



New Mexico's First Study of PFAS in Leachate & On-Site Groundwater

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Chad Spreadbury, PhD, PE, Solid Waste/Landfill Engineer

PFAS and Landfills

- What are PFAS?
 - Per- and Polyfluoroalkyl Substances
 - Large, ubiquitous class of compounds containing C-F bonds – over 5,000 kinds!
 - C-F bond strongest known in nature, high resistance to degradation.
 - Great for products, processes – not so good for environment (and our health).
- Landfills, by default, have become passive receivers of PFAS.
 - Emerging challenge is understanding how PFAS can escape landfills – through leachate, gas, and possible impacts.

NEWS ENVIRONMENT

Landfills belch toxic ‘forever chemicals’ into the air

The systems that collect landfill gas weren’t designed to manage or destroy volatile PFAS



NCDEQ data reveals PFAS contamination at landfill sites



NOW AT 6
FOREVER CHEMICAL CONTAMINATION AT LANDFILLS
 NCDEQ TESTED GROUNDWATER CONTAMINATION NEAR LANDFILLS

The numbers reveal high maximum detection amounts at sites in Southeastern North Carolina.

By Connor Smith
 Updated: May 28, 2025 at 7:12 PM EDT

US landfills are major source of toxic PFAS pollution, study finds

New research shows toxic ‘forever chemicals’ gas may escape landfills and threaten the environment



Workers use heavy machinery to move trash and waste in Irvine, California, in June 2021. Photograph: Mike Blake/Reuters

NMED's Proactive Approach to PFAS



The screenshot shows a web browser window with the URL env.nm.gov/pfas/. The page title is "PFAS in New Mexico" with a "CLOSE" button. The navigation menu includes "PFAS Home", "Data", "Emerging Contaminants Program (ECP)", and "Resident Information". The main content area has a heading "What's the PFAS situation in New Mexico?" followed by text explaining PFAS contamination in New Mexico, particularly near military bases. A photograph shows a man in a green shirt and orange cap holding a sign that reads: "Are you eligible for a free PFAS blood test? Call 575-575-PFAS to find out!". A sidebar on the right contains a call icon and the text: "Have questions about PFAS in New Mexico? Email strategic.initiatives@state.nm.us".

PFAS in New Mexico

[CLOSE](#)

[PFAS Home](#)

[Data](#)

[Emerging Contaminants Program \(ECP\)](#)

[Resident Information](#)

PFAS — short for per- and poly-fluoroalkyl substances — are toxic, man-made chemicals that do not break down in the environment. They are often called “forever chemicals” because once they enter our bodies, they stay there forever.

PFAS exposure has been linked in human studies to increased risks of kidney and testicular cancers, changes in liver function, thyroid disease, elevated cholesterol, pregnancy complications (including gestational hypertension and preeclampsia), lower birth weight, and impacts on the immune system such as reduced vaccine antibody response.

Because many PFAS persist and can build up in the body, even small, repeated exposures over time can matter.

What's the PFAS situation in New Mexico?

In New Mexico, PFAS contamination is most severe near military bases where firefighting foams were used for decades, including at Cannon Air Force Base in Curry County and Holloman Air Force Base in Otero County.

These sites have created groundwater plumes that threaten drinking water supplies, agriculture, and wildlife. In Curry County, more than 3,500 dairy cows had to be euthanized after drinking contaminated water, and blood testing shows that



Have questions about PFAS in New Mexico?
Email strategic.initiatives@state.nm.us



PFAS and Landfills Pilot Study

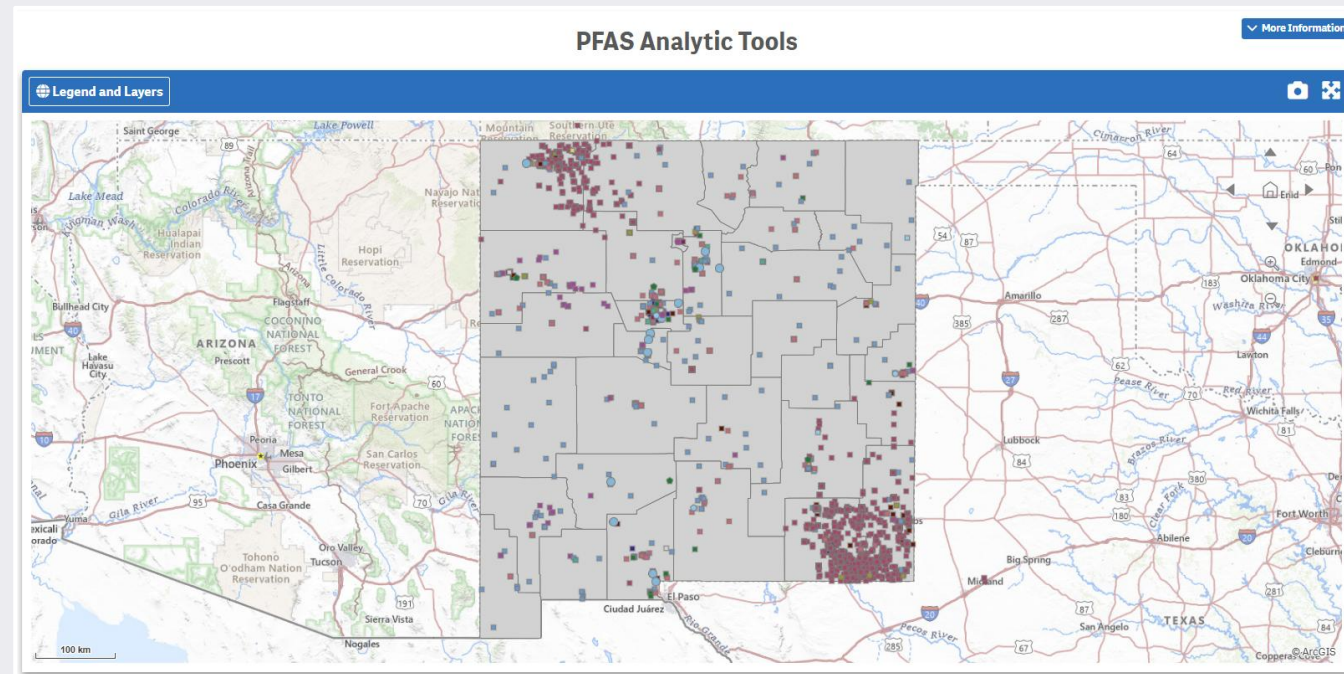
Pilot Study Approach

- Three (3) landfill sites volunteered: Sites A, B, and C.
 - Different geographic regions.
 - All ~30 years old, composite liners.
 - Varying acreages: ~30-150 acres.
 - Similar wastes accepted: MSW, sludges, various industrial wastes.
- ERG team collected leachate, on-site groundwater.
 - Minimum of one downgradient, one upgradient well per site.
 - 40 PFAS analytes - EPA Method 1633.



Beyond the Landfill: Other Nearby Sources?

- PFAS in groundwater **does not** automatically mean it is from the landfill.
- Any conclusions on source of PFAS, if detected, was beyond study scope.
- Need to understand if other potential off-site sources could be contributors.
- ERG used EPA's PFAS Analytic Tools:
 - Identified potential industrial sources within 1, 5, 10 miles of study sites.
 - Tool pulls from national databases (e.g., ECHO) where PFAS sources may have been reported or sectors known to manage PFAS.



Again, **potential** sources – a lines of evidence approach is necessary to make any conclusions on sources and possible risks.

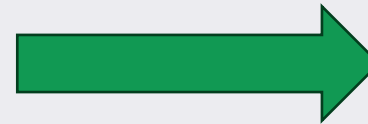
Field Sampling Protocols and Activities

- ERG developed protocols and led sampling activities:
 - Low-Flow Groundwater Sampling.
 - Leachate PFAS Sampling/Handling Guidance.
- *Challenge #1:* Groundwater well/leachate sump pumps on-site had potential to contain components that contain PFAS.
 - i.e., O-Rings, Teflon check valves.
 - Lab results indicated no contamination.
- *Challenge #2:* Site C groundwater wells were dry.
 - Only leachate samples taken from Site C.
- Aqueous parameters (pH, ORP), recorded along with site parameters such as weather conditions.
- Preservation (iced cooler), overnight shipment to lab for EPA Method 1633.



Laboratory Testing and Analysis

- Samples were processed by Battelle using EPA Method 1633 for 40 PFAS analytes.
- This initial pilot study focused on detecting and quantifying PFAS in these samples.
- Future studies could use other techniques, such as non-targeted analysis, and existing data libraries and advanced AI/ML tools to “fingerprint” detected PFAS.
- For groundwater, five PFAS were focused on with current or formerly* issued Federal MCLs.
- Field, equipment, trip blanks indicated no cross-contamination or any other issues during sampling/shipment/processing.



Analyte	MCL	Units
PFOA	4	ppt
PFNA	10	ppt
PFHxS	10	ppt
PFOS	4	ppt
HFPO-DA	10	ppt

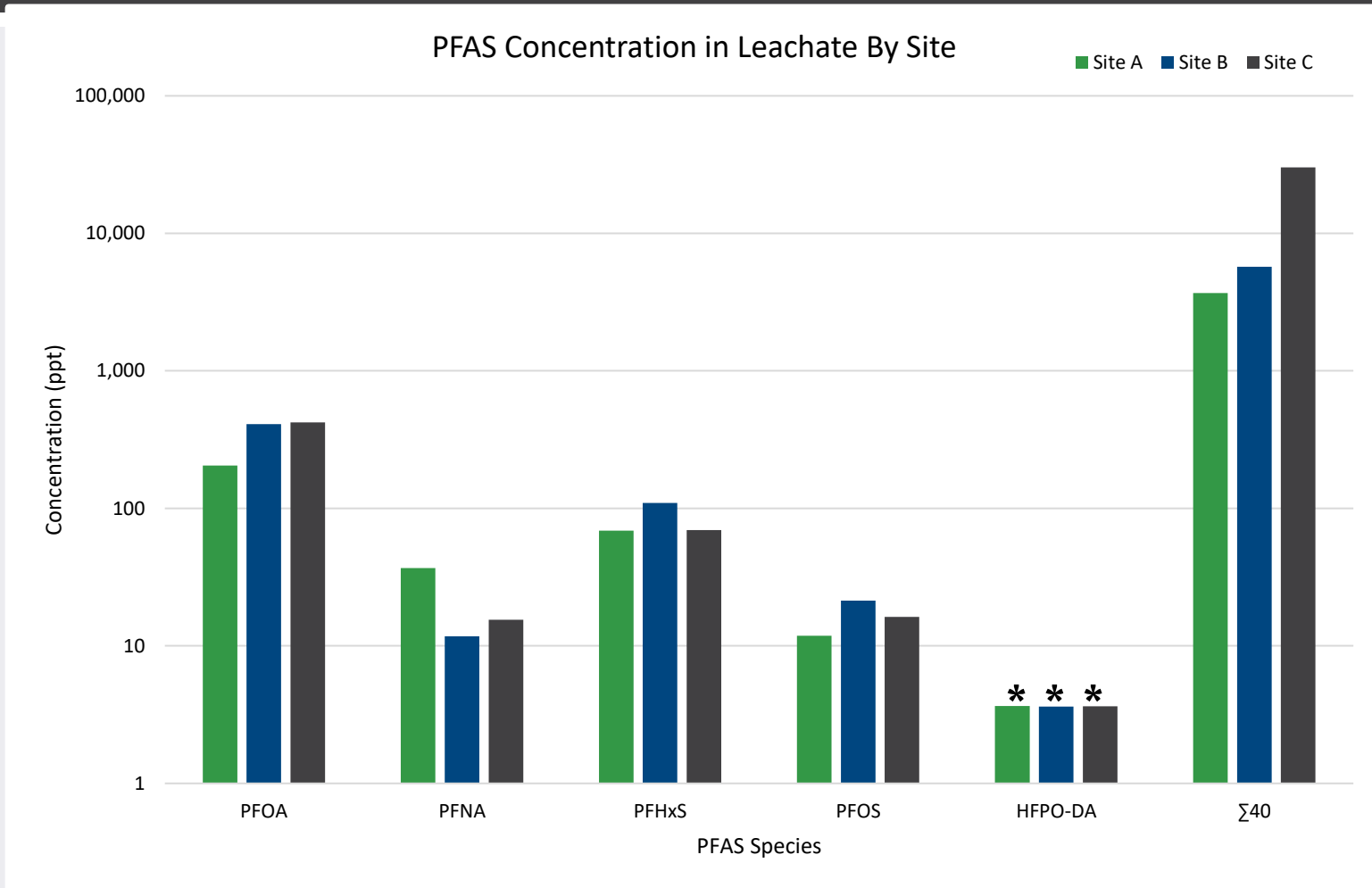
**PFNA, PFHxS, HFPO-DA MCLs are currently under reconsideration of as September 2025.*



Landfill Leachate PFAS Results

PFAS in Leachate (Sites A, B, C)

- Probably not a surprise to anyone...but there's PFAS in leachate!
- PFAS in leachates across all sites were typically all in the same order of magnitude.
 - Leachates had PFAS concentrations typical of literature.
 - Site C – $\Sigma 40$ PFAS, especially FTCAs, were an order of magnitude higher than Sites A, B, but still within ranges previously reported in literature.
 - Could be related to accepting certain waste streams, differences in waste ages, in-situ landfill conditions, weather conditions.



*HFPO-DA was below limit of quantification.



Groundwater PFAS Results (Sites A & B)

**Reminder: Groundwater wells from Site C were dry.*



PFAS in Sampled On-Site Groundwater (Site A)

MW-2R	
PFOA	1.64
PFNA	ND
PFHxS	ND
PFOS	ND
HFPO-DA	ND

MW-4R	
PFOA	ND
PFNA	ND
PFHxS	ND
PFOS	ND
HFPO-DA	ND

Legend

- Monitoring Well
- Groundwater Elevation Contours (ft)
- Groundwater Flow Direction
- Permitted Boundary

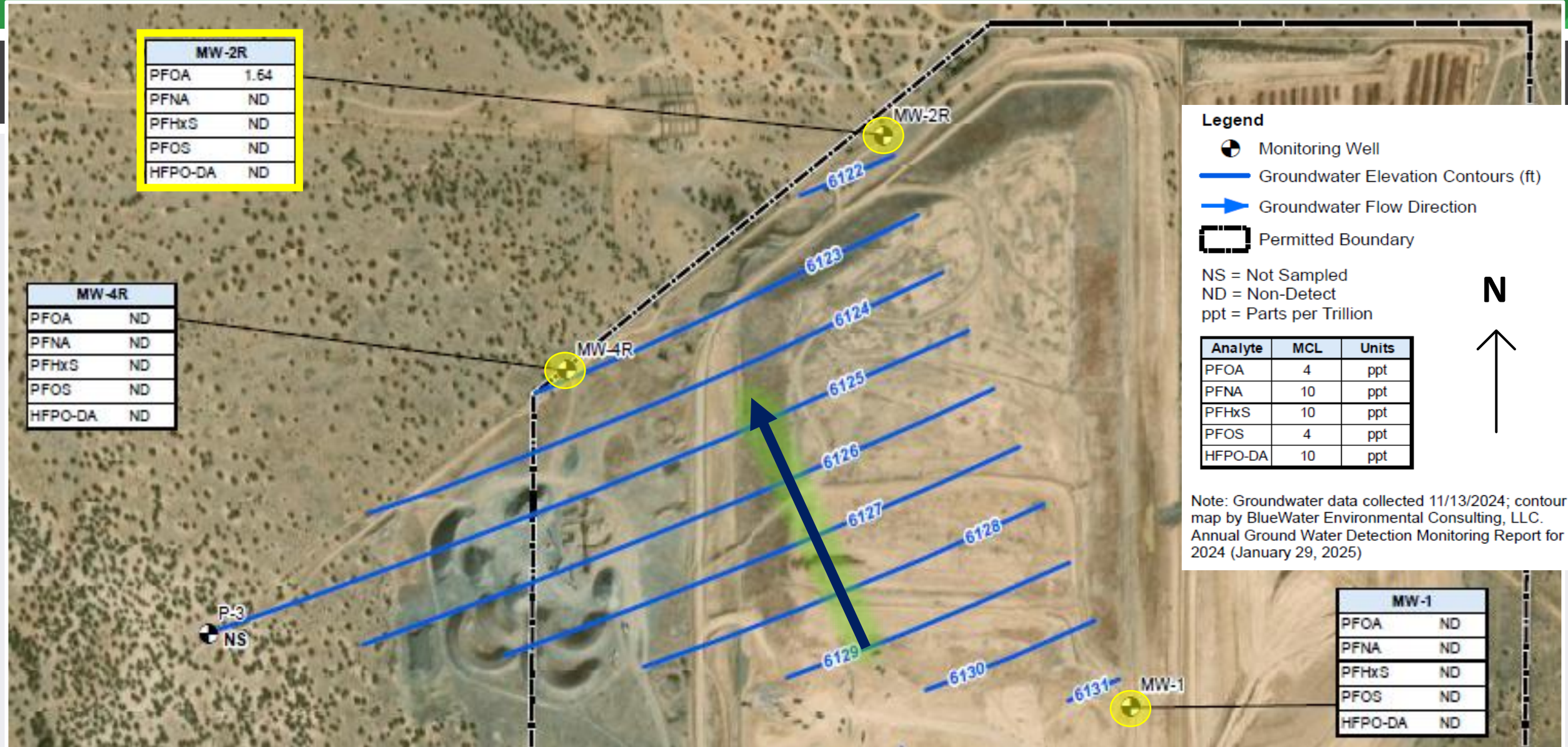
NS = Not Sampled
ND = Non-Detect
ppt = Parts per Trillion

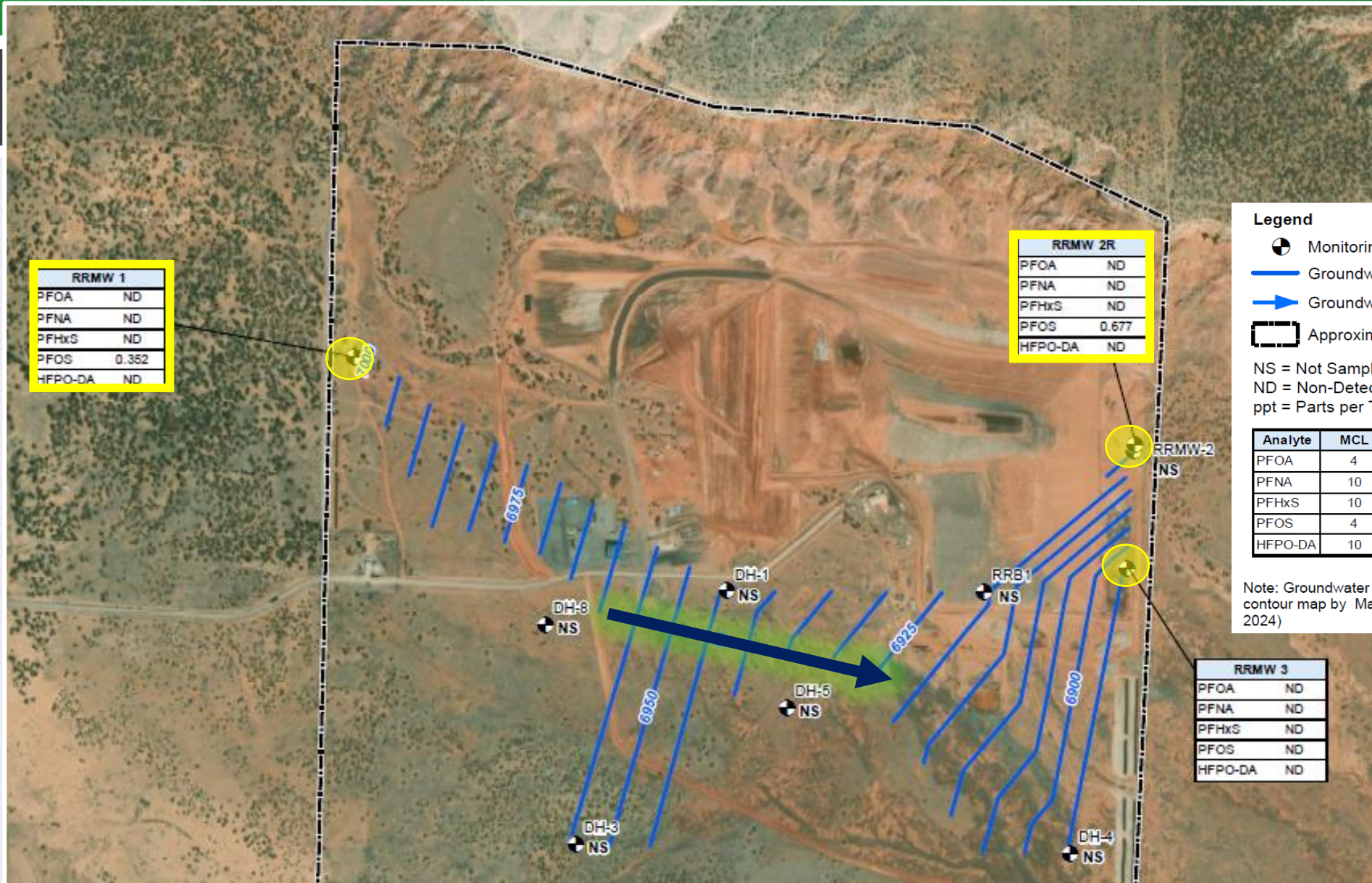
Analyte	MCL	Units
PFOA	4	ppt
PFNA	10	ppt
PFHxS	10	ppt
PFOS	4	ppt
HFPO-DA	10	ppt



Note: Groundwater data collected 11/13/2024; contour map by BlueWater Environmental Consulting, LLC. Annual Ground Water Detection Monitoring Report for 2024 (January 29, 2025)

MW-1	
PFOA	ND
PFNA	ND
PFHxS	ND
PFOS	ND
HFPO-DA	ND





RRMW 1	
PFOA	ND
PFNA	ND
PFHxS	ND
PFOS	0.352
HFPO-DA	ND

RRMW 2R	
PFOA	ND
PFNA	ND
PFHxS	ND
PFOS	0.677
HFPO-DA	ND

RRMW 3	
PFOA	ND
PFNA	ND
PFHxS	ND
PFOS	ND
HFPO-DA	ND

Legend

- Monitoring Well
- Groundwater Elevation Contours (ft)
- Groundwater Flow Direction
- Approximate Property Line

NS = Not Sampled
 ND = Non-Detect
 ppt = Parts per Trillion

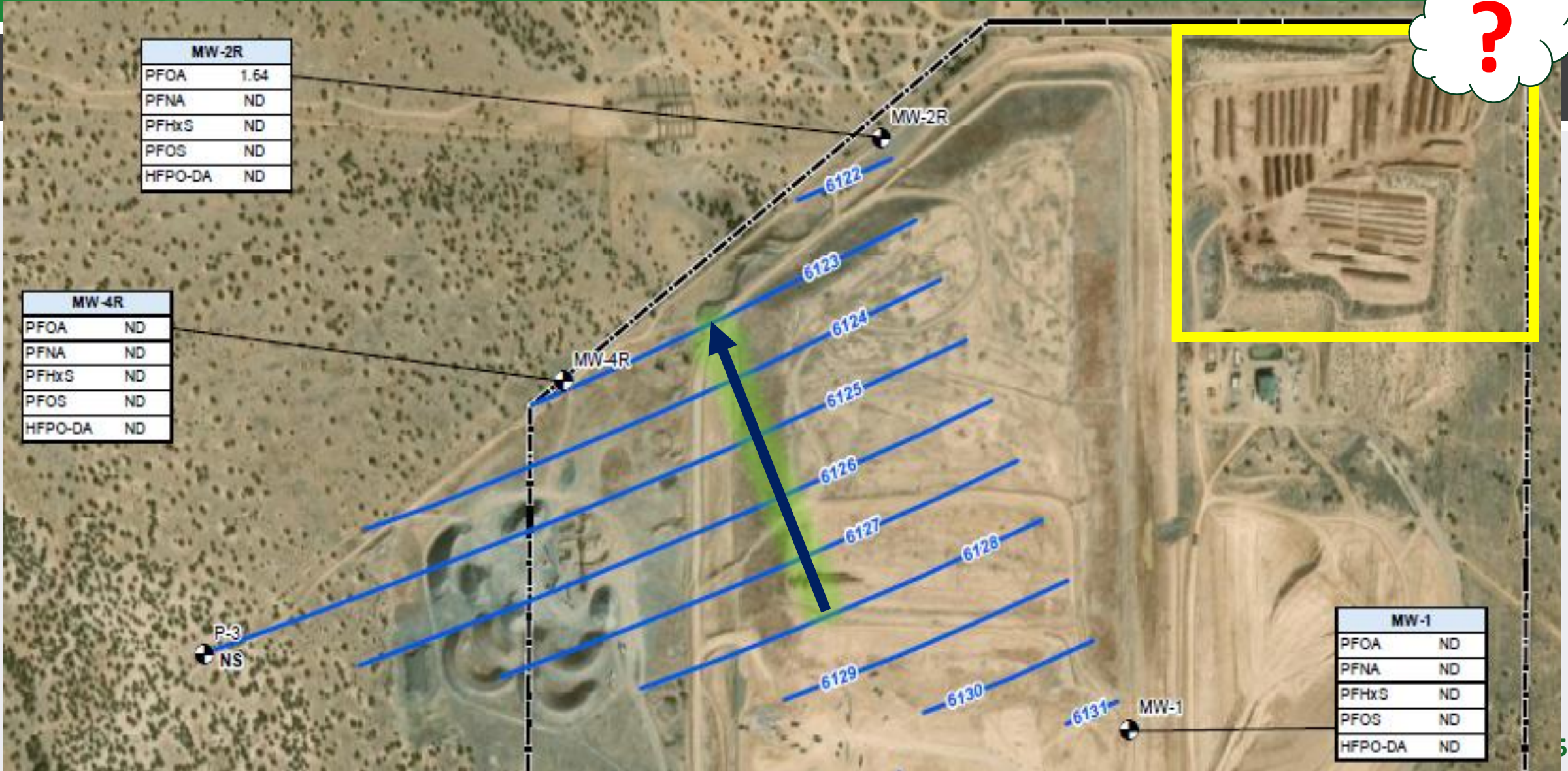
Analyte	MCL	Units
PFOA	4	ppt
PFNA	10	ppt
PFHxS	10	ppt
PFOS	4	ppt
HFPO-DA	10	ppt

Note: Groundwater data collected on 08/07/2024;
 contour map by Magee and Associates, Inc. (August 27, 2024)



Let's pause - So what do these pilot results mean?

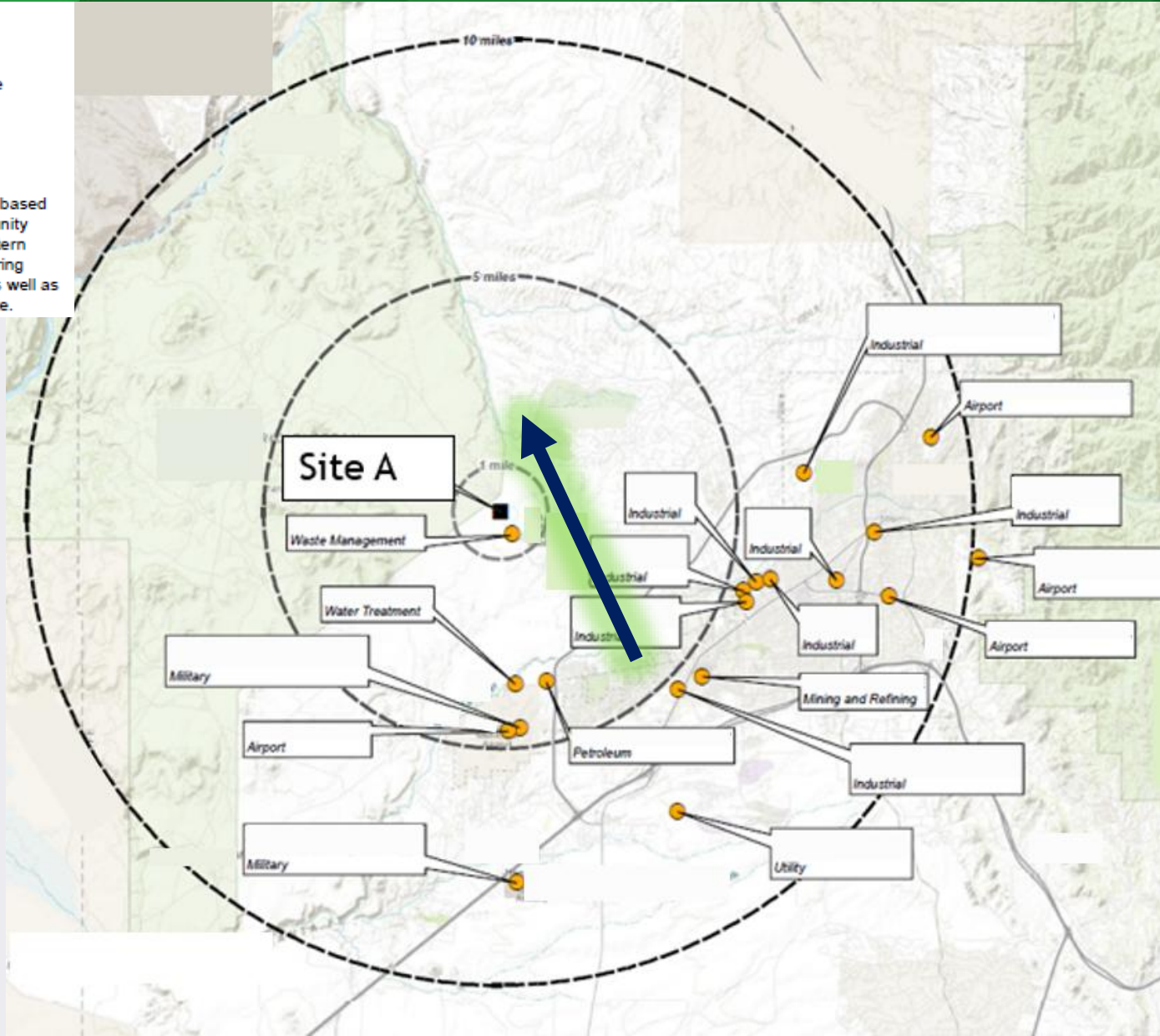
- PFAS in landfill leachate – no surprises there!
 - Sites in same order of mag. (except Sum 40 for Site C), similar to existing literature.
- Some PFAS detected in some groundwater wells, at orders of magnitude below what was detected in leachate.
 - All below any current or former MCLs.
- Data represents a “snapshot” in time.
 - Focus of this pilot study was a “first look” at PFAS in- and around landfills.
- Any conclusions on trends, source(s) requires future study.
 - Longitudinal data (i.e., seasonal, annual).
 - Understanding on-site activities, conditions and those in local proximity.
 - *How could possible on-site and off-site activities contribute to detected PFAS?*





- Legend**
- Site
 - Known or Potential PFAS Source
 - Distance to Site (miles)

Note: Known and potential PFAS sources based on review of the PFAS Sites and Community Resources Map, developed by Northeastern University's PFAS Project Lab, Silent Spring Institute, and the PFAS-REACH team, as well as the U.S. EPA PFAS Analytic Tools website.

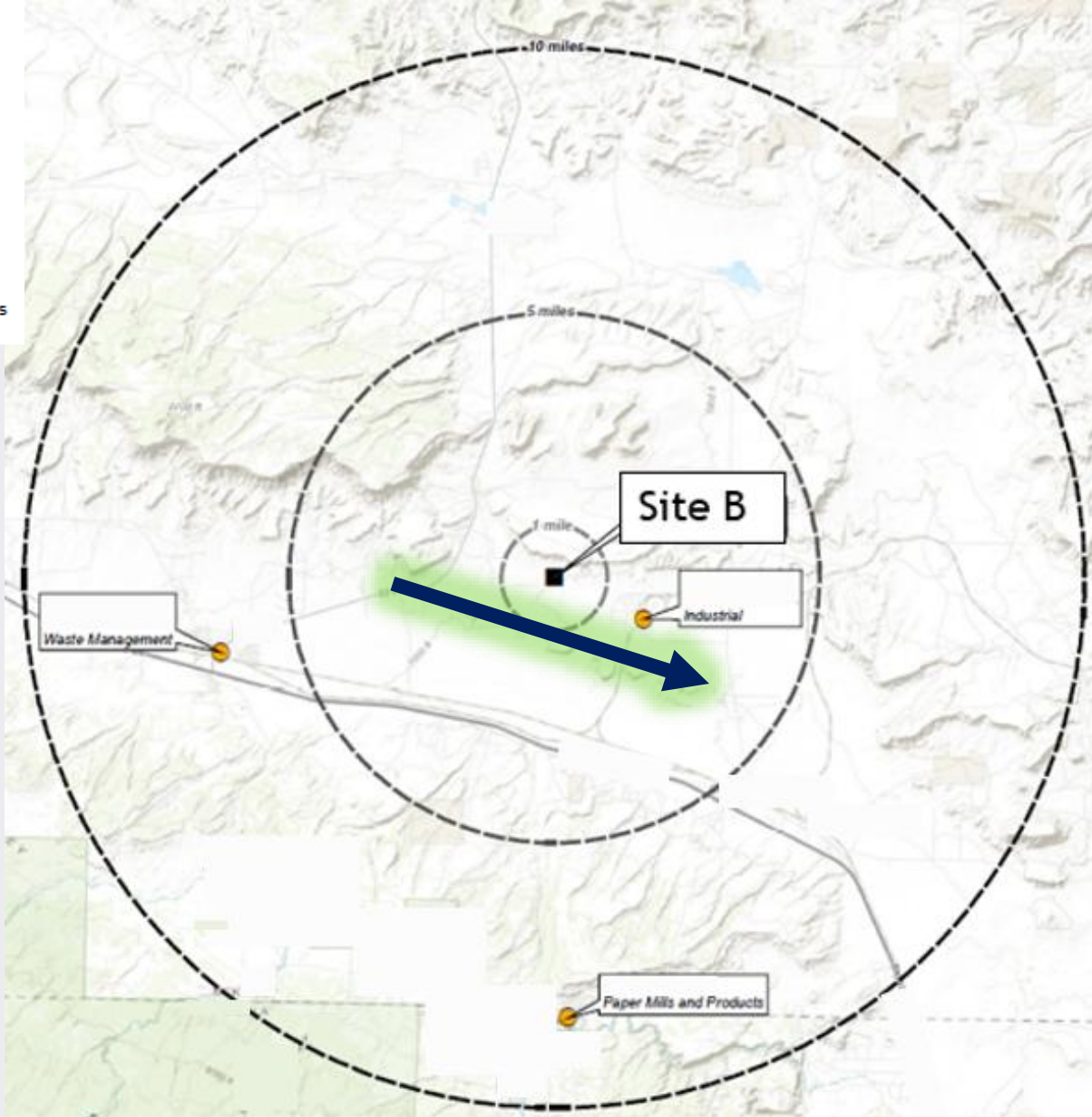


Possible Sources	
Proximity (mi)	Number
1	1
5	5
10	19

CAVEAT: This assumes that on-site groundwater direction reflects groundwater flow in this region. Additional data is required to make this determination!

- Legend**
- Site
 - Known or Potential PFAS Source
 - Distance to Site (miles)

Note: Know and potential PFAS sources based on review of the PFAS Sites and Community Resources Map, developed by Northeastern University's PFAS Project Lab, Silent Spring Institute, and the PFAS-REACH team, as well as the U.S. EPA PFAS Analytic Tools website.



Possible Sources	
Proximity (mi)	Number
1	0
5	1
10	3

CAVEAT: This assumes that on-site groundwater direction reflects groundwater flow in this region. Additional data is required to make this determination!

Summary and Next Steps

- First NM-specific data that provides context to waste management and PFAS!
 - PFAS in leachate similar by site and as reported in literature.
 - Some PFAS detected in groundwater – ***all below MCLs***.
 - Additional data is needed to isolate any possible trends, source(s).
- *Next steps*: Increase sample size, long-term data, and additional analyses.
 - More (longitudinal) data, more sites to identify trends, insights for operations.
 - Site activities investigations, advanced testing & forensics (AI/ML database tools).
- This new knowledge is the first step in guiding policy development and industry best practices.
 - Benefits New Mexico and our Industry by solving another piece of the PFAS “puzzle” nationwide (worldwide).



Thank you!

Chad Spreadbury, PhD, PE

Solid Waste & Landfill Engineer

chad.spreadbury@erg.com

(727)698-4327