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We CAN Clean Up PFAS

(We don't HAVE to drink it!)

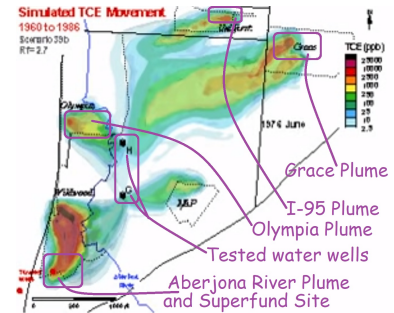
We are facing a cost of a half-million dollars per year to filter PFAS out of our reservoir. Instead, we could investigate where that PFAS is coming from, and remove it at the source. This webpage discusses the steps we've taken toward that goal in 2022, and the next steps proposed in 2023-2024.

Sections:

- [GAC filters](#): a half million dollars per year
- [PFAS hotspots](#): how DPW can identify PFAS sources
- [PFAS remediation](#): how ConComm can clean up PFAS
- [Woburn Superfund site](#): how water contamination was identified and cleaned up
- [Cost estimates](#): Battelle Labs PFAS water and soil testing

Relevant materials:

- [YouTube video: underground plumes spreading from a hotspot](#)
- [Councilor Gordon's 2023 proposal for DPW to find PFAS hotspots](#)
- [Councilor Gordon's 2023 proposal to empower ConComm to remediate PFAS hotspots](#)
- [Councilor Gordon's 2022 order on PFAS testing and GAC filtering](#)



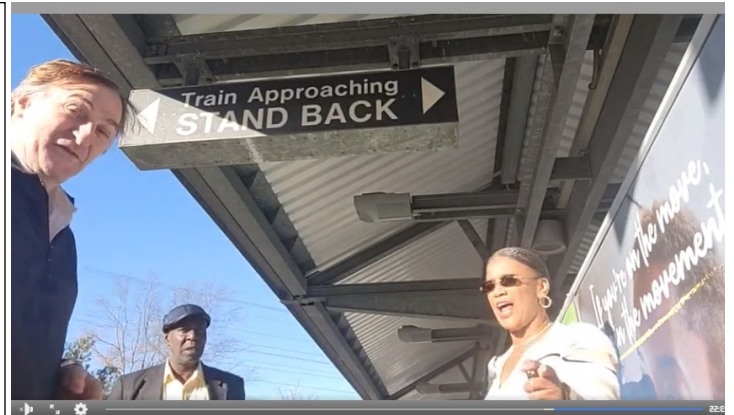
GAC filters: a half million dollars per year

- Our Tri-Town reservoir currently has PFAS levels around 16 ppt. We are required to send out a mailer warning about PFAS in the water supply, if the PFAS levels exceed 20 ppt for three months; that occurred in 2020-2021.
- Councilor Gordon introduced two actions in 2022 to remedy the situation: first, filter PFAS from the water supply using GAC ("Granular Activated Charcoal"); and second, identify the sources of PFAS so we can remove them. Both actions have begun, but need further steps.
- On GAC filtering: the current Braintree water treatment plant (WTP) started using GAC filters a few years ago, and the current Randolph/Holbrook WTP is starting to use GAC filters this year. The new Tri-Town WTP under construction will use GAC filters as well.
- GAC filters cost about \$50,000 per tank to "recharge" (which means replace the GAC material with recycled GAC). Braintree expected to replace theirs every couple of years -- but actually had to do so in less than a year because they get "saturated" with PFAS. For the three towns, we have a dozen tanks, so that is an expense of over a half-million dollars per year, for both the existing water treatment plants and the new Tri-Town WTP under construction.
- GAC filters get saturated with PFAS depending on how much PFAS is in the source water. If we can cut PFAS in our incoming water from 16 ppt to 8 ppt, the GAC filters will last twice as long. That is the financial goal of cleaning up PFAS sources -- to reduce the cost of frequently replacing GAC filters.

Holbrook/Randolph Water Plant and PFAS



[Councilor Gordon and Holbrook Select Board Member Watkins discuss PFAS at our Water treatment Plant](#)

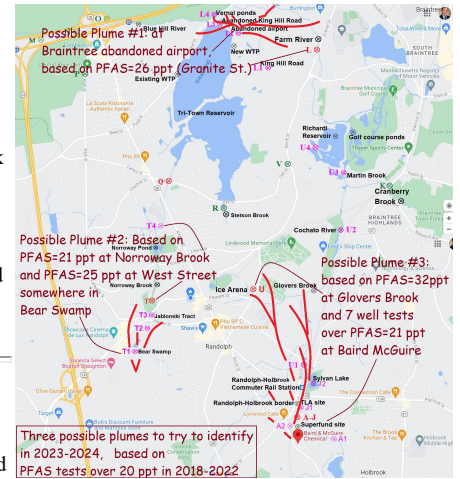


[Councilors Natacha Clerger and Jesse Gordon discuss water contamination at the Commuter Rail Station adjacent to the TLA site](#)

PFAS hotspots: how DPW can identify PFAS sources

- We can clean up PFAS sources if we identify where they are. Typically, there's a spill, decades ago, of some PFAS-containing materials, such as fire-fighting foam. One fire at the abandoned airport on the Braintree shore of our reservoir in 1960, for example, would continue to leach PFAS into the reservoir for decades (that's why they're called "forever chemicals"). By identifying "PFAS hotspots," we can remove the contaminated soil, and reduce the PFAS leaching into our reservoir forever.
- Our state environmental agency, MassDEP, has done some PFAS water testing in all three towns, at our request, to try to find PFAS sources. MassDEP found [three spots with high PFAS levels areas warranting further exploration](#). Councilor Gordon has asked MassDEP to do another round of PFAS water testing, and MassDEP will likely do so within the year. But we need soil tests too, and we need more frequent water tests!

- We need a lot of tests to find PFAS hotspots because we have to plot them on a map to find the "PFAS plume". A "plume" means the PFAS spreads out underground in a giant triangle, over a period of many years, with the PFAS hotspot at the top point of the triangle.
- A dozen tests should be enough to find a PFAS hotspot, using the results of each round of testing to pick the next round's locations. MassDEP can do that, but their feedback time is about 6-to-12 months. [Councilor Gordon proposes](#) to have Randolph DPW conduct the PFAS sampling, to send to a commercial PFAS lab, which would have a feedback time of 1 month, so we can actually identify PFAS hotspots by next year.
- It's hard to understand how underground PFAS plumes work, so people have made videos about it. The image at the top of this webpage shows four underground plumes that contaminated groundwater -- the red area at the top of each plume is the "hotspot." There's a [YouTube video below](#) showing how that underground plume grew over a period of 26 years. This is a simulation of an actual contaminated water issue in Woburn, where they actually found the hotspots and cleaned them up.



PFAS remediation: how ConComm can clean up PFAS

- Once we identify the PFAS hotspots, we can begin "PFAS remediation," which means digging up the contaminated soil and trucking it to a toxic waste dump. That may span across the Holbrook or Braintree border; that's why these two Council Orders are most effective if passed jointly with Holbrook and Braintree, as we did with the 2022 Council Order.
- Our Conservation Commission (ConComm) could include PFAS remediation in building permits for construction that includes wetland areas (which all of the likely PFAS sources include). Our current ConComm rules don't mention PFAS at all -- because PFAS wasn't an issue when those rules were written -- so Councilor Gordon's order includes explicitly empowering our ConComm to address PFAS remediation. The [Holbrook ConComm](#) discussed exactly this issue in June 2023, putting a hold on a TLA building permit pending PFAS testing.
- The cost of contaminated soil removal can run into millions of dollars (depending on how wide an area has PFAS, if it's underwaer, etc.). We could certainly apply for state and federal grants for that cost when the time comes. Maybe our ConComm could require accounting for the risk of those possible costs in building permits (that's the idea with the Superfund site near the Holbrook TLA, where MassDEP did find high PFAS levels in water wells).

Woburn Superfund site: how water contamination was identified and cleaned up

Contamination of Groundwater Wells, Woburn MA



Simulation of Contamination of Groundwater Wells in Woburn MA from 1960 to 1986: [\(Click for YouTube video\)](#), "From Wooster College Geology Program; Childhood Leukemia cases linked to groundwater wells containing TCE in the 1970s."

To watch video (it has three parts):

1. 0:10 to 2:10: Month-by-month spread of TCE where red indicates high TCE other colors indicate lower TCE levels
2. 2:15 to 4:00: Simulation including "well G" underground perspective (showing how seepage occurs, like with PFAS)
3. 4:15 to 6:00: Same from "well H" underground perspective (contamination was found in "Well H" and then water and soil testing moved upstream; Randolph and Holbrook need to do the same!)

Explanation of video and how it applies to PFAS in Randolph and Holbrook:

- The video shows "TCE contamination" in Woburn; TCE is a "halogenated organic compound" like PFAS, and both cause cancer.
- There are 4 identifiable "plumes" -- where TCE flows underground from 4 different "point sources." The goal of the Randolph PFAS project is to identify our underground plumes and point sources.
- One plume in Woburn is a [Superfund site called the "Aberjona River"](#); Randolph/Holbrook also has a [Superfund site called "Baird/McGuire"](#)
- The well sites marked "G" and "H" were where contaminated water was found. MassDEP testing in Randolph has identified three possible point sources, by testing at downstream points like "G" and "H" (one on Glovers Brook, downstream from our Superfund site).
- In Woburn, they found the point sources by water and soil testing upstream from wells "G" and "H". That's what Councilor Gordon is proposing in Randolph and Holbrook -- try to find our PFAS hotspots by upstream water and soil testing.
- In Woburn, they "cleaned up" the point sources once they were found -- if we clean up our "PFAS hotspots" in Randolph and Holbrook, we'll save a quarter million dollars per year on our new Water Treatment Plant!

There's a movie made about the Woburn water contamination: [A Civil Action](#), starring John Travolta. The movie dramatizes the true story of how John Travolta's character traipses around the woods of Woburn to find half-buried barrels dumped in wetlands, which were causing cancer in Woburn residents downstream for decades.

I happened to work for several years at West Cummings Park in Woburn, which is located on Washington Street, right on the red spot labeled "Grace Plume" on the map above. I worked there in the early 2000s, after the cleanup occurred, but the people of Woburn still all said "Don't drink Woburn water!" The hotspot was on the Aberjona River in the woods behind the office park. Our multi-building office park was "remediated" by disallowing ground contact -- the entire office park was paved to "seal in" the contaminants. Since office parks should have picnic areas so employees can go outside for lunch, Cumming Park built those as "raised structures" with 3 feet of dirt added ABOVE the pavement, with picnic tables on top of the dirt.

I loved the heroic story of [A Civil Action](#), and I kept a copy of the book on my office desk, to show all new employees at my office. One day, our out-of-state boss asked all of us Woburn employees if we'd like to move to a bigger office. I said, "Bigger is fine, but it'd be better to move to a place that doesn't feel like a paved-over toxic waste site." He asked why it felt like that, and I responded, "Because our parking lot is literally a paved-over toxic waste site!"

The Woburn story is relevant to Randolph and Holbrook because we can use the same methods that Woburn used, to find our underground PFAS plumes. They did it in the 1980s -- the technology is not rocket science and our DPW is entirely capable of it. It just requires traipsing around in the woods taking water samples and soil

samples, and sending them to a PFAS testing lab. I have done that traipsing myself in Braintree, to try to find a PFAS hotspot from their abandoned airport -- I send in my water samples to a lab for \$75 -- I haven't found a PFAS hotspot yet, but I'll keep trying!



The same company that toxified Woburn, W. R. Grace, also happened to be my neighbor when I lived in North Cambridge around that same time. The Grace property was between my home and the Red Line Alewife station -- shown in the photo behind all those fences, because it was a toxic waste site too (asbestos contamination in this case). People who walked to my home from Alewife between the two fences would comment, "It feels like you're walking through a toxic waste site," because, once again, they literally were.

W. R. Grace held neighborhood meetings because they wanted to develop those acres -- I attended and suggested they remediate by removing all the dirt for 3 feet deep on several acres, which the EPA estimated would cost a few million dollars. The Grace developers said, "Oh, we'll put up tents during construction so that the asbestos won't get airborne and you'll all be fine, trust us!" I responded, "I don't trust W.R.Grace because [I saw the movie!](#)" The Grace property still remains undeveloped, and still remains behind fences if you visit there now.

The Cambridge story is relevant to Randolph and Holbrook because we can use the same methods to stop the TLA Trash Transfer Station from building on the toxic waste site on our border. The EPA estimate of "a few million dollars" was made by an EPA guy who attended as a "resource" for the neighborhood meeting -- I asked him publicly to make an estimate because I knew he could, and I knew he'd agree that was a good solution. W.R.Grace disagreed -- they didn't want to pay millions to remediate before they even started building! The Cambridge ConComm at the time did not require W.R.Grace to remediate before construction -- we stopped them by protesting as a neighborhood group -- in other words, their ConComm rules were not strong enough to enforce toxic cleanup.

We can make our ConComm rules stronger, so that we CAN require TLA to remediate. The result might be something like in Cambridge -- where W.R.Grace gave up on a brownfield development because the remediation cost was too high. Or the result might be something like in Woburn -- where W.R.Grace remediated as part of a brownfield development. If we find a PFAS hotspot at the Superfund site, the Holbrook ConComm could require TLA to remediate by removing contaminated soil, perhaps including downstream in Randolph. It might not stop TLA from building -- but it will give the people of Randolph and Holbrook some real benefit!

Cost estimates: Battelle Labs PFAS water and soil testing

How much does it cost for a professional PFAS lab to do water and soil testing? About \$300 per sample. A price estimate from Battelle Labs appears below -- that's their official book prices -- we get a good price by sending in 10 samples at once (we can refrigerate them to avoid having to collect all 10 in one day). I asked for a "municipal price" as a "package deal" for 3 months -- here's the gist of it:

- \$278.25 per water sample test on 21-day turnaround
- \$291.50 per water sample test on 14-day turnaround
- \$341.25 per soil sample test on 21-day turnaround
- \$357.50 per soil sample test on 14-day turnaround

That means for 20 water tests and 10 soil tests, at sites that we pick on a monthly basis, the grand total would be \$9,292.50 (2 sets of 10 water tests x \$278.25, then 1 set of 10 soil tests x \$341.25). That might be enough to identify the TLA hotspot over a 3-month testing period before winter, and then next spring we can repeat the process in Holbrook, or to find the Braintree abandoned airport hotspot.

Here are notes from the Battelle representative:

This cost per sample is based on 10 sample or more of each matrix, and analyzing the samples together. The table below shows the cost/sample for both a 21-calendar day turnaround as well as a 14-calendar turnaround. I have attached the analyte list and detection limits for both of these matrices as well. This method is nationally accredited by both the Department of Defense as well as NELAC. We are not accredited by Massachusetts, but based on our discussions, the state level accreditation is not necessarily for this work.

Here are the documents about PFS "detection limits," which indicate all of the compounds to be analyzed. Soil tests aren't on the same scale (well over 20 ppt -- we're looking for PFAS over 500 ppt for a soil hotspot). We can replicate the state's "PFAS6" test by adding up the 6 analytes that the Commonwealth requires -- PFOS + PFOA + PFHxS + PFNA + PFHpA + PFDA. Battelle will do a dozen more for us for the same price -- if the total for the water test PFAS6 is over 100 ppt, we can define that as a hotspot.

- [Detection Limits in Solid \(40 CFR 136 2017-9.28.2021\)](#)
- [Detection Limits in Water \(40 CFR 136 2017-9.16.2021\)](#)

EPA Method 1633 – all target analytes

Description	Sample count	28-Day	21-Day	14-Day	7-Day	72-Hour
Non potable waters by EPA 1633	10+	\$445.00	\$467.25	\$489.50	\$556.25	\$667.50
	5 to 9	\$511.75	\$537.50	\$563.00	\$639.75	\$767.75
	1 to 4	\$578.50	\$607.50	\$637.00	\$723.25	\$867.75
Vapor (SPE cartridge) by EPA 1633	10+	\$445.00	\$467.25	\$489.50	\$556.25	\$667.50
	5 to 9	\$511.75	\$537.50	\$563.00	\$639.75	\$767.75
	1 to 4	\$578.50	\$607.50	\$637.00	\$723.25	\$867.75
Solids by EPA 1633	10+	\$465.00	\$488.25	\$511.50	\$581.25	\$697.50
	5 to 9	\$511.50	\$537.25	\$562.75	\$639.50	\$767.25
	1 to 4	\$604.50	\$634.75	\$665.00	\$755.75	\$906.75

EPA Method 1633 – PFOA, PFOS, and PFBS only

Description	Sample count	28-Day	21-Day	14-Day	7-Day	72-Hour
Non potable waters by EPA 1633	10+	\$395.00	\$414.75	\$434.50	\$493.75	\$592.50
	5 to 9	\$454.25	\$477.00	\$500.00	\$568.00	\$682.00
	1 to 4	\$513.50	\$540.00	\$565.00	\$642.00	\$770.25
Vapor (SPE cartridge) by EPA 1633	10+	\$395.00	\$414.75	\$434.50	\$493.75	\$592.50
	5 to 9	\$454.25	\$477.00	\$500.00	\$568.00	\$682.00
	1 to 4	\$513.50	\$540.00	\$565.00	\$642.00	\$770.25
Solids by EPA 1633	10+	\$420.00	\$441.00	\$462.00	\$525.00	\$630.00
	5 to 9	\$483.00	\$507.50	\$531.50	\$603.75	\$724.50
	1 to 4	\$546.00	\$573.30	\$600.60	\$682.50	\$819.00

Committee to Elect Jesse Gordon, 52 West St, Randolph MA 02368

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