

CLOSING OF THE CAM004 CSO IN CAMBRIDGE

NEWEA
January 23, 2017



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Summary

- **Alewife CSO Control Plan Overview, Summary of Projects and Benefits – David Kubiak, MWRA**
- **CAM004 Sewer Separation Details and Challenges – Christine Clancy, Kleinfelder**
- **Hydraulic Performance Update – David VanHoven, MWH**
- **Q&A**

MWRA's CSO Plan is complete and operational

Boston, Cambridge, Chelsea, Somerville and MWRA have combined sewers and permitted CSOs. Parts of Brookline were also served by combined sewers.

MWRA's Long Term CSO Control Plan (LTCP) addresses 84 CSO outfalls to 14 receiving water segments in Boston Harbor and the Charles, Mystic and Neponset watersheds.

The LTCP includes 35 projects to bring CSOs into compliance with the Clean Water Act.

All 35 projects are complete and operational.



MWRA CSO Accomplishments

✓ CSO reduction and water quality improvement every year since 1987.

- Many outfalls were closed by the communities in the late 1980's
- Elimination of dry weather overflows by 1990
- Completion of Deer Island transport upgrades by 1992
- >100 CSO system optimization measures 1993-97
- Construction of 35 CSO projects 1996-2015



✓ 182 CSO-related federal court milestones addressed to date.

- Completion of the last construction project in the Boston Harbor Case in December 2015
- Two remaining federal court milestones: post-construction monitoring/performance assessment



MWRA CSO Accomplishments

35 CSO projects designed and constructed in 20 years (1996-2015)

125 contracts

- 82 construction
- 33 engineering
- 10 planning/technical support

5 agreements with CSO communities totaling \$423 million

\$910 million capital investment by MWRA since 1987

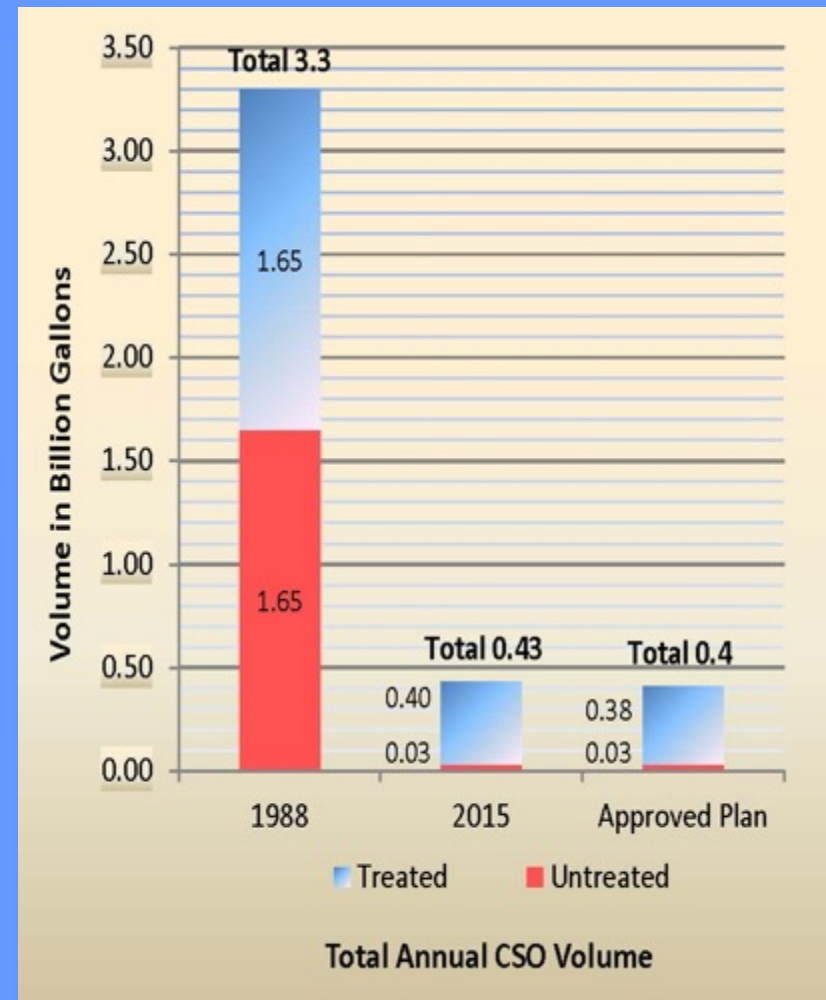


MWRA LTCP Benefits

The LTCP brings 84 CSO outfalls into compliance:

