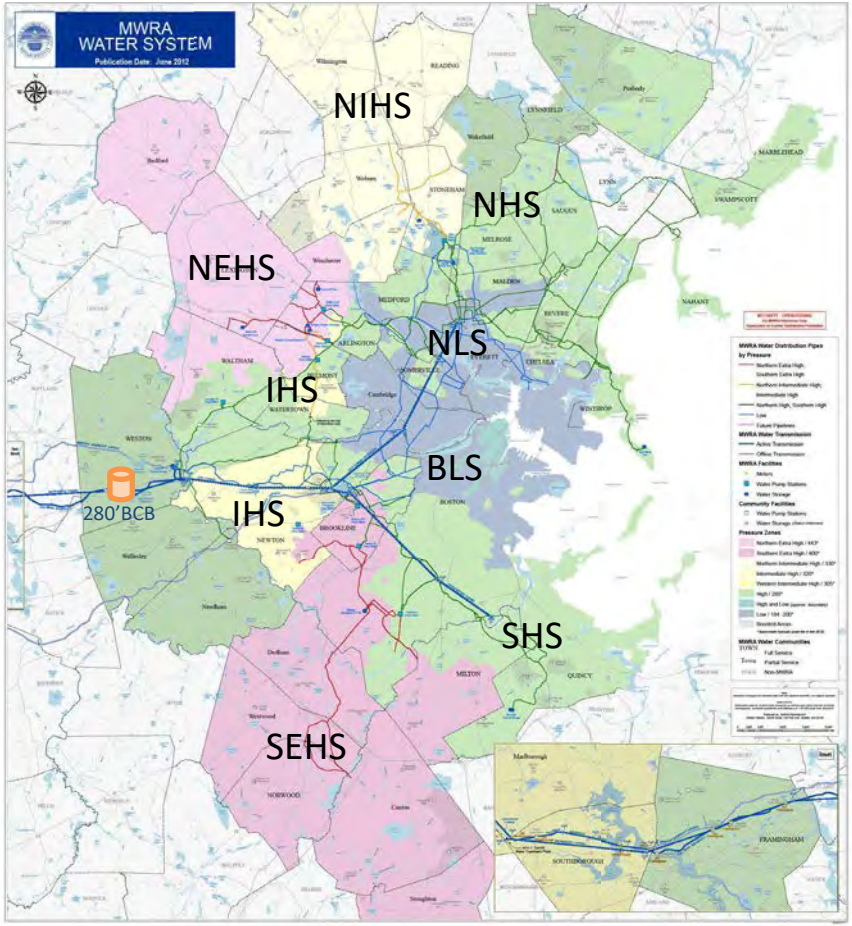
Presentation to

MWRA Board of Directors

Overview of Water Pipeline Maintenance Leak Repairs

July 24, 2024

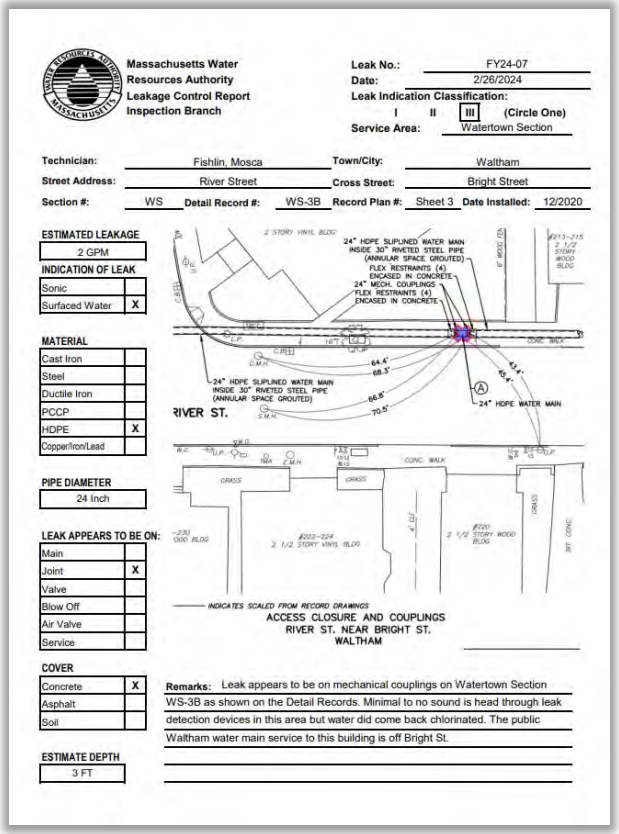
Metropolitan Water System Overview



- 41 Communities within Metropolitan Boston area
- 300+ Miles of Pipeline
- Over 5500 Valves
- Multiple Pressure Zones
- 11 Storage Facilities (Tanks & Covered)
- 11 Pump Stations

