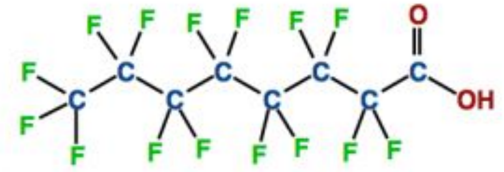
PFAS Treatment Options and Case Studies



Kyle Hay, PE, Project Manager

MMA Webinar on PFAS
Wednesday, July 21, 2021

Weston & Sampson

Expect to see more impacted sites

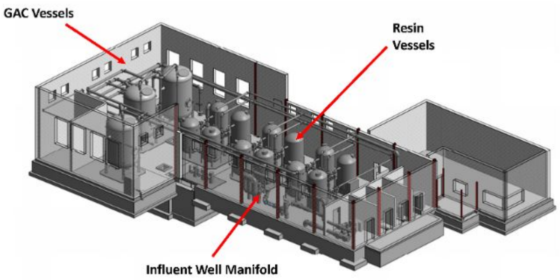
- Continue, or begin, to develop good will within the community served.
  - Customer Service & Call Center Staff are First Line of Defense
  - Engage with Community

- Develop an emergency response plan.

Exhausted all other options

<u>Alternatives:</u>

- Can’t abandon source
- No alternative sources
- No interconnections
- No blending available



- d the last viable option.
- capital and O&M cost.

Weston & Sampson

"Conventional" treatment technologies do not work for PFAS removal

- Coagulation, flocculation, sedimentation
- Sand, anthracite, greensand filtration
- Disinfection processes

Do not have a significant impact on PFAS concentrations.

Granular Activated Carbon

- Advantages – cost effective, numerous systems in use, PFAS can be transported offsite for destruction

- Disadvantages – may be costly to changeout for short chain breakthrough, footprint/building height

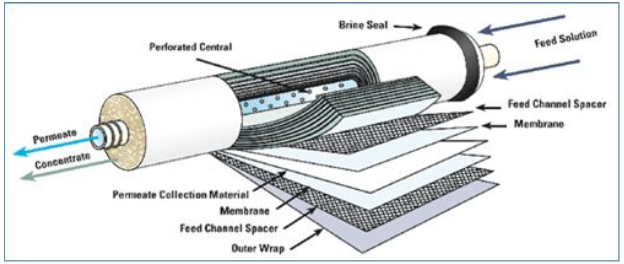
Ion Exchange Resins

- Advantages – custom designed treatment, long service life, smaller vessels required

- Disadvantages – expensive if single use, newer technology with limited data

Reverse Osmosis

- Advantages – near 100% removals
- Disadvantages – waste stream, high capital and O&M costs, more complex system



Generally still GAC vs IX resin

Design considerations:

- Flow rates and vessel size
- Footprint available
- Pretreatment requirements
- PFAS concentrations
- Waste handling
- Capital vs O&M costs

Typical Pressure Filter Design

Is short term treatment needed?

- Typically GAC is selected
- Helps with data collection to support a design
  - Performance and O&M costs
- Buys time
  - Work on permanent design
  - Explore alternative options
  - Find funding

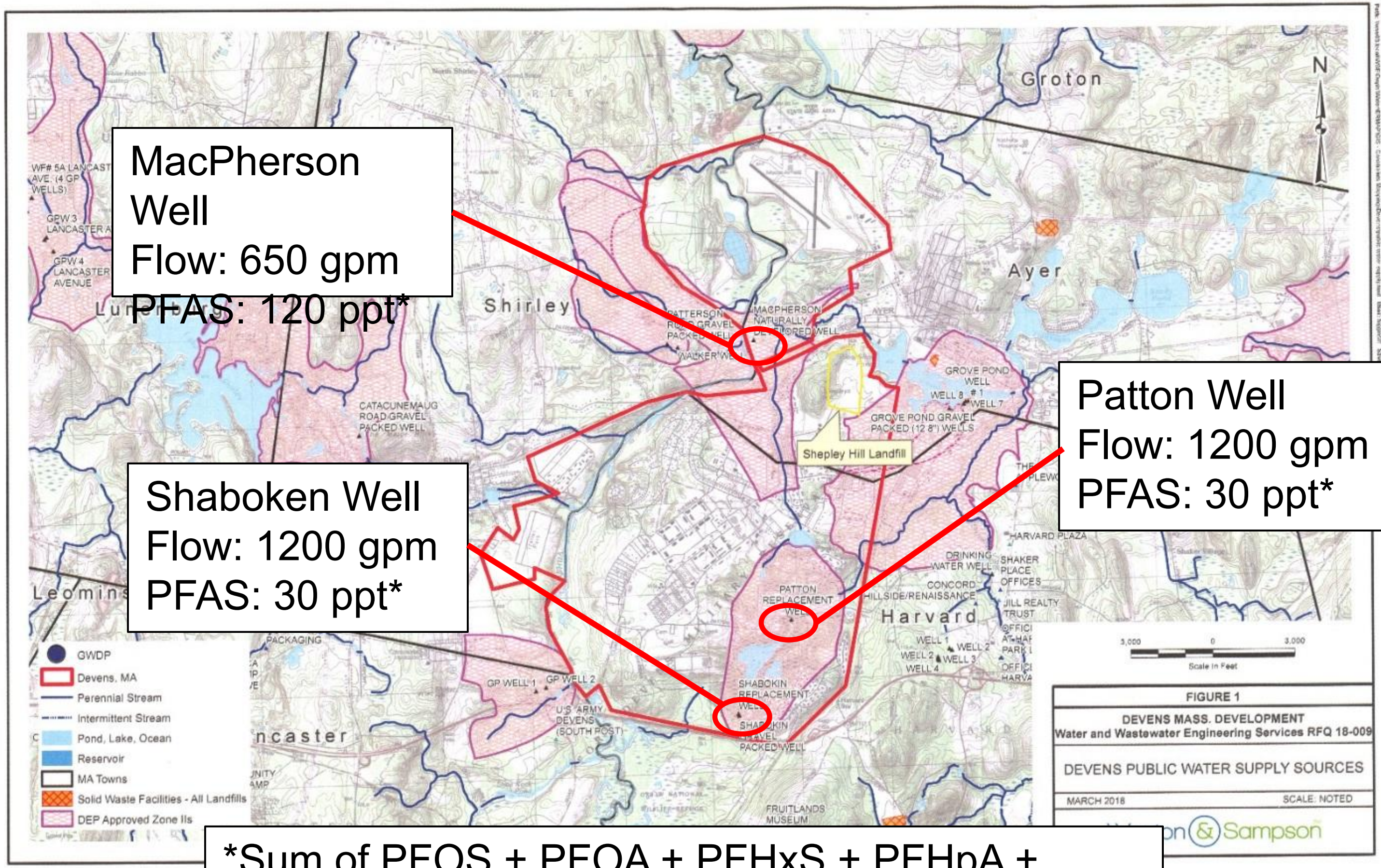
Case Study: Former US Army Base Fort Devens

- Devens, MA
- Base shut down in 1996
- Majority overseen by MassDevelopment
- Expanding office space with some light industrial, college buildings, golf course, restaurants

MacPherson Well
Flow: 650 gpm
PFAS: 120 ppt*

Patton Well
Flow: 1200 gpm
PFAS: 30 ppt*

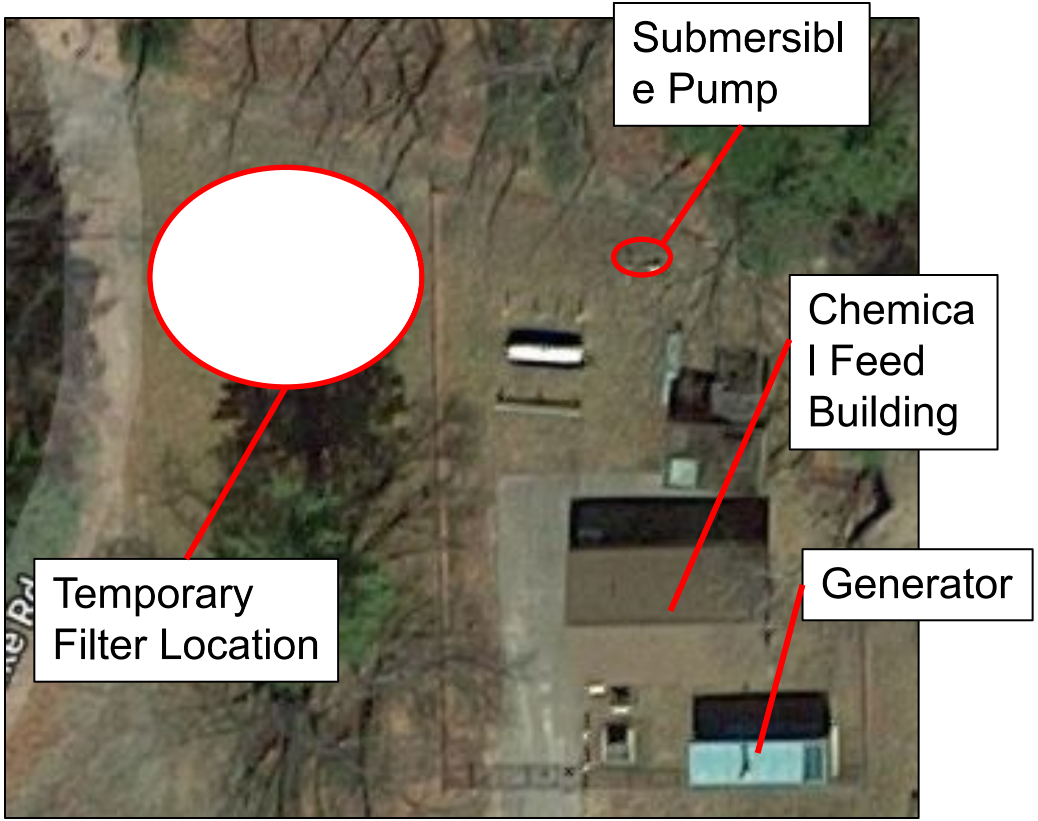
Shaboken Well
Flow: 1200 gpm
PFAS: 30 ppt*



*Sum of PFOS + PFOA + PFHxS + PFHpA + PFNA + PFDA

Shaboken Well

- Well capacity: 1,200 gpm
- PFAS ~30-40 ppt
- Temporary Design
  - Two pair 12’ GAC vessels
  - Up to 900 gpm (10 min EBCT)
  - Insulated membrane structure (installed at later date)

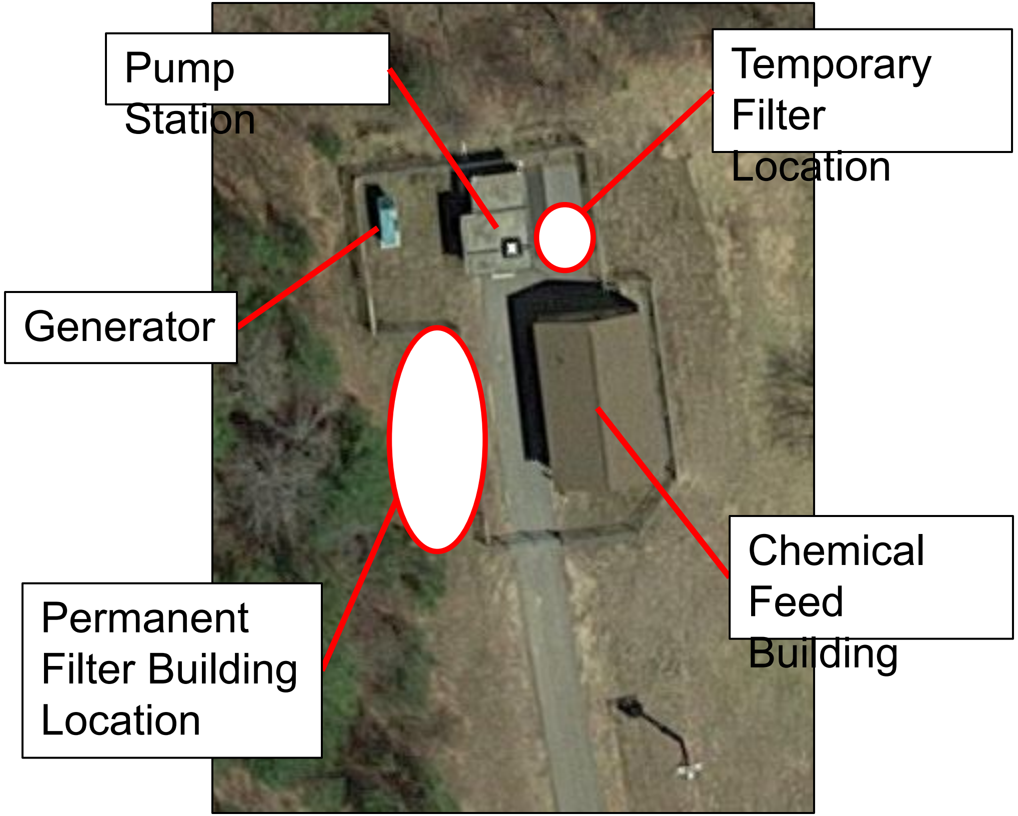


Weston & Sampson

Shaboken Well Temporary Filters

MacPherson Well

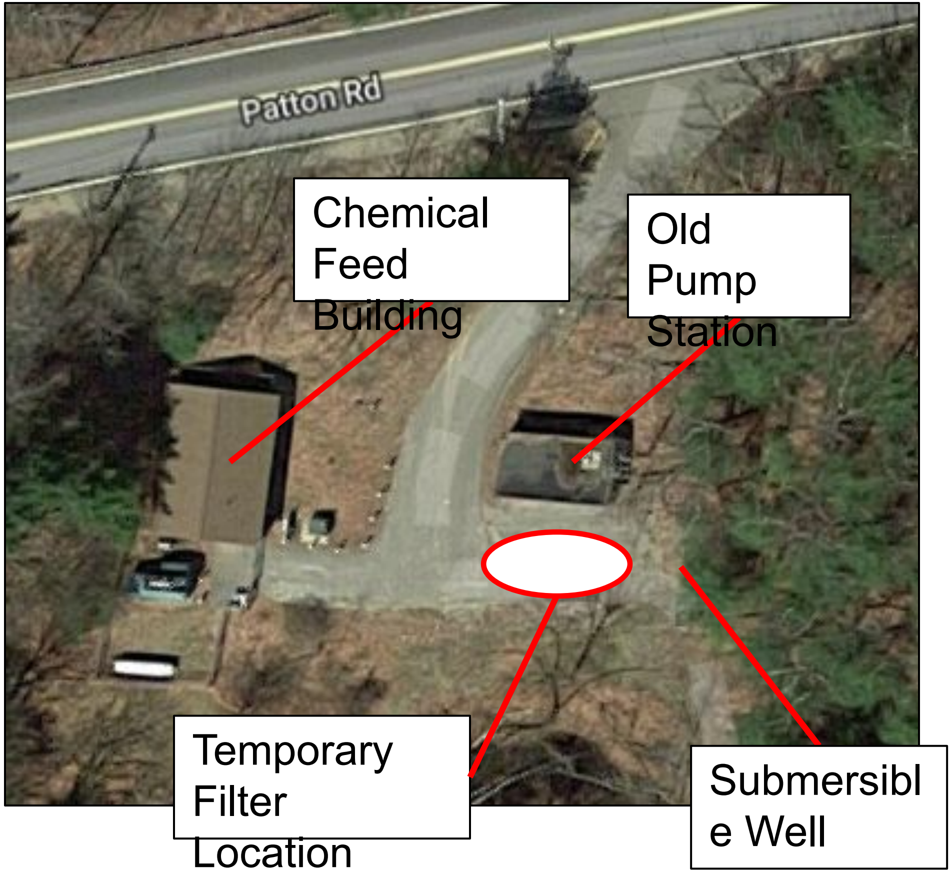
- Well capacity: 650 gpm
- PFAS: ~120-130 ppt
- Temporary Design
  - Single 10' GAC vessel
  - 400 gpm (10 min EBCT)
  - Scaffolding structure for winterization (installed at later date)



MacPherson Well Temporary Filter

Patton Well

- Well Capacity: 1,200 gpm
- PFAS ~30-40 ppt
- Temporary Design
  - Three 4' diameter resin filters
  - 200 gpm each (parallel flow)
  - Insulated storage container



Weston & Sampson

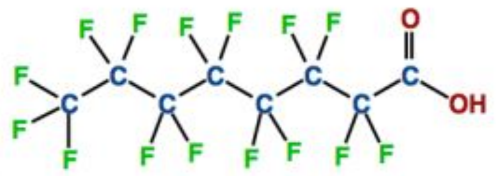
Patton Well Temporary Filters

Summary & Conclusions

- PFAS is a contaminant and drinking water systems must prepare and adapt
- Communication, community engagement and planning are critical
- Expect more public inquiry, long lead times for analytical services and equipment
- PFAS treatment is complex – not just treating for PFAS!
- Prepare for uncommon issues with any response plan – expect the unexpected!

Weston & Sampson

PFAS Treatment Options and Case Studies



Kyle Hay, **PE**, Project Manager

hayk@wseinc.com

603-263-9296

Weston & Sampson