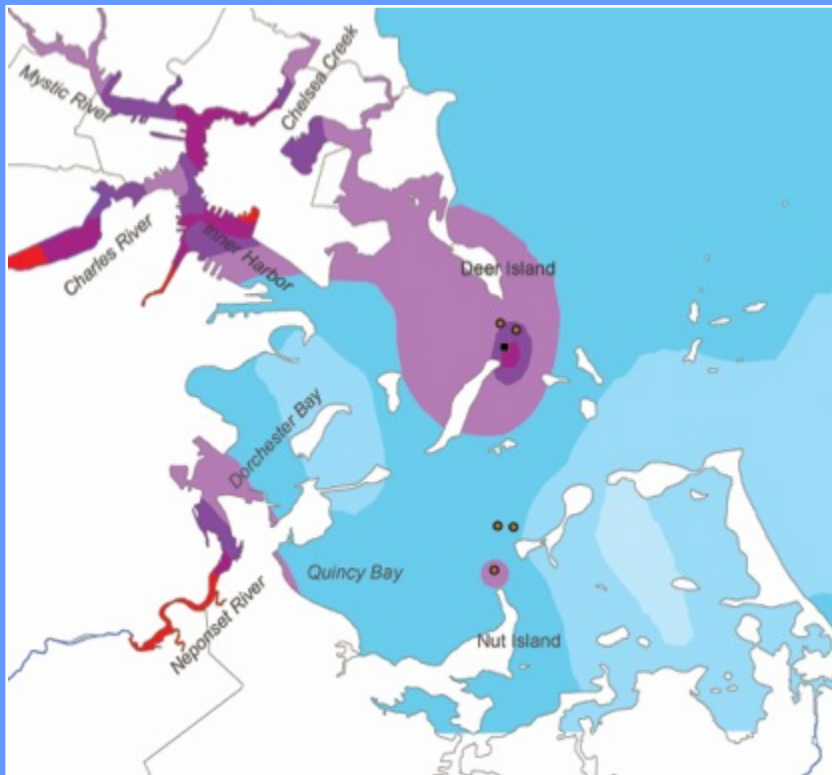
- 34 outfalls are closed to CSO discharges
- 5 outfalls along the South Boston beaches have 25-year storm level of control
- 4 outfalls have upgraded wet weather treatment (CSO facilities)
- Frequency and volume of discharge greatly reduced at remaining outfalls

Reduces system-wide CSO discharge volume in a Typical Year by 88%, with 93% of remaining volume treated at MWRA's four CSO facilities.

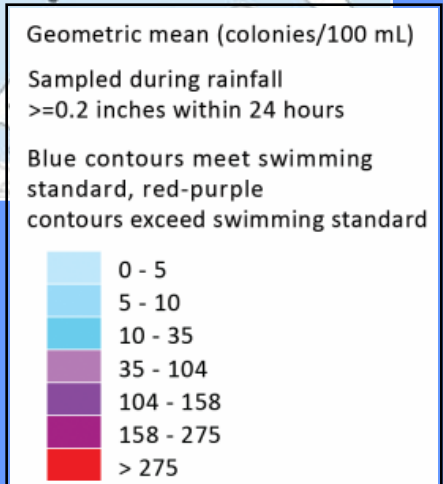
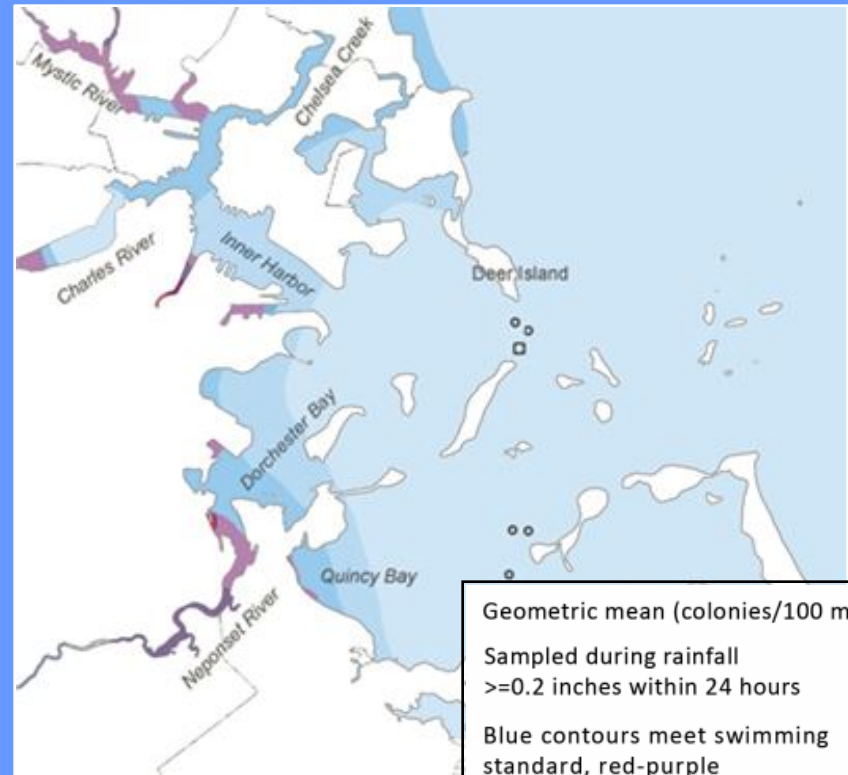


Change in Boston Harbor *Enterococcus* Bacteria in Wet Weather

Prior to Boston Harbor projects (1989-1991)



Most Boston Harbor projects complete (post-2007)



Contours show geometric means of *Enterococcus* bacteria samples collected when more than 0.2 inch of rain fell in the previous day.

Blue areas meet EPA geometric mean standard for *Enterococcus* (35 cfu/100 mL). Red-purple areas exceed the standard.

Remaining Federal Court Obligations

There are 184 CSO related milestones in the Court Order.

Two milestones are left:



January 2018: Commence 3-year CSO post-construction monitoring and performance assessment.

December 2020: Submit results of 3-year performance assessment to EPA and DEP.

Compliance with State Water Quality Standards

Class B	Neponset River	CSO eliminated.
Class SB	North Dorchester Bay South Dorchester Bay Neponset River Constitution Beach	(25-year storm control for the South Boston beaches)
Class B_(CSO)	Back Bay Fens (Muddy River)	Min. 95% compliance with Class B.
Class SB_(CSO)	Upper and Lower Boston Inner Harbor Lower Mystic River/Chelsea Creek Reserved Channel Fort Point Channel	CSOs reduced/treated in accordance with approved the Long-Term Control Plan, providing >98% compliance
Class B (CSO Variance)	Alewife Brook/Upper Mystic River Charles River Basin	Class B standards sustained w/temporary allowance for CSO discharges as LTCP is implemented and verified (1998-2020) CSOs reduced/treated in accordance with approved Long-Term Control Plan With CSO performance assessment (2020), DEP to make determinations on long-term water quality standards and associated levels of CSO control

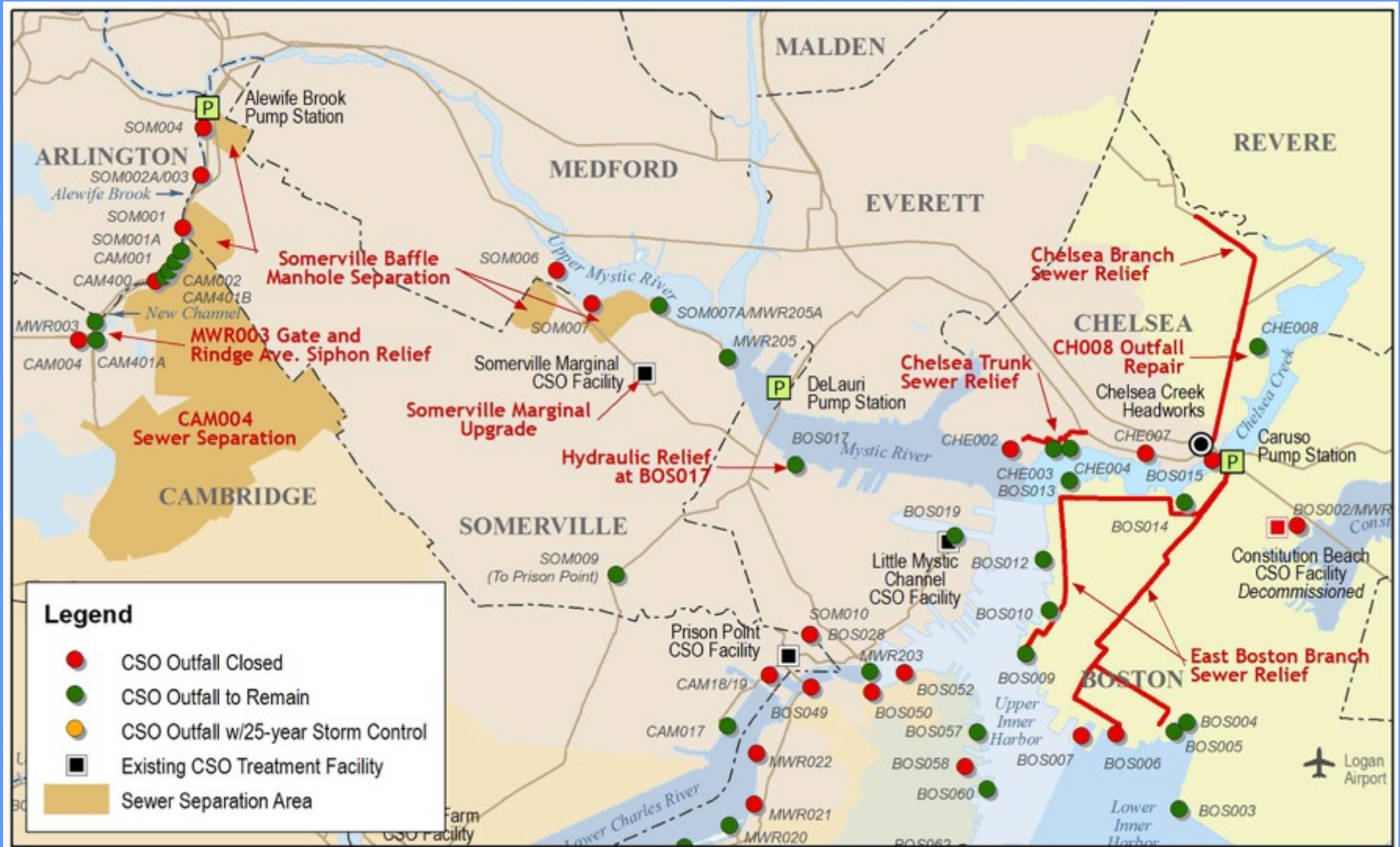
CSO Variances and WQS Determinations

Charles River Basin and Alewife Brook/Upper Mystic River

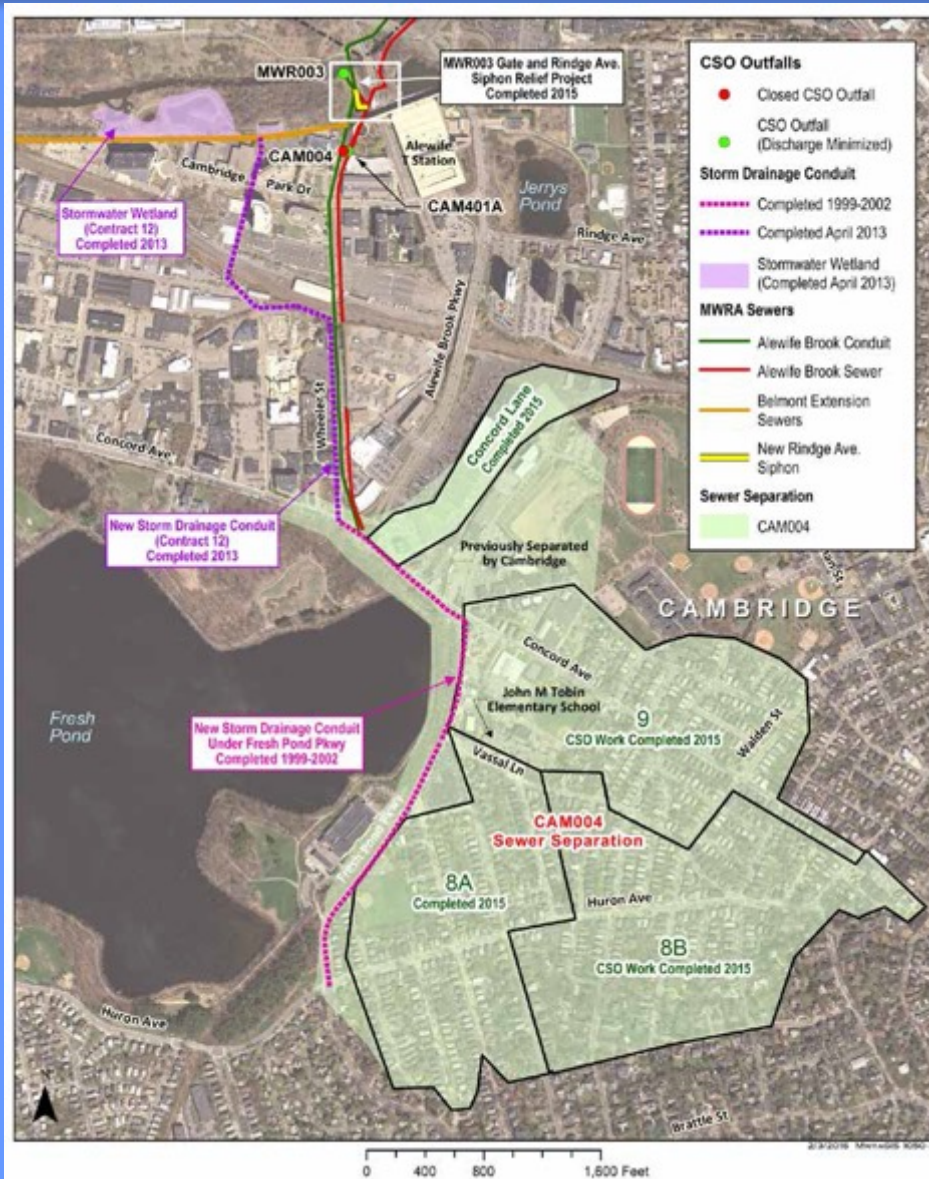
- DEP has issued CSO variances for the Charles River Basin and the Alewife Brook/Upper Mystic River Basin from the late 1990's through 2019.
- DEP/EPA have agreed to issue a further extension through 2020.
- DEP will make long-term WQS determinations for these water segments after 2020, using:
 - MWRA WQ data and evaluations of remaining CSO impacts to WQ conditions
 - Results of CSO post-construction monitoring and system performance assessment



Alewife Brook and Mystic River CSO Outfalls and Projects



Alewife Brook CSO Control Plan - 1 of 2



Alewife Brook CSO Control Plan - 2 of 2



Alewife Wetland and Stormwater Outfall



Rendering of Stormwater Wetland at Alewife Brook, Cambridge

Alewife Wetland and Stormwater Outfall



Alewife Brook/Upper Mystic River CSO Control

		No. of CSO Outfalls	In a Typical Rainfall Year				Total Discharge Volume Reduction
			Frequency of Most Active Outfall		Discharge Volume (million gallons)		
			Untreated	Treated*	Untreated	Treated*	
Alewife Brook/ Upper Mystic River	1992	15	63	9	50.0	7.6	
	2015	7	5	3	6.6	2.0	85%
	LTCP	7	7	3	7.3	3.5	81%

* At Somerville Marginal CSO Treatment Facility's Upper Mystic Outfall MWR205A

CAM004 Sewer Separation

Project Elements

- Sewer Separation
- Private inflow removal
- Upgrade failing infrastructure
- Positive landscape and water quality opportunities



CAM004 Sewer Separation

Project Elements (Continued)

- Upgrade sidewalks, improve pedestrian safety
- Consideration of multi-modal transportation
- Community outreach



CAM004 Sewer Separation Challenges

CONCORD (CONTRACT 9) SEWER SEPARATION AND SURFACE IMPROVEMENTS PROJECT

CONSTRUCTION PROGRESS

LEGEND

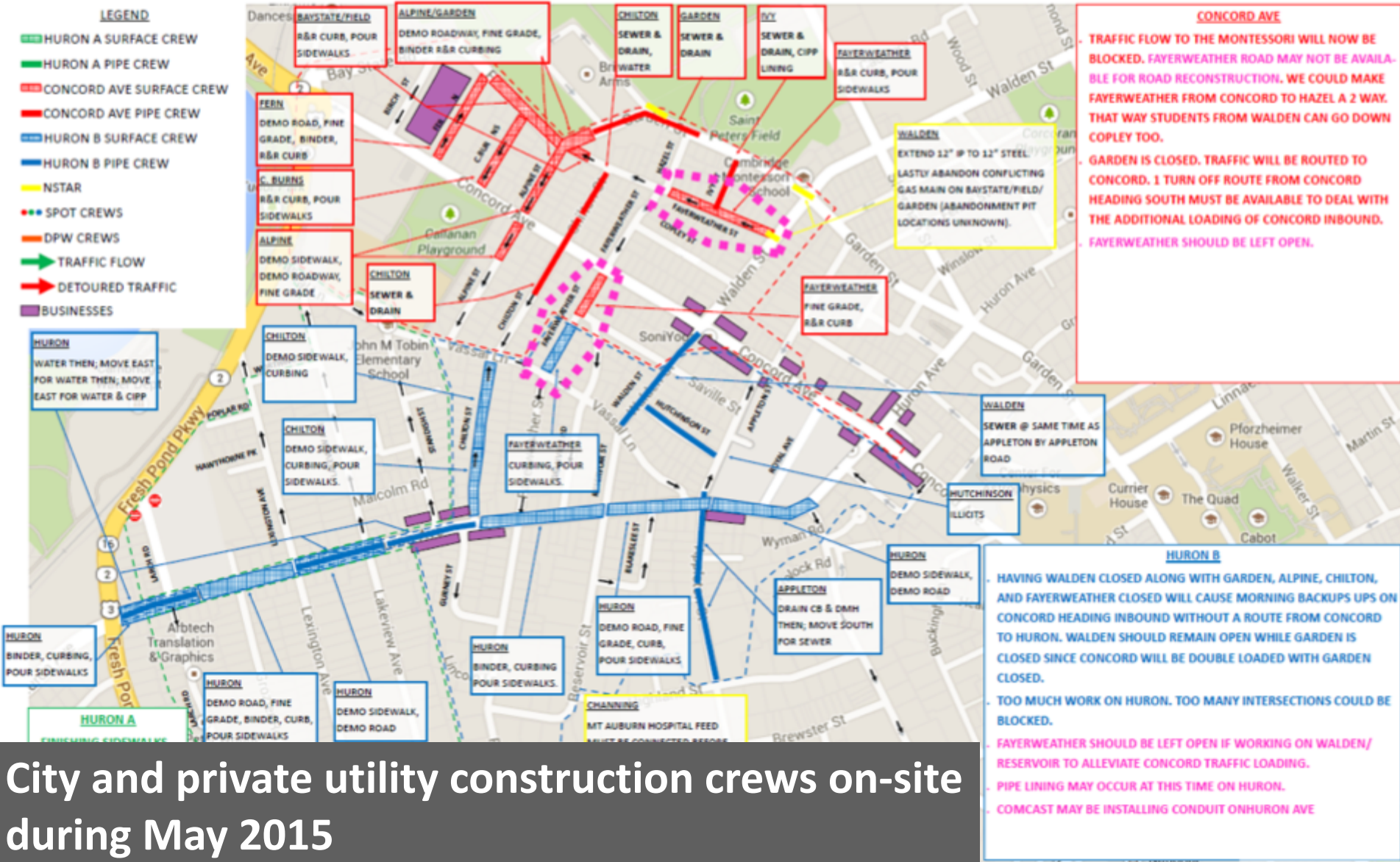
- | | | |
|--|--|--|
|  HURON A PROJECT AREA |  HURON B PROJECT AREA |  CONCORD AVE PROJECT AREA |
|  DRAIN INSTALLED |  DRAIN REMAINING | |
|  SEWER INSTALLED |  SEWER REMAINING | |
|  WATER INSTALLED |  WATER REMAINING | |
|  GAS INSTALLED |  GAS REMAINING | |
|  SIDEWALK INSTALLED |  SIDEWALK REMAINING | |
|  UTILITY WORK COMPLETE
FINAL PAVING INSTALLED | | |



LAST UPDATED 9/04/14



CAM004 Sewer Separation Challenges

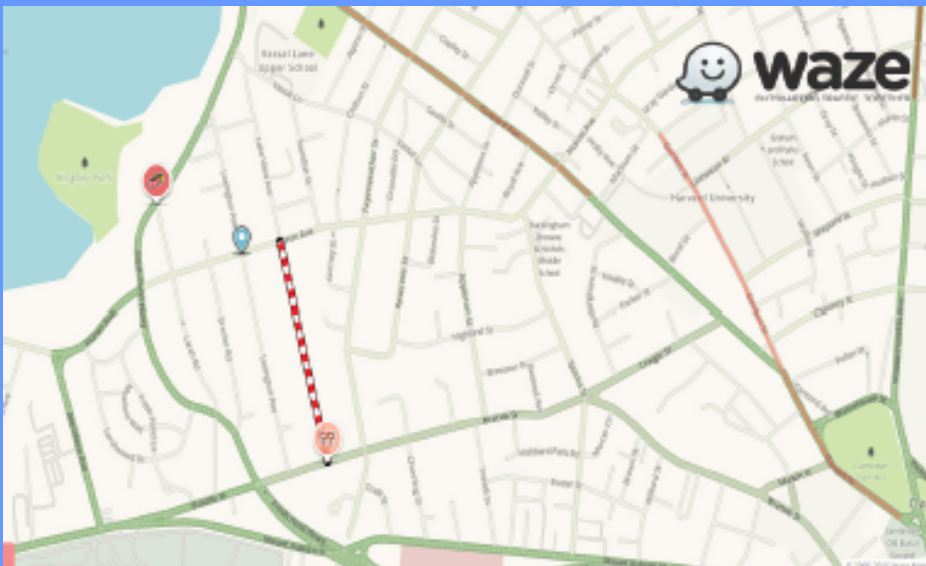


City and private utility construction crews on-site during May 2015

CAM004 Sewer Separation Challenges

Community Coordination

- Open houses
- Business meetings
- Social events
- Bimonthly newsletters
- Waze (traffic app)



COMMUNITY EVENTS

Come to Coffee Talk

We are here to listen!

Please drop in to join our project team at Sarah's Market (200 Concord) every 1st Thursday, 7-11am:

• September 1 • October 6 • November 3



Support Observatory Hill

Join the project team at Appleton Street (Concord to Saville)

Thursday, September 15th, 5pm-8pm

Help support your local businesses for a night of music, shopping, and chatting with your neighbors. See you there!

Neighborhood BBQ!

We invite you to come enjoy some food and refreshments on



Wednesday, October 5th*, 5:30pm-7:30pm on Granville Road.

Project staff will be cooking up burgers and answering any questions you have.

*[Rain date: October 6th]

CAM004 Sewer Separation Challenges



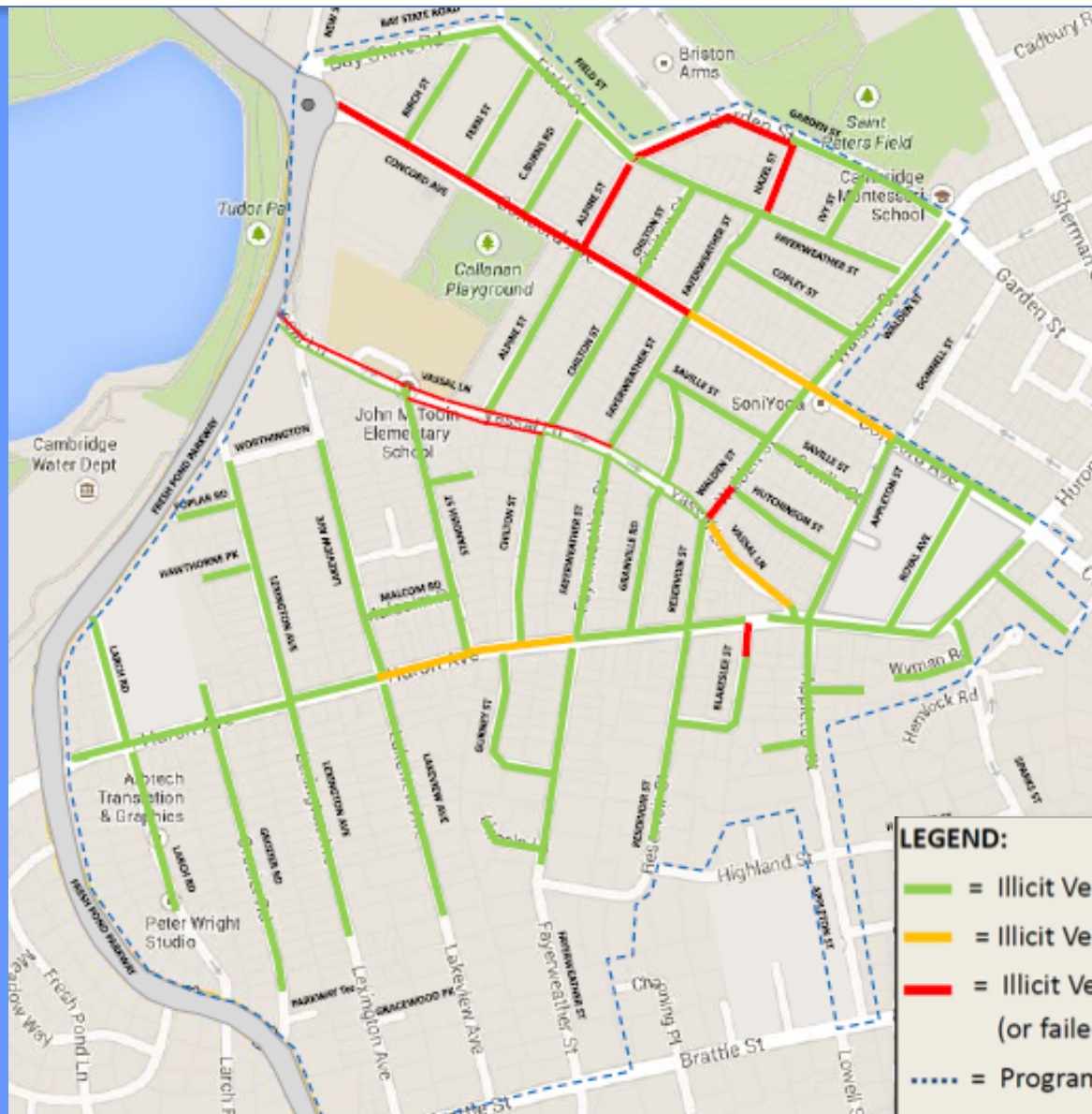
CAM004 Sewer Separation Challenges

Illicit Survey Verification Process

- Contract overlap (2 contractors)
- Downstream areas separated up to 15 years ago
- Project wide pipe cleaning
- Iterative dry weather sampling



CAM004 Sewer Separation Challenges

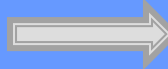


LEGEND:

- = Illicit Verification Complete (Passed)
- = Illicit Verification Pending Lab Results
- = Illicit Verification Remains to be Completed (or failed and retest required)
- - - = Program Area

CAM004 Hydraulic Performance

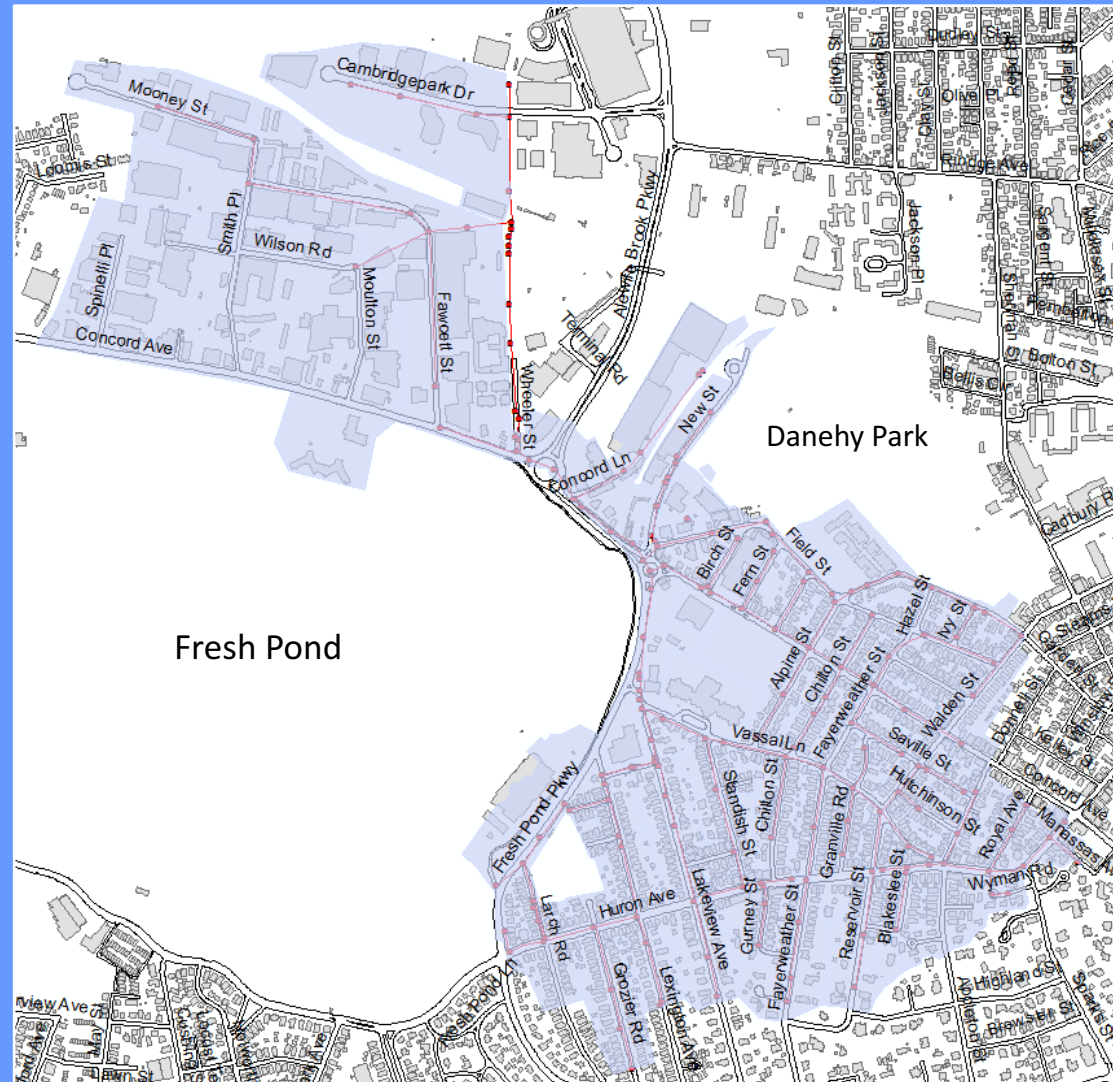
- CAM 004 was originally responsible for 24 MG of CSO annually (~50% of the total going to Alewife Brook)
- With interim controls in place: <5 MG
- Now zero.



City of Cambridge and MWRA post-construction monitoring program began in Spring 2016

CAM004 Hydraulic Performance

- Flow monitoring May to August of 2016.
 - 7 meters to confirm the reduction in wet weather flows due to separation and the PPI removal program
 - Calibrate the hydraulic model



Planning Phase vs As-built

- Difficulties in private property inflow removal
 - Impervious area remaining of 5 acres in planning vs 7.6 acres.
 - 30 sump pumps in planning vs 40 sumps pumps (100 removed)
- NRCS 10-year, 24-hour vs NRCC 10-year, 24-hour storm (4.69 versus 4.90 inches)
- New pump stations discovered and required

Preliminary Results

- Sanitary system hydraulic model was calibrated for both dry and wet weather conditions.
- Model calibration results were satisfactory and, for the most part, within recommended ranges of error.
- The calibrated model was then used to quantify the impact of the CAM004 area sewer separation on CSOs to the Alewife Brook for the typical year.
- Estimated reductions in annual volumes to the MWRA amounted to 137.3MG in post-separation conditions

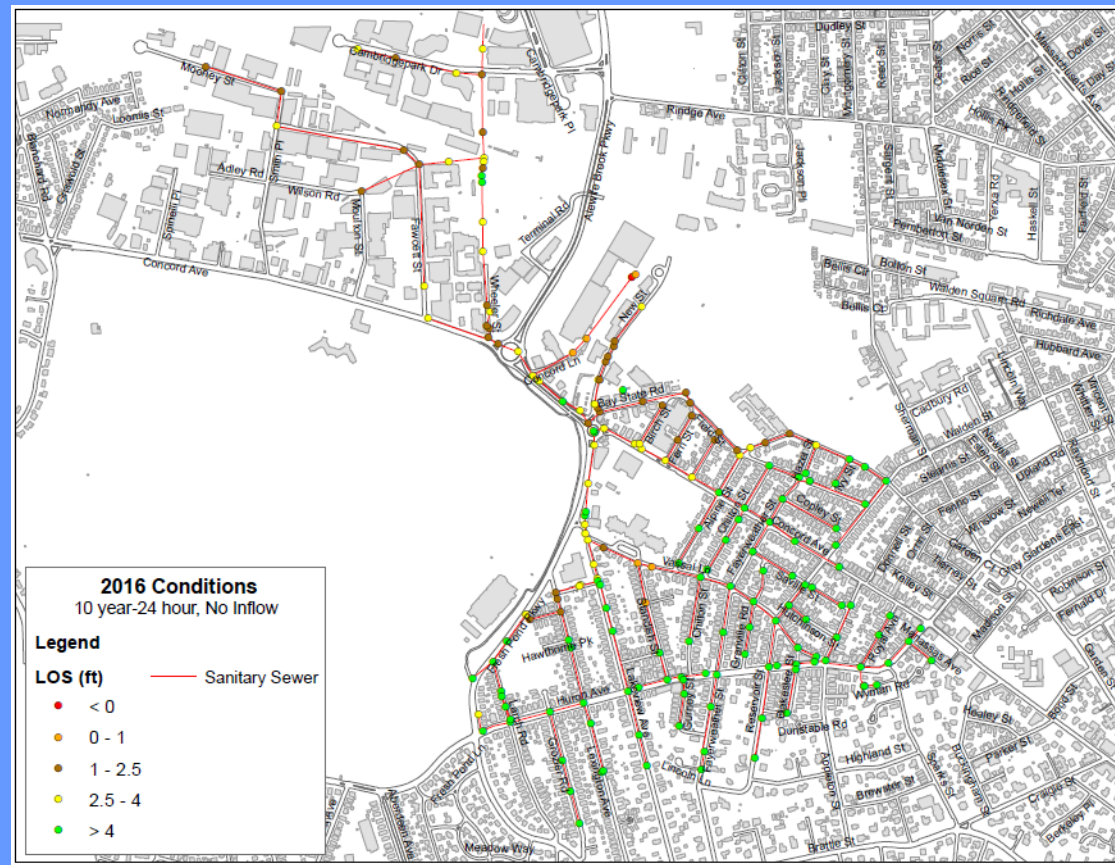
Annual Volume to the MWRA	2014 Conditions*		2016 Conditions		Cambridge LTCP Conditions	
	Volume to MWRA (MG)	CSO Volume (MG)	Volume to MWRA (MG)	CSO Volume (MG)	Volume to MWRA (MG)	CSO Volume (MG)
CAM004 Area	674.68	5.89	537.37	0.00 (Closed)	537.37	0.00 (Closed)

*Per MWRA's CSO Discharge Estimates and Rainfall Analyses for Calendar Year 2014

Preliminary Results

*10-year level of service goal

- No overflows for the 5-year, 24-hour NRCC storms with all forty sump pumps on.
- No overflows for the 10-year, 24-hour NRCC storms with no sump pumps on.
- Small overflows for the 10-year, 24-hour NRCC storm with all forty sump pumps on.



Closing of the CAM004 CSO in Cambridge

Questions?

Acknowledgements:



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