

Fairchild Air Force Base
Phase I PFAS Remedial Investigation
Preliminary Groundwater Sampling Results
September 2021

DRAFT

Fairchild Air Force Base

Summary of Activities – Summer 2021

- Round I water level measurements and groundwater sampling for PFAS analysis at 47 existing wells – June 2021
- Round II water level measurements and groundwater sampling for PFAS analysis at 53 existing wells – August 2021
- Wells were selected:
 - to provide representative sampling of unconsolidated, Basalt A and Basalt B aquifers on- and off-base
 - based on complete well construction details (elevation to TOC, well depth, screen length)
- Transducers deployed at 100 monitoring locations
- New data and existing data used to compile lithologic and hydrostratigraphic cross-sections of relevant groundwater flow regimes
- Identification of data gaps and selection of first set of new monitoring well locations

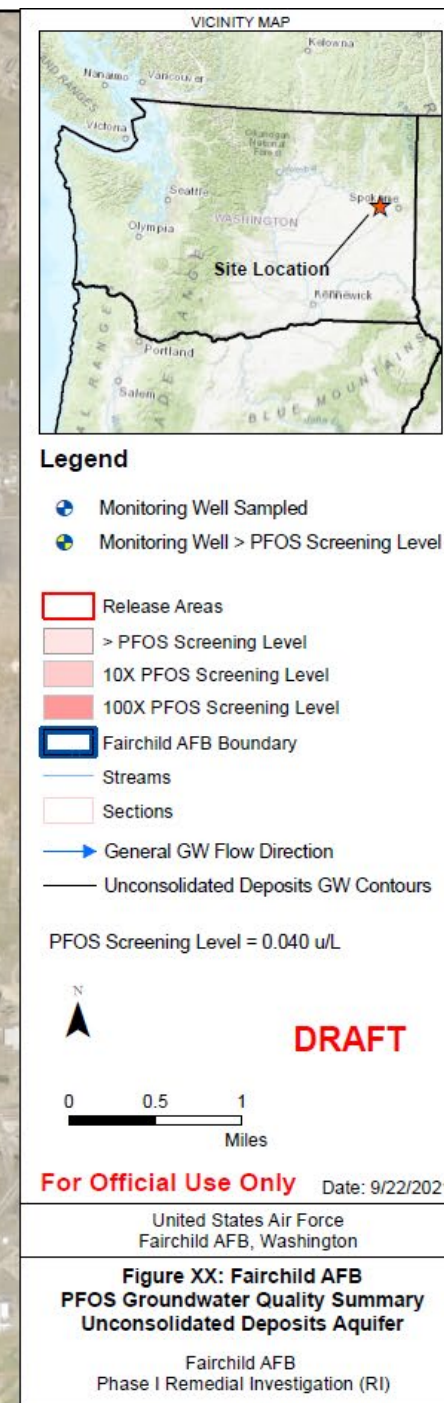
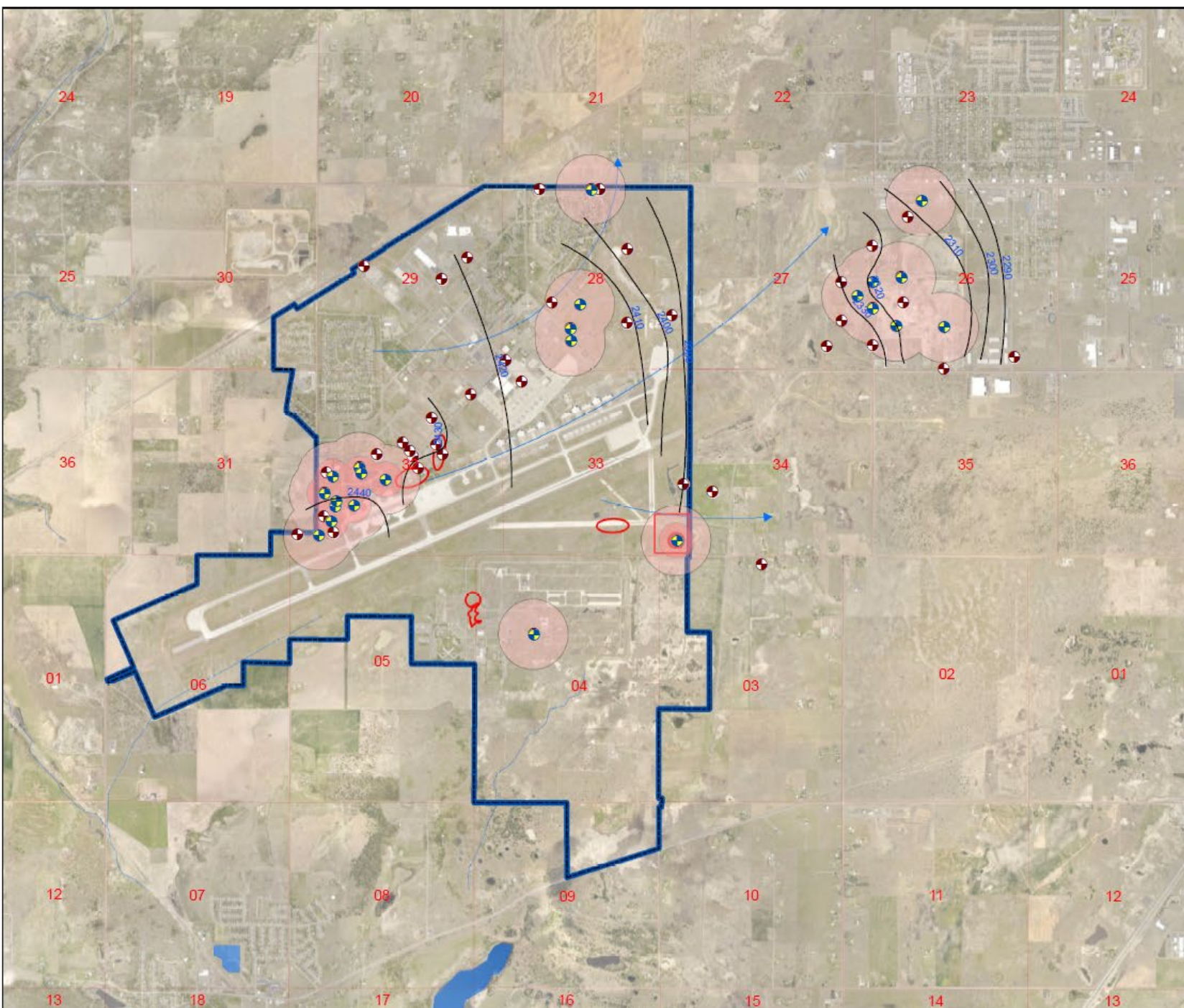