MWRA Leak Detection Program

- 334 miles of pipeline is surveyed on a regular maintenance schedule
- FY24, 143 miles were surveyed with a total of 7 leaks reported



Massachusetts Water Resources Authority
Leakage Control Report
Inspection Branch

Leak No.: FY24-07
Date: 2/26/2024
Leak Indication Classification: I II III (Circle One)
Service Area: Watertown Section

Technician: Fishlin, Mosca
Town/City: Waltham
Street Address: River Street
Cross Street: Bright Street
Section #: WS
Detail Record #: WS-3B
Record Plan #: Sheet 3
Date Installed: 12/2020

ESTIMATED LEAKAGE: 2 GPM

INDICATION OF LEAK

Sonic	
Surfaced Water	X

MATERIAL

Cast Iron	
Steel	
Ductile Iron	
PCCP	
HDPE	X
Copper/Iron/Lead	

PIPE DIAMETER: 24 Inch

LEAK APPEARS TO BE ON:

Main	
Joint	X
Valve	
Blow Off	
Air Valve	
Service	

COVER

Concrete	X
Asphalt	
Soil	

ESTIMATE DEPTH: 3 FT

24" HDPE SLIPLINED WATER MAIN INSIDE 30" RIVETED STEEL PIPE (ANNULAR SPACE GROUTED)
FLEX RESTRAINTS (4) ENCASED IN CONCRETE
24" MECH. COUPLINGS
FLEX RESTRAINTS (4) ENCASED IN CONCRETE
24" HDPE SLIPLINED WATER MAIN INSIDE 30" RIVETED STEEL PIPE (ANNULAR SPACE GROUTED)
24" HDPE WATER MAIN
RIVER ST.
INDICATES SCALED FROM RECORD DRAWINGS

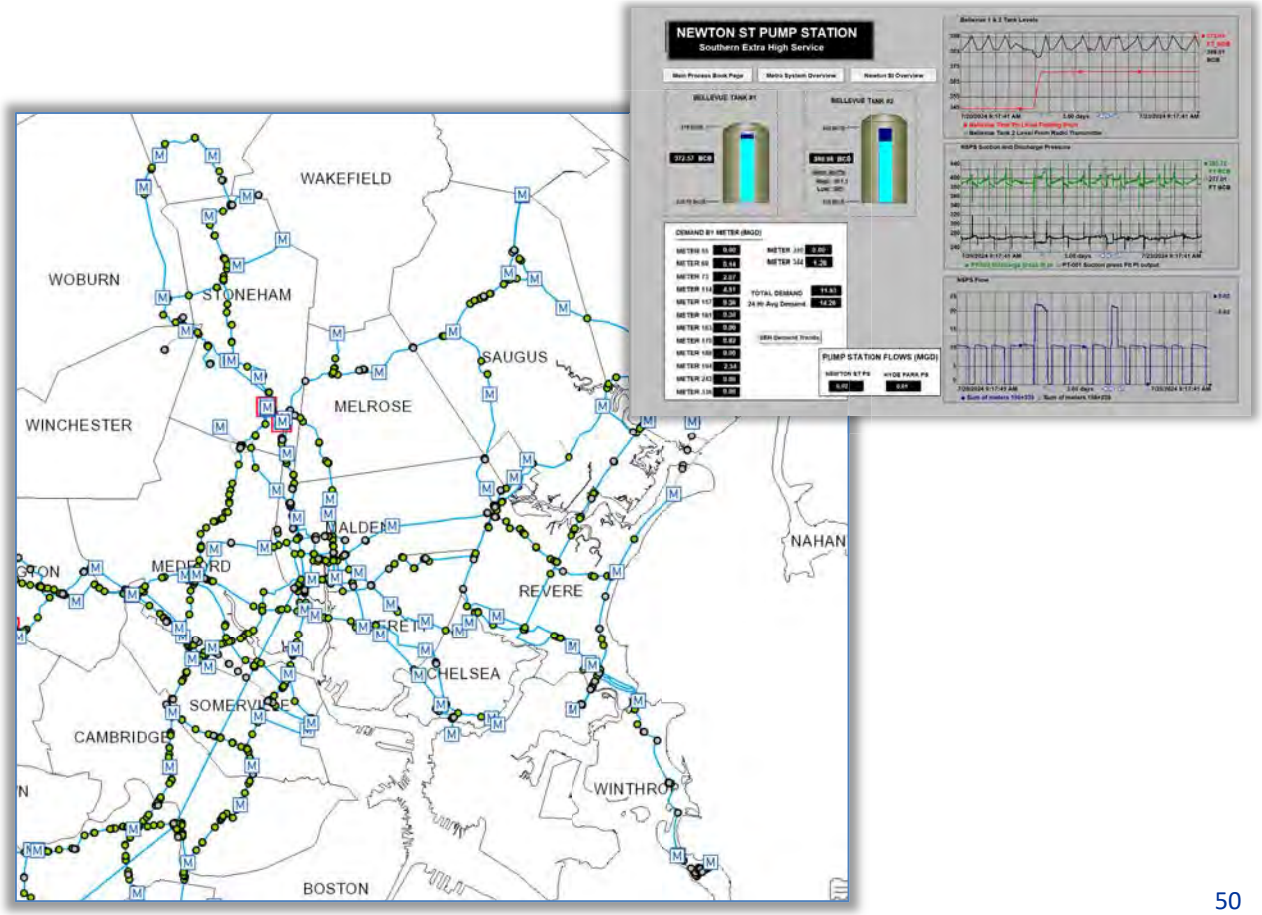
ACCESS CLOSURE AND COUPLINGS
RIVER ST. NEAR BRIGHT ST.
WALTHAM

Remarks: Leak appears to be on mechanical couplings on Watertown Section WS-3B as shown on the Detail Records. Minimal to no sound is head through leak detection devices in this area but water did come back chlorinated. The public Waltham water main service to this building is off Bright St.

Leaks that Surface

Response Actions

- Dispatch crews
- Review record drawings
- Review operational data/impacts
- Community outreach



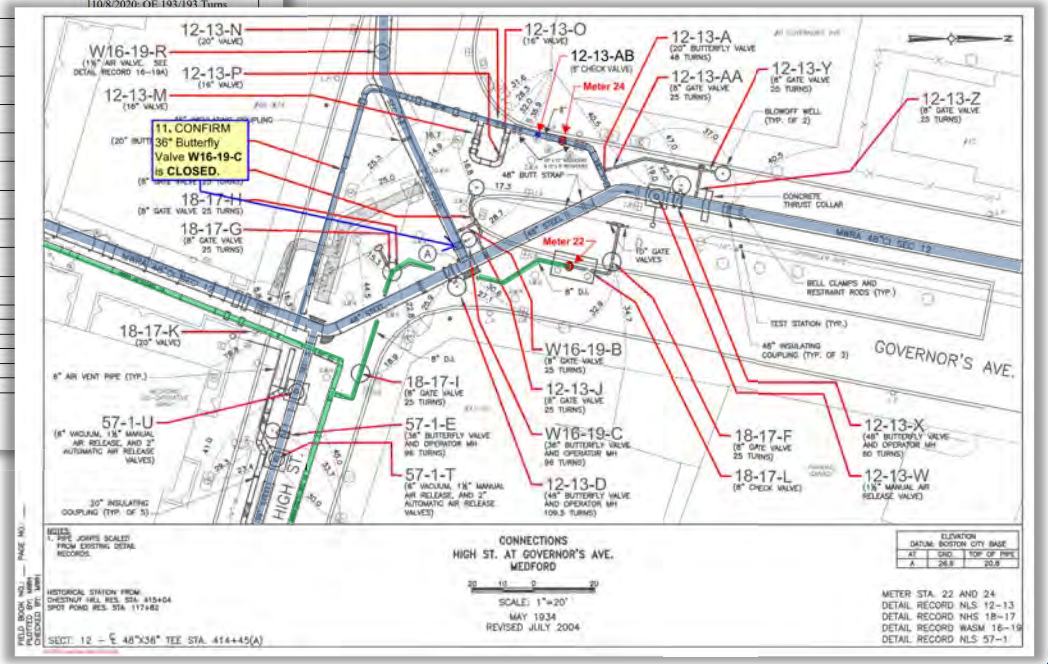
Operation Plans

PROJECT : Section 53 Leak Repair

DATE: March 23, 2022 **Prepared By:** **D. Kempe**

DESCRIPTION: Section 53 will be isolated for pipeline maintenance near Main & Madison Street, Malden. Extended shutdown included due to known BFV operability issues in 2018/2019

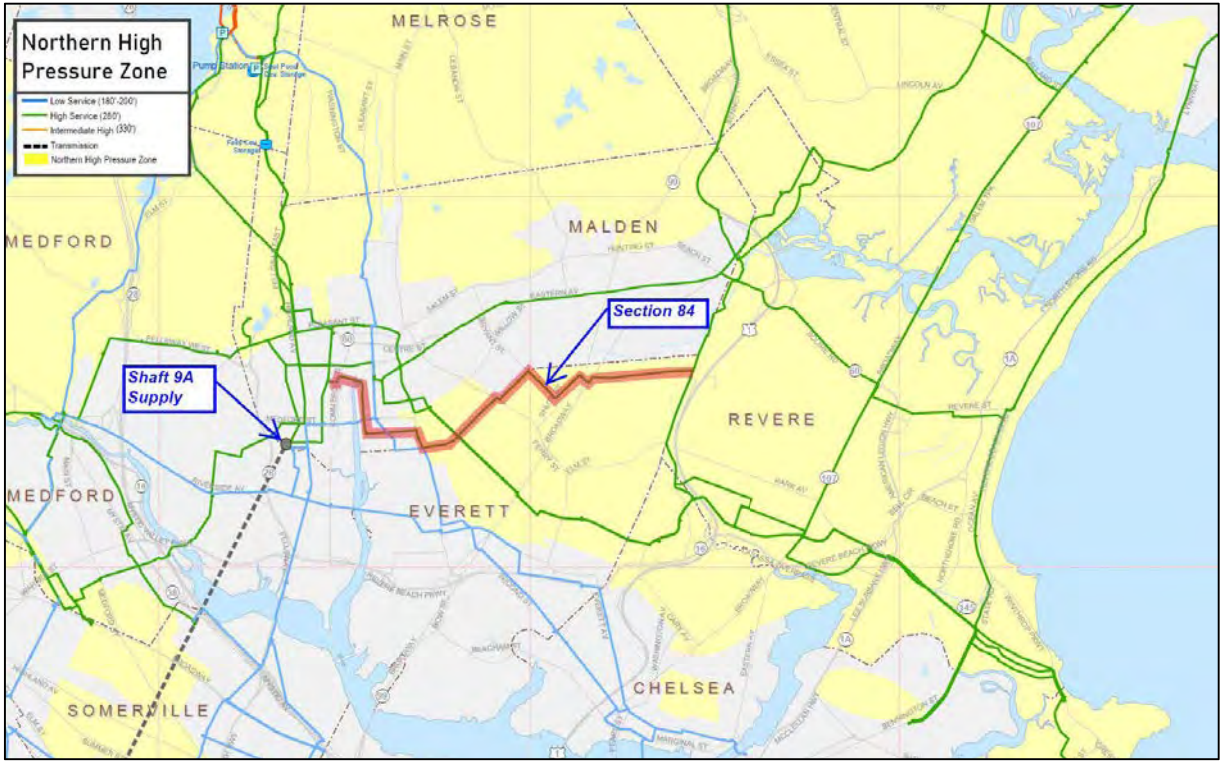
ITEM		DESCRIPTION	ELEV. (FT)	LOCATION	COMMENT
PREREQUISITIES					
ISOLATION	1	Before proceeding with shutdown, slowly **OPEN** 36" Butterfly Valve **70-60-D** in Saugus to supply NHS meters from Fells.		Lynn Fells Parkway at Main Street, Saugus	
	2	Slowly **CLOSE** 20" Gate Valve **49A-4-C**.		Madison Street at Bow Street, Malden	10/8/2020: OE 193/193 Turns
	3	Confirm 12" Gate Valve **49A-1-C** to Malden Meter 140 is **CLOSED**.		Madison Street at Main Street, Malden	
	4	Slowly **CLOSE** 30" Butterfly Valve **14-7A-A**.		Eastern Avenue at Main Street, Malden	
	5	Slowly **CLOSE** 30" Butterfly Valve **14-6-A**.		Pleasant Street at Main Street, Malden	
	6	Slowly **CLOSE** 24" Gate Valve **49-14-A**.		Main Street at Wigglesworth Street, Malden	
	7	Slowly **CLOSE** 30" Gate Valve & Bypass **14-10A-A**.		#16 Cross Street, Malden	
	8	Slowly **CLOSE** 48" Butterfly Valve **53-3-A**.		Eastern Avenue at Hillside Avenue, Malden	
	9	Slowly **CLOSE** 48" Butterfly Valve **53-9-A**.		Eastern Avenue at Warren Avenue, Malden	
	10	Confirm 48" Butterfly Valve **53-9-C** is **CLOSED**.		Eastern Avenue at Warren Avenue, Malden	
	11	Slowly **CLOSE** 48" Butterfly Valve **53-9-B**.		Eastern Avenue at Warren Avenue, Malden	
DEWATERING	12	**OPEN** 12" Blow-off Valves **53-3-B** and **53-3-C** to dewater pipe.		Eastern Avenue at Hillside Avenue, Malden	
	13	**OPEN** Air Valves as needed.		-	
	13A	1.5" Air Valve 14-8-A	42.4'	Main Street near Ellis Avenue, Malden	
	13B	6" Air/Vacuum Valve (14-7A-F)	19.2'	Eastern Avenue at Main Street, Malden	
	13C	1-1/2" Air Valve (49A-2-A)	18.4'	Madison Street at Meridian Street, Malden	
	13D	1" Ball Valves in chamber 53-1-A	15.0'	Main Street at Madison Street, Malden	
	13E	1" Ball Valves in chamber 53-3-A	12.5'	Eastern Avenue at Hillside Avenue, Malden	
		(remaining air valves in appendix expected to remain full unless additional blow-offs are used)			



Section 84 Leak

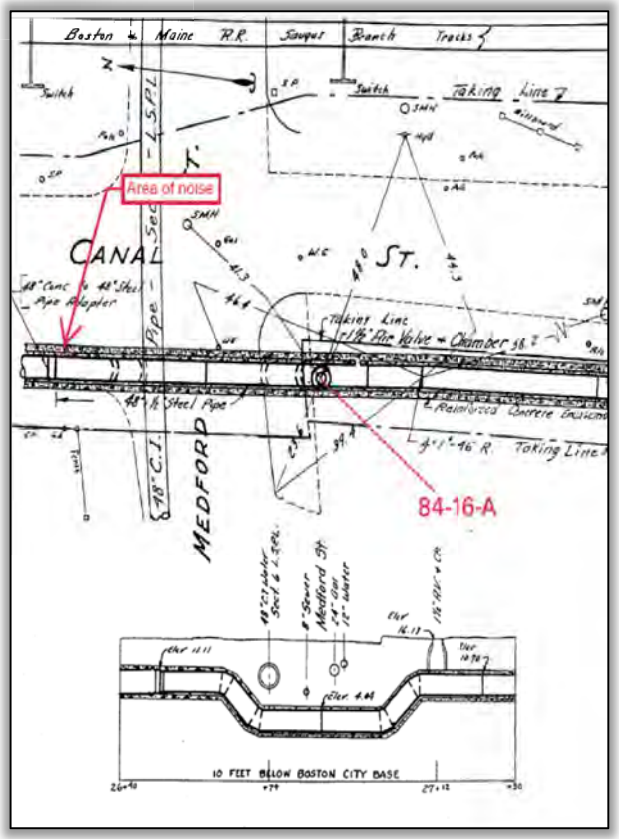
- Reported by City of Malden
- Confirmed by MWRA Leak Detection Crew
- Located on MWRA Section 84 pipeline

Section 84 Hydraulic Importance



- 48” Concrete Pipeline
- Major Supply to Northern High Service Area
- Seasonal constraints

Location of Leak



- Pipe transitions to concrete encased steel at intersection
- Leak suspected in steel section
- Difficult excavation

Utility Conflicts

- City of Malden 12-inch water line conflict
- Main to be relocated
- Installed new valves and restraint

Concrete Encasement

- Concrete encasement concealed leak
- Staff had to remove encasement on one side of pipe
- Very labor intensive

Leak located

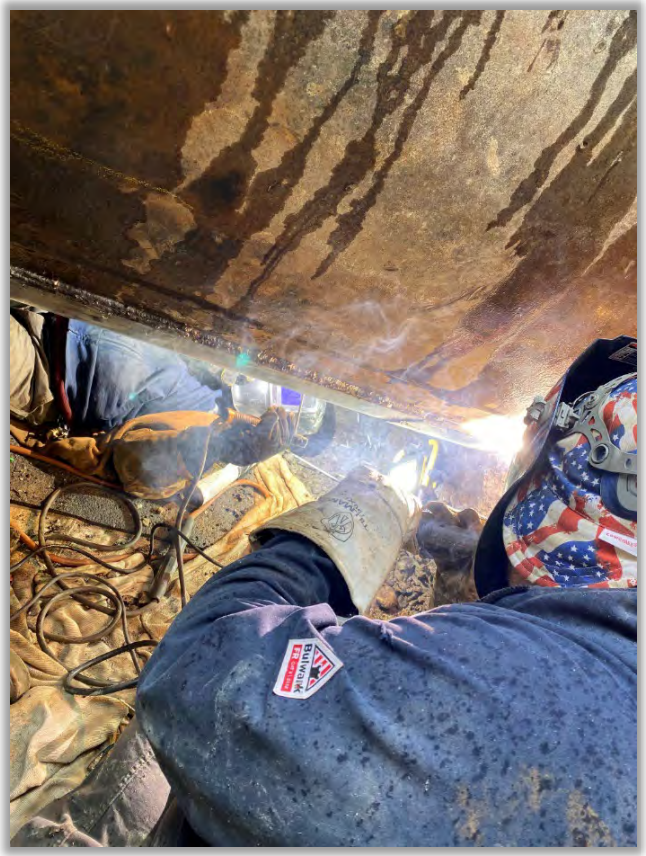
- Steel corroded on bottom of pipe
- Pipe severely pitted

Engineering Evaluation

- Thickness testing of steel pipe
- Recommended rolled steel welded repair
- Remove entire concrete encasement

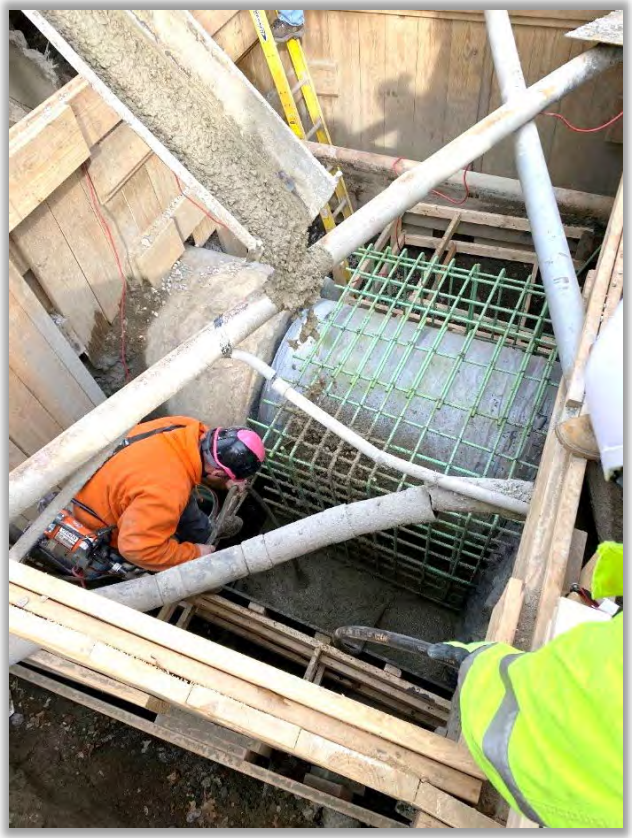
Utility Pole Support Required

Concrete Encasement Removal / Rolled Steel Installation



Concrete Encasement Installation

- In-house design
- Two separate pours due to the dimensions



Pipeline Disinfection and Activation

- Disinfected and back in service before warm weather/high demand
- Final pavement completed and road reopened

Questions

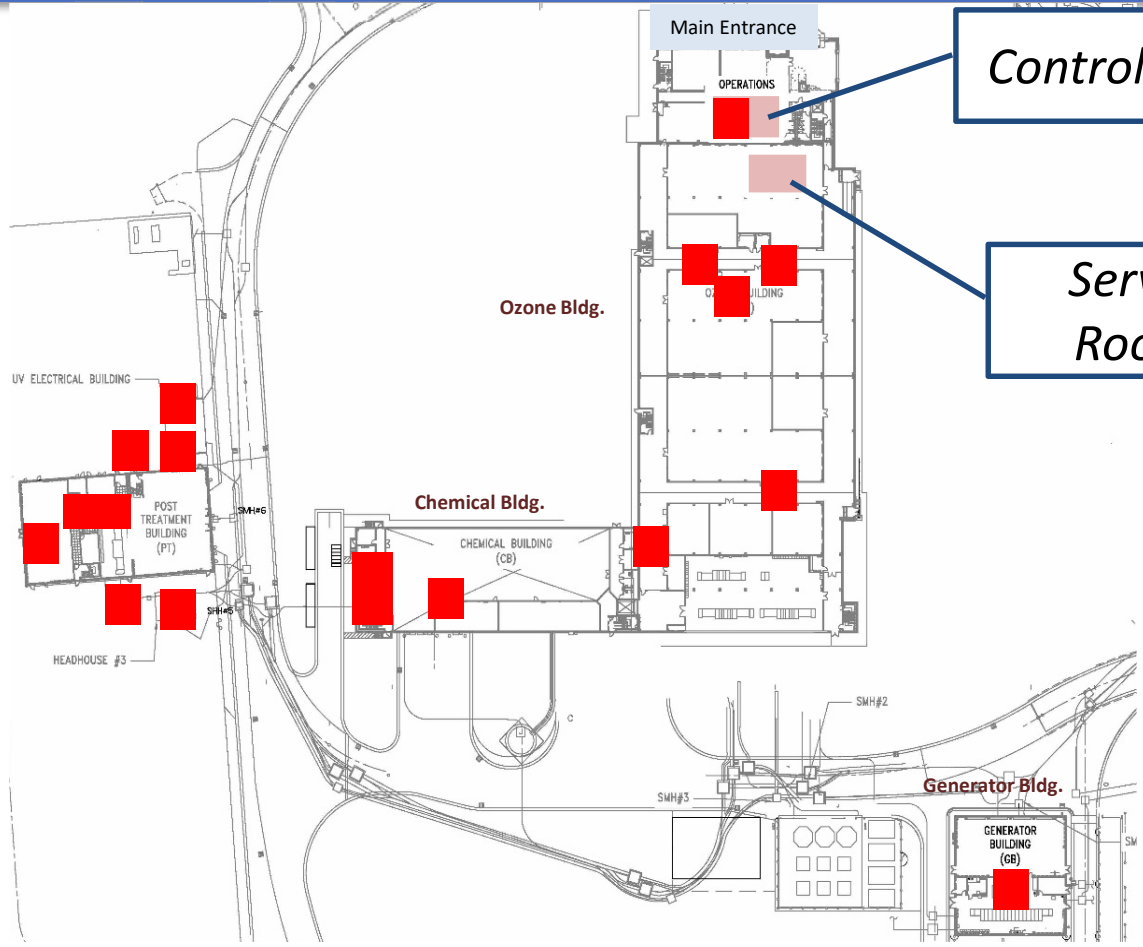
Presentation to

MWRA Board of Directors

Carroll Water Treatment Plant SCADA System Improvements Contract 7582, Change Order 14

July 24, 2024

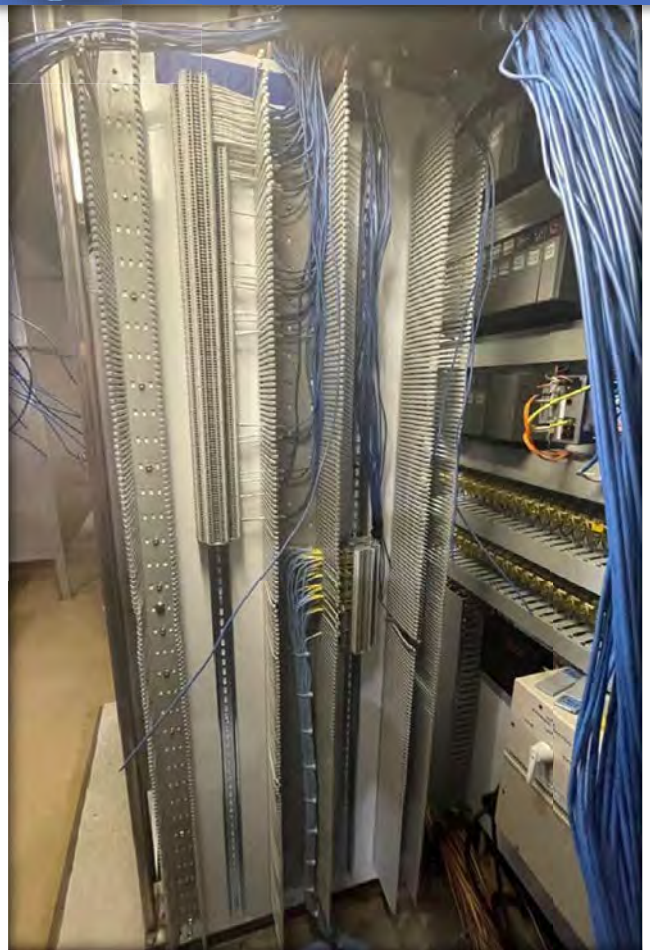
Contract 7582: Carroll Water Treatment Plant SCADA System
SCADA Control Panels (Qty: 17)

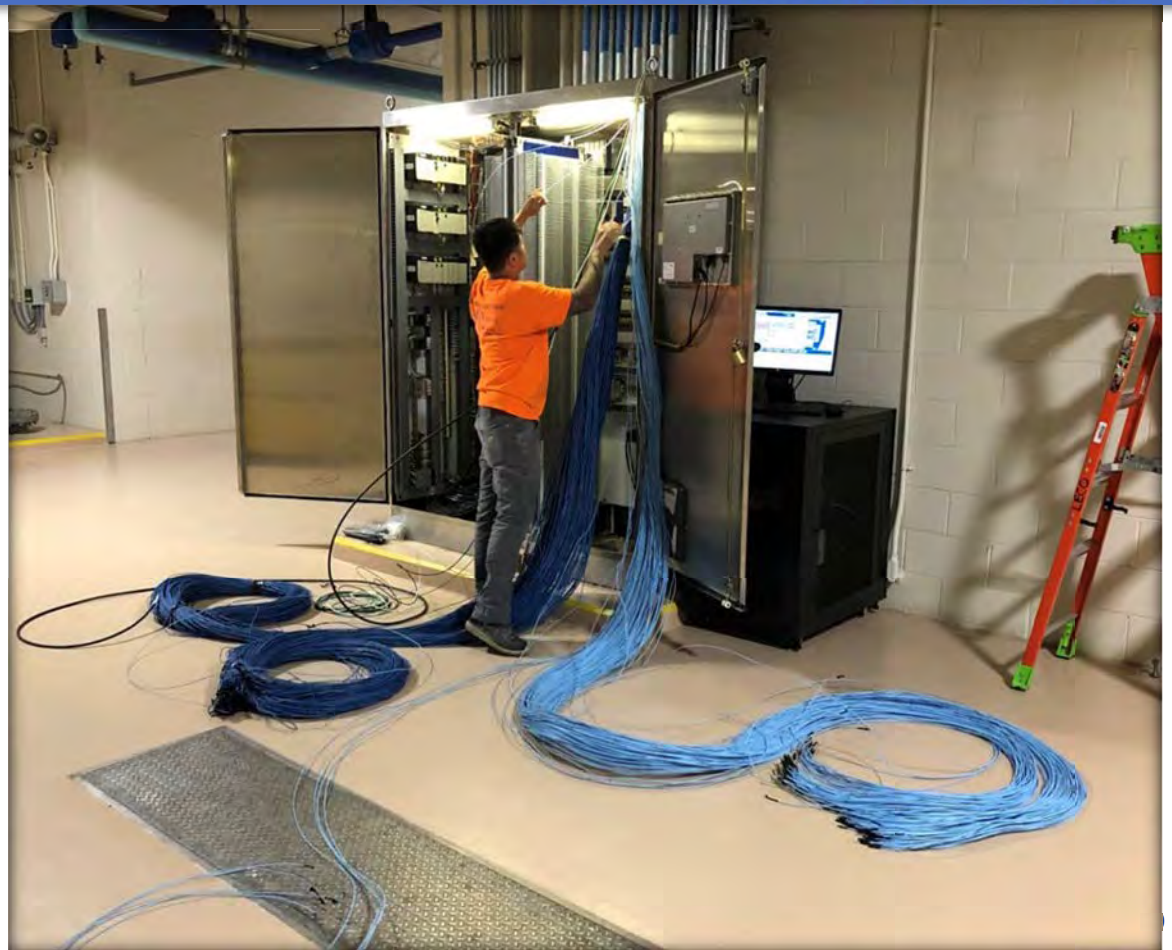


Contract 7582: Carroll Water Treatment Plant SCADA System
Typical SCADA Control Panel: Supply Chain Delays

Contract 7582: Carroll Water Treatment Plant SCADA System
Change Order #9: Cyber Security Improvements

Contract 7582: Carroll Water Treatment Plant SCADA System
Change Orders #10 & 13: Backplane Sub Panels & Additional Testing





Contract 7582: Carroll Water Treatment Plant SCADA System Control Room Upgrade