**Figure XX: Fairchild AFB
PFOS Groundwater Quality Summary
Unconsolidated Deposits Aquifer**

Fairchild AFB
Phase I Remedial Investigation (RI)



Legend

- Monitoring Well Sampled
- Monitoring Well > PFOS Screening Level
- Release Areas
- > PFOS Screening Level
- 10X PFOS Screening Level
- 100X PFOS Screening Level
- Fairchild AFB Boundary
- Streams
- Sections
- General GW Flow Direction
- Basalt A Groundwater Contours

PFOS Screening Level = 0.040 u/L



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0 0.5 1
Miles

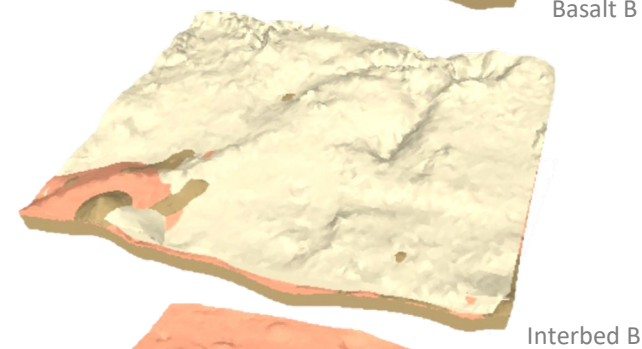
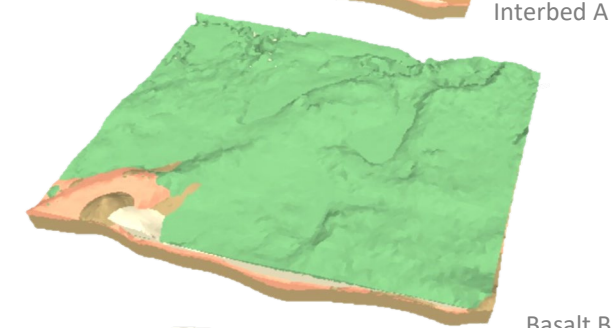
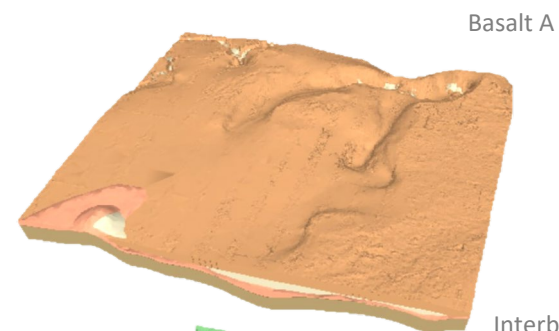
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United States Air Force
Fairchild AFB, Washington

**Figure XX: Fairchild AFB
PFOS Groundwater Quality Summary
Basalt A Aquifer**

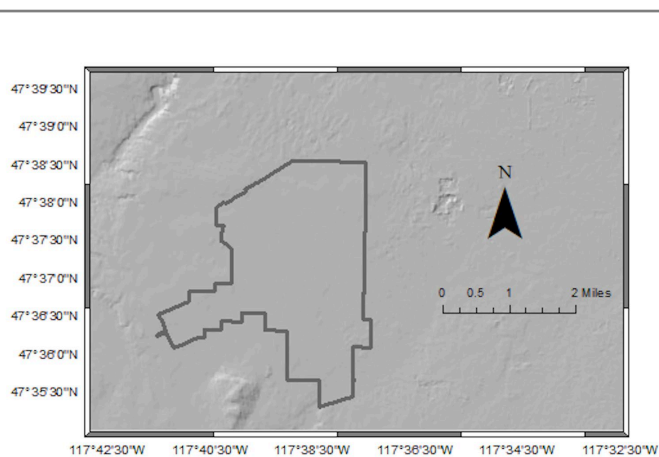
Fairchild AFB
Phase I Remedial Investigation (RI)

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- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement

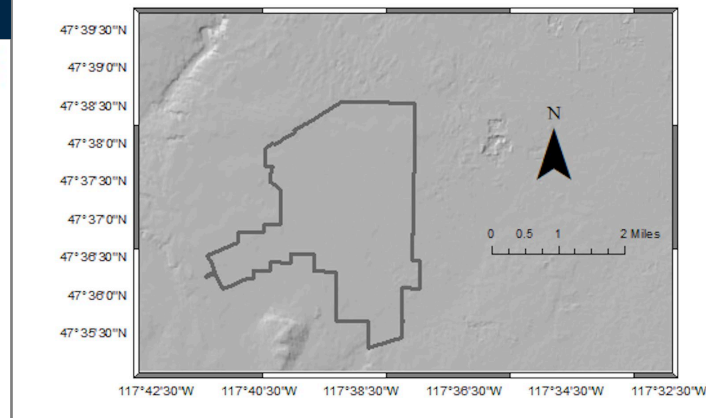
vertical exaggeration 10x



Date: 09/22/2021 **DRAFT**

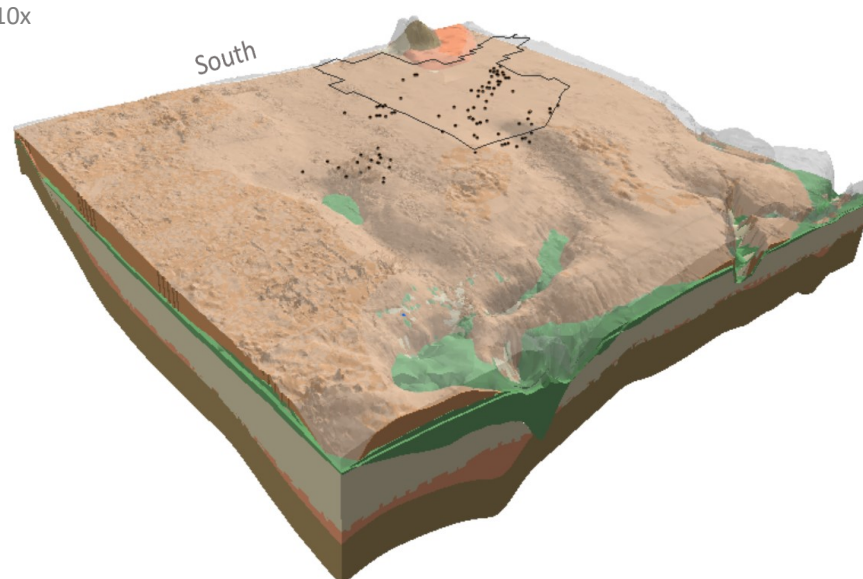
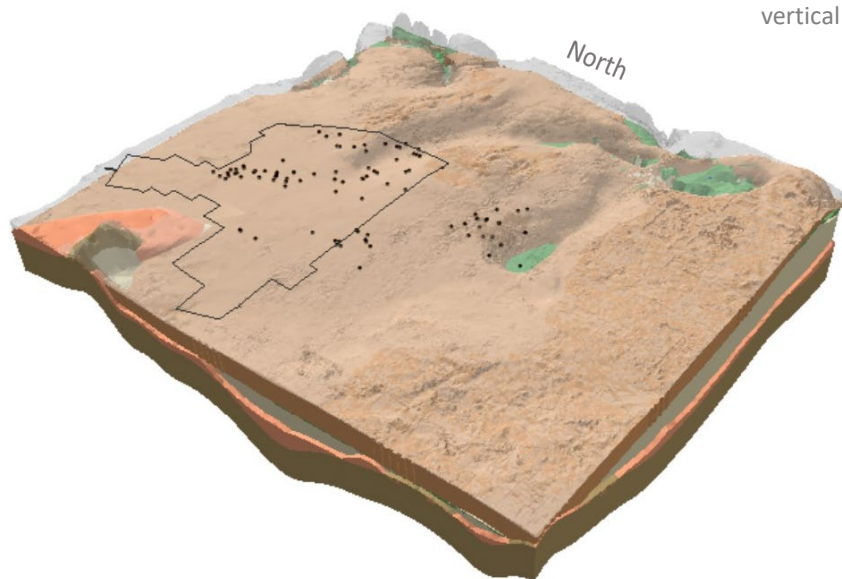
East Deep Creek
Paleochannel

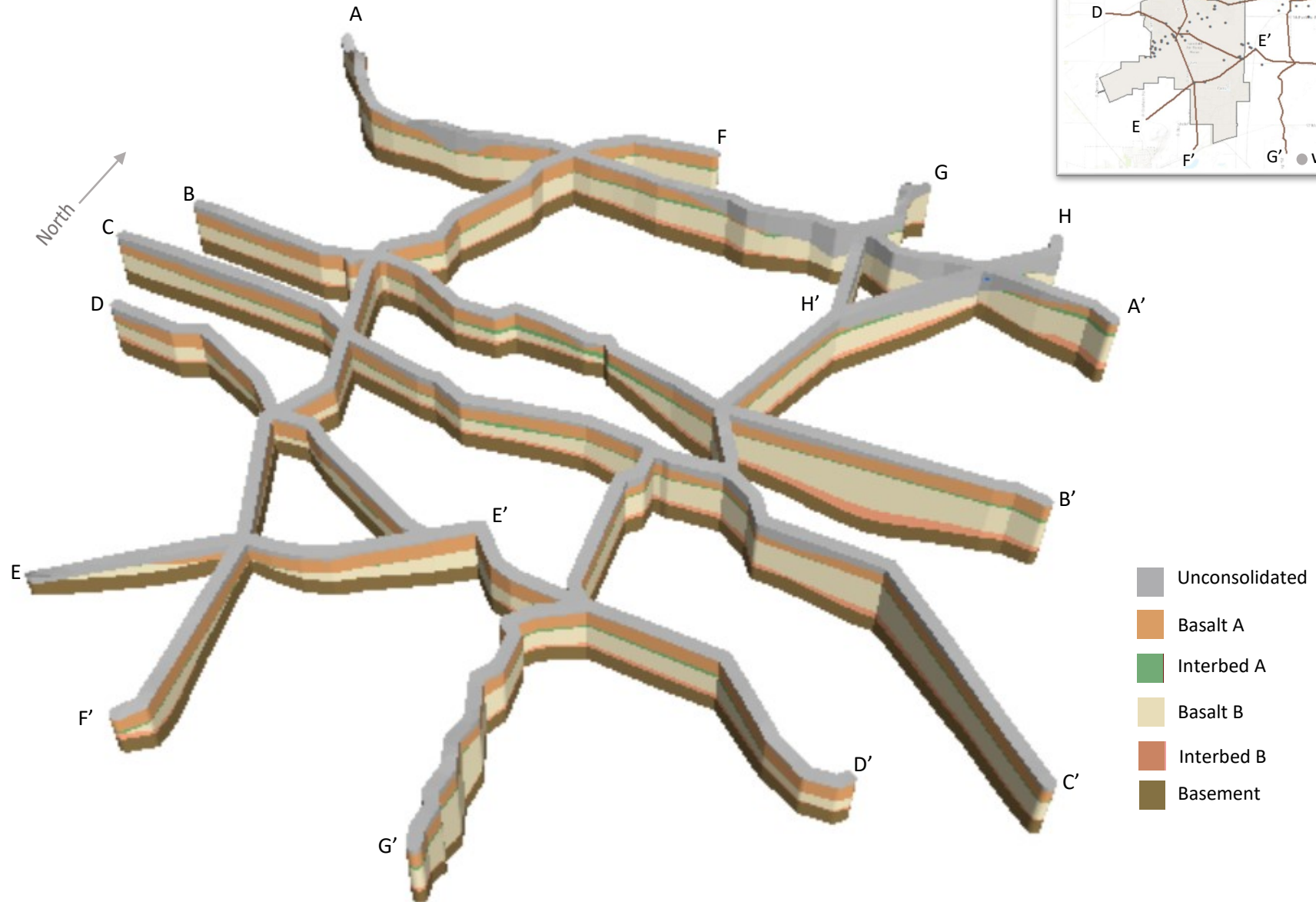
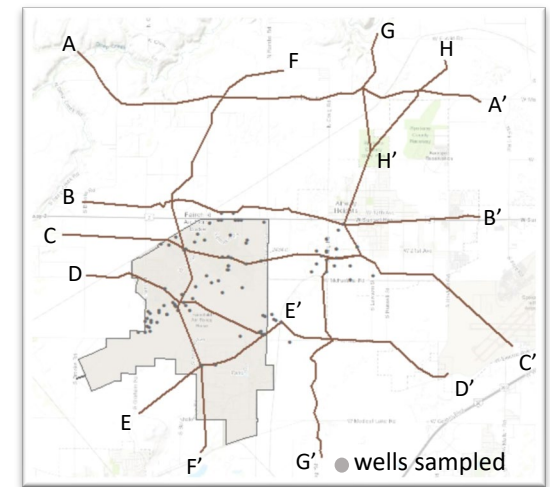
Airway Heights
Paleochannel



- *Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement
- First 100 wells sampled
- *partially transparent

vertical exaggeration 10x

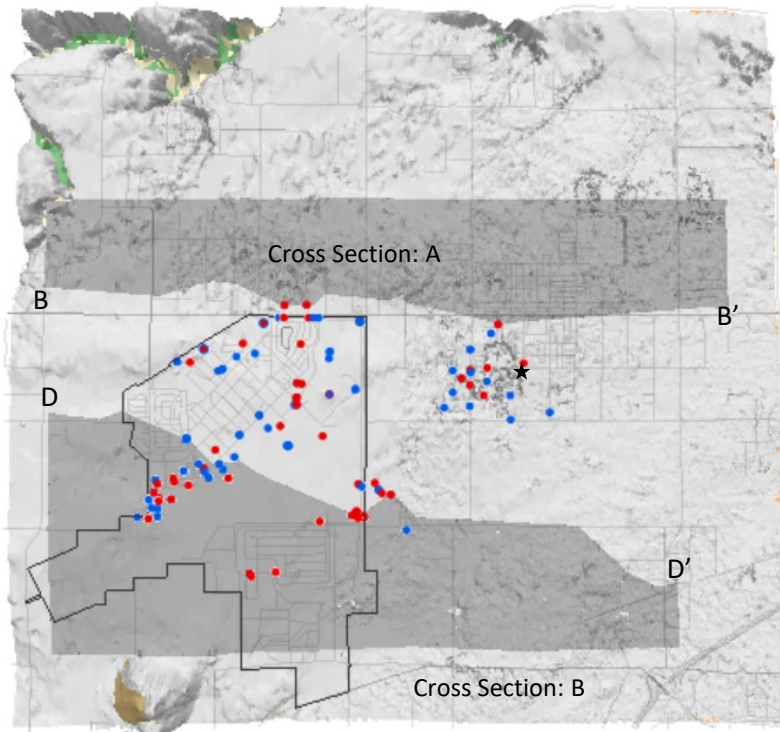


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vertical exaggeration 5x

Date: 09/22/2021 **DRAFT**

Location of Cross Sections



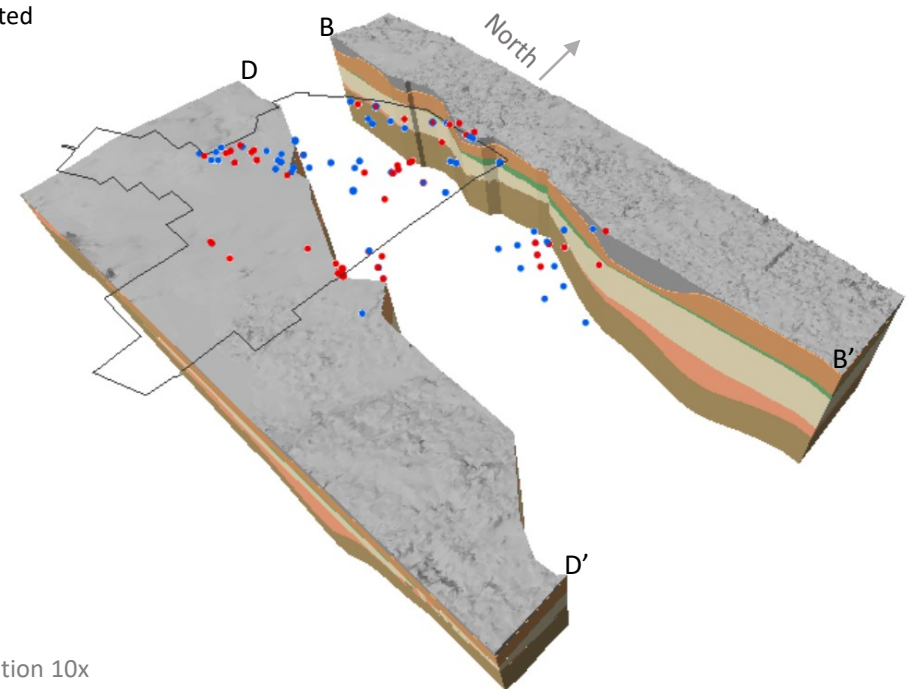
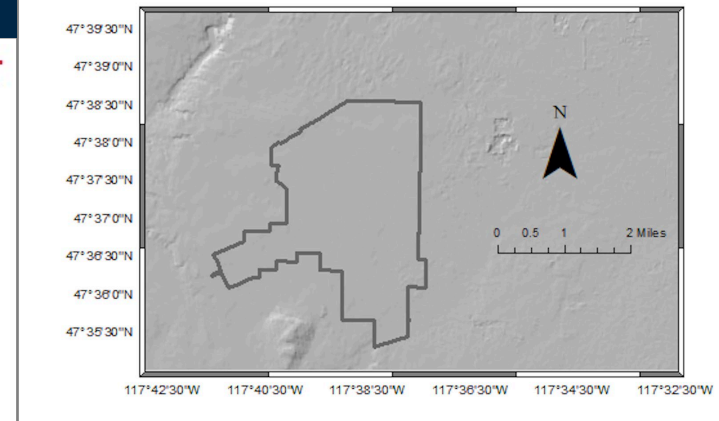
★ Municipal Well

- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement

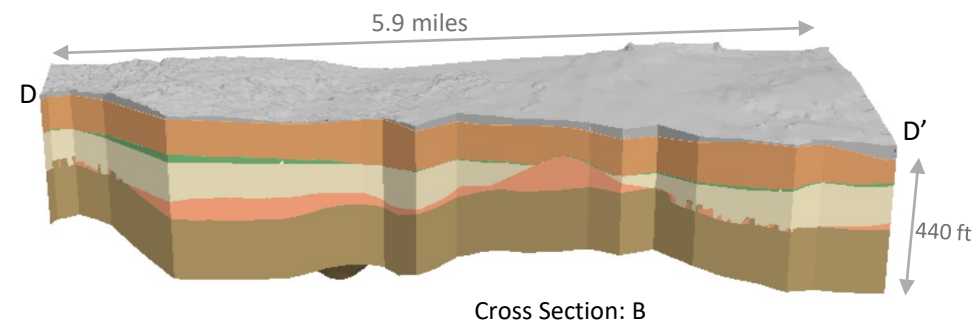
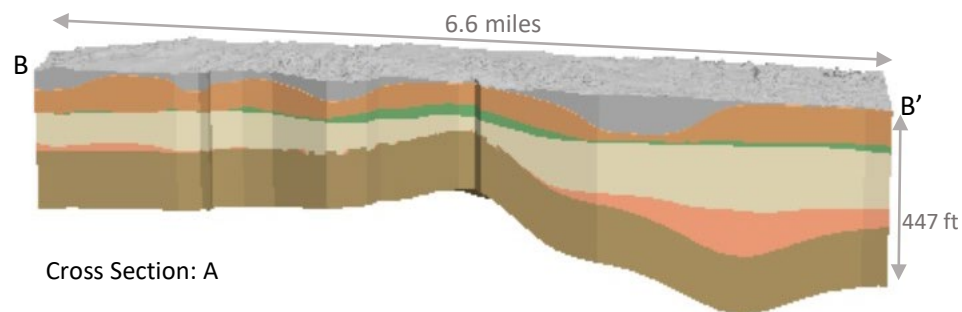
100 wells sampled 2021

● Below PFAS Screening Limits

● Exceeds PFAS Screening Limits



vertical exaggeration 10x

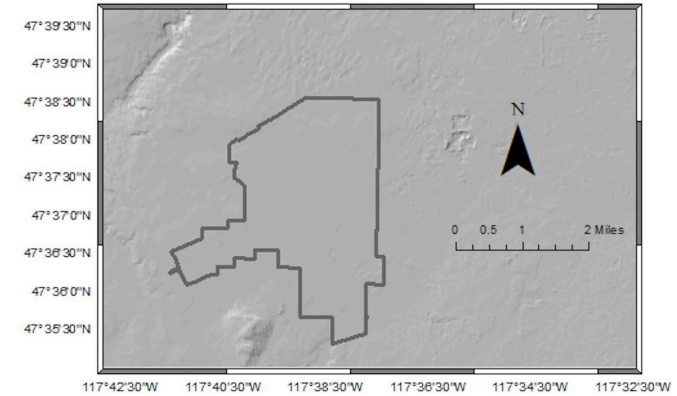


Proposed New Well Location Areas

Fairchild AFB Spokane, WA



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Possible secondary sources

- A periodically purged water tank north of Airway Heights
- Landfills including former CRL
- Potential leaky sewer lines
- WWTPs including the former WWTP near CRL and former WWTP Site WP036
- Potential on-Base source near SD037

Northeast PFAS Area

Sample along the existing sewer lines to see if leaky pipes could be contributing to off-Base impacts.

Northwest PFAS Area

Graham Road Landfill is not likely a source for PFAS in this area due to the groundwater flow directions, but groundwater flow directions are not well understood in this area. Additional wells in this area with corresponding depth to water measurements would aid in understanding groundwater flow in this region.

East PFAS Area

Install well(s) to sample potential groundwater impacts between WP036 and Base boundary.

100 wells sampled 2021

- Below PFAS Screening Limits
- Exceeds PFAS Screening Limit

★ Municipal Well

North Airway Heights

Install and sample at least one monitoring well immediately downgradient of the tank.

Install and sample monitoring wells upgradient of the tank.

South Airway Heights

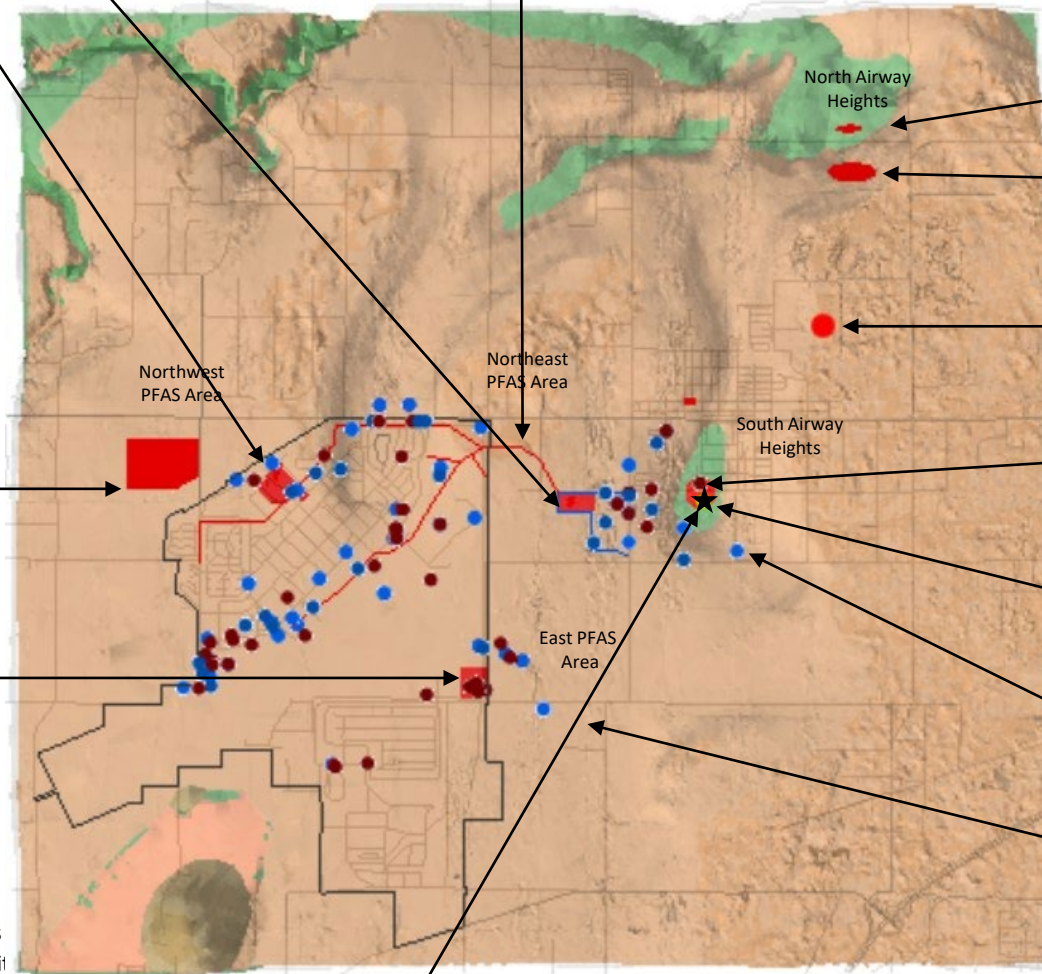
Install additional MWs east of the Airway Heights Paleochannel to confirm groundwater flow directions from east to west in that area.

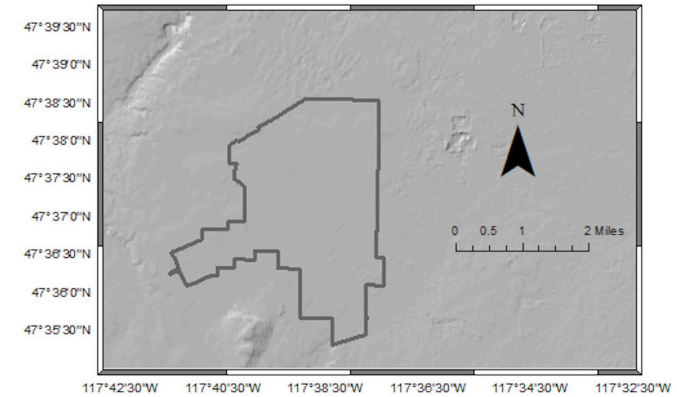
Install additional MWs south and southeast of MW-127 to help define connection between South Airway Heights and the East PFAS Area.

Install wells in triplicate (alluvium, both basalts) to assess vertical gradients near the deeply scoured area in the Airway Heights Paleochannel and to define the vertical distribution of PFAS. This is an attempt to rule out FAFB as the source of impacts to the east of the Airway Heights Paleochannel.

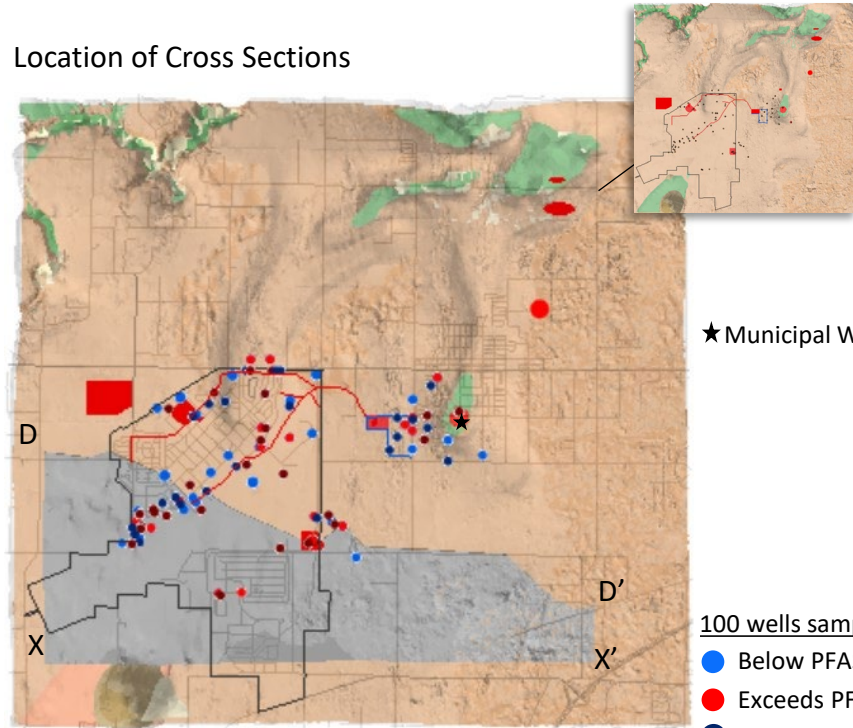
Install additional MWs north, northeast of MW-115 to help define connection between South Airway Heights and North Airway Heights.

Based on the cross sections, alluvium is only a few ft thick, and the Wanapum Basalt may outcrop to the southwest. Groundwater may potentially flow in the alluvium and in the basalt. The exact outcropping of the basalt is unknown but critical, as this might serve as a barrier to groundwater flow in alluvium.





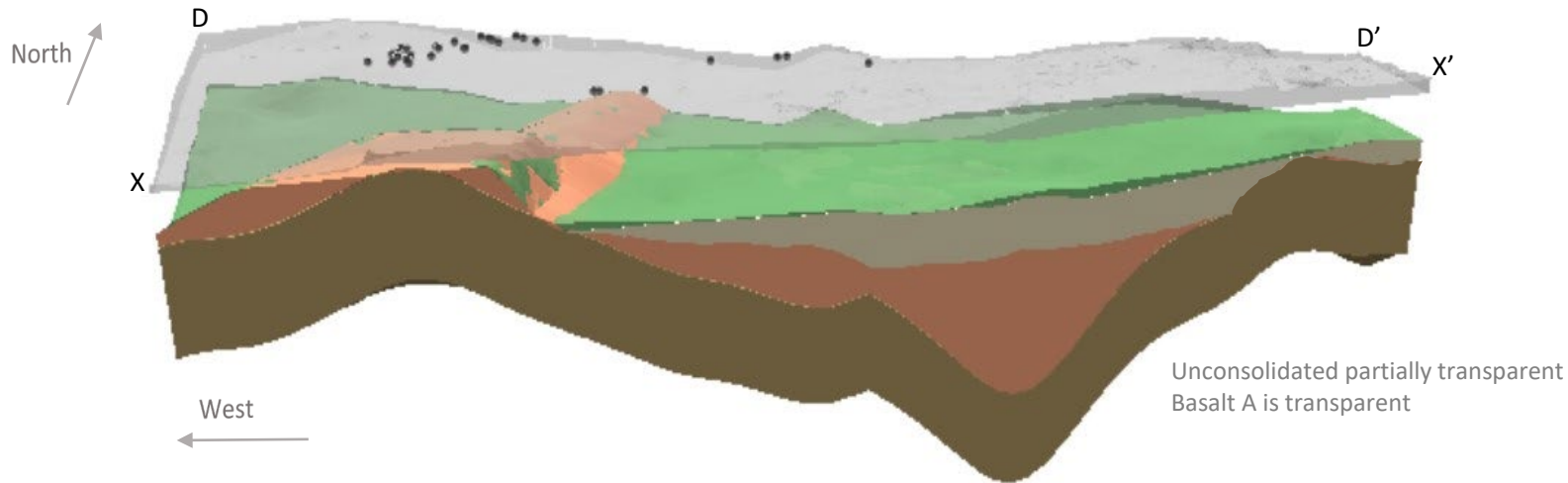
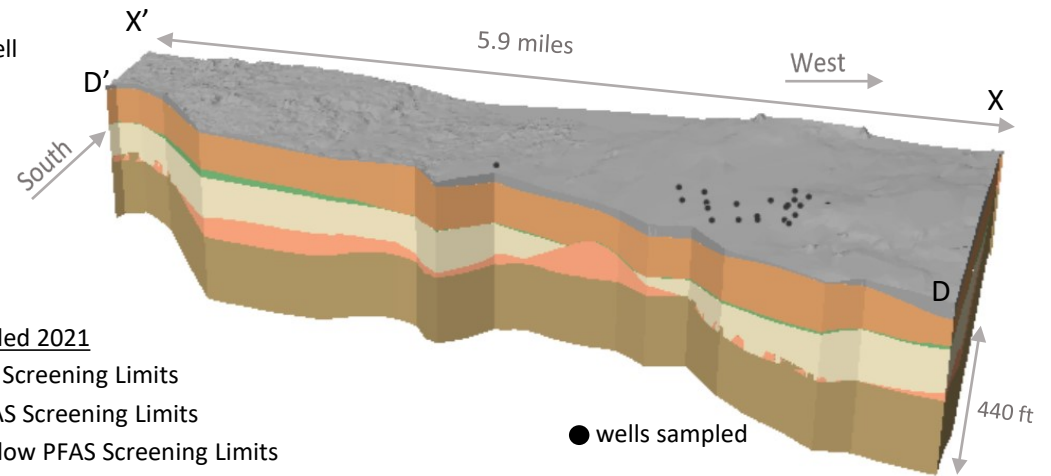
Location of Cross Sections



★ Municipal Well

100 wells sampled 2021

- Below PFAS Screening Limits
- Exceeds PFAS Screening Limits
- Round 2: Below PFAS Screening Limits
- Round 2: Exceeds PFAS Screening Limits

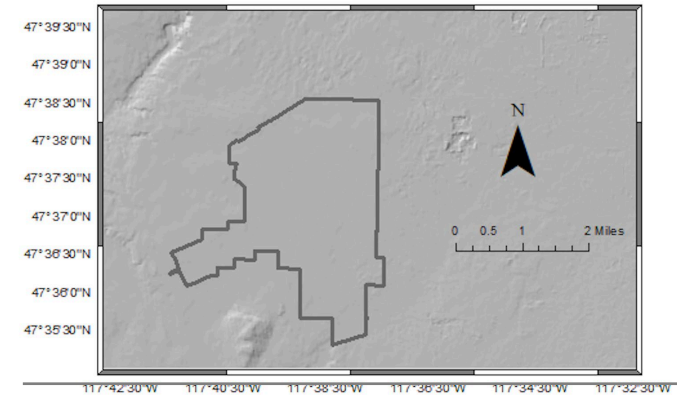


- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement
- Data Gap Areas

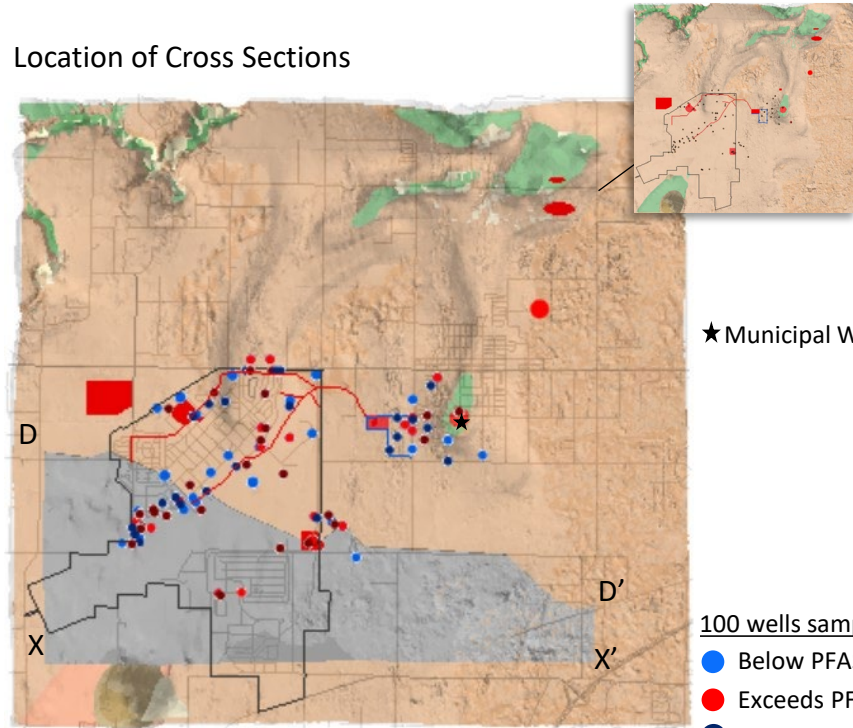
Unconsolidated partially transparent
Basalt A is transparent

vertical exaggeration 10x

Date: 09/22/2021 **DRAFT**



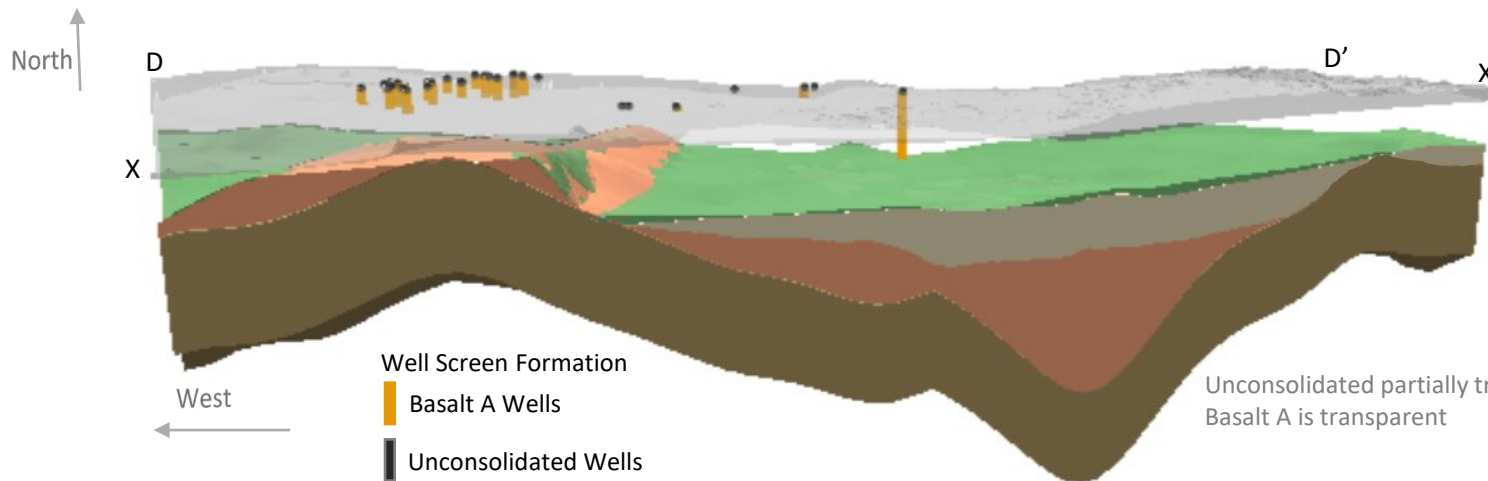
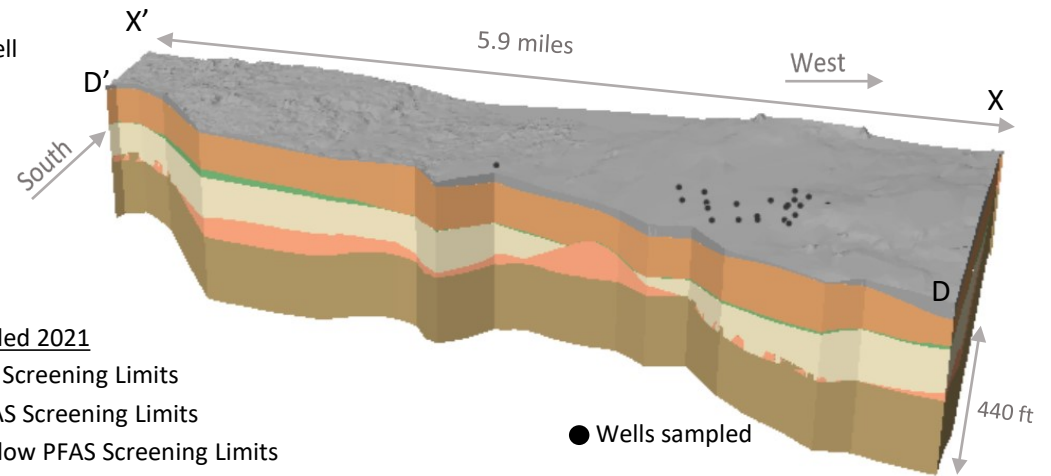
Location of Cross Sections



★ Municipal Well

100 wells sampled 2021

- Below PFAS Screening Limits
- Exceeds PFAS Screening Limits
- Round 2: Below PFAS Screening Limits
- Round 2: Exceeds PFAS Screening Limits



Well Screen Formation

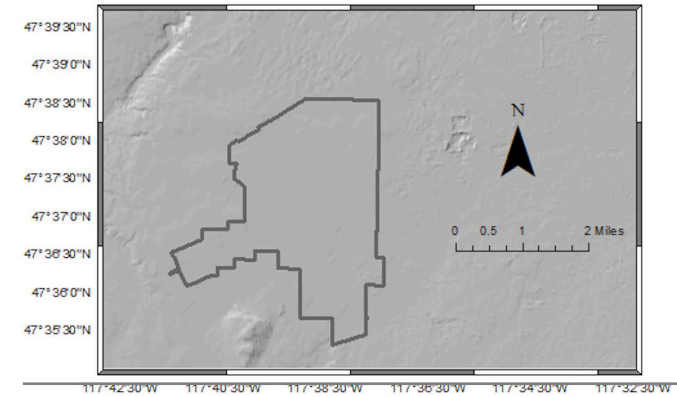
Basalt A Wells

Unconsolidated Wells

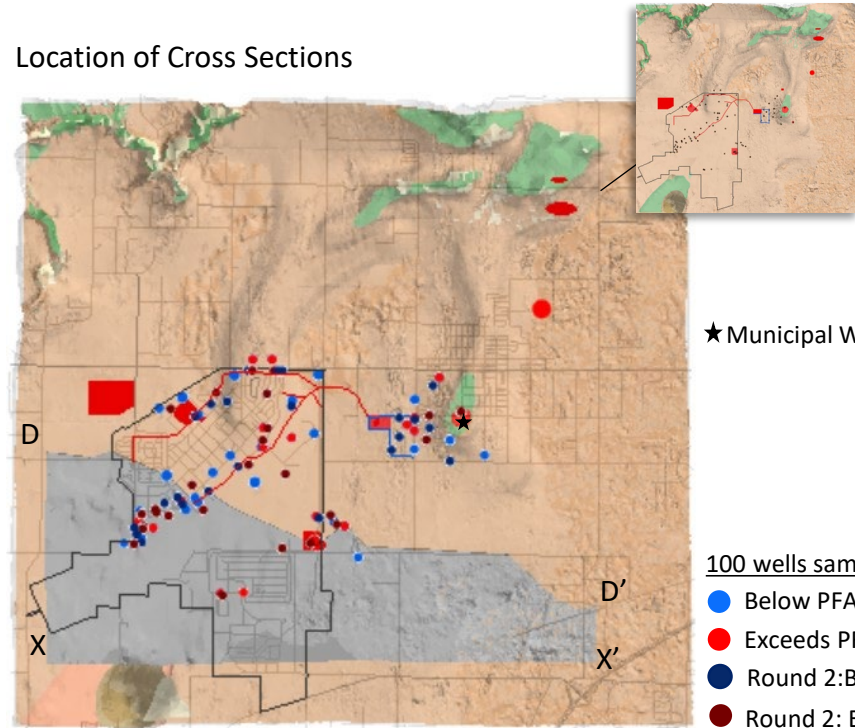
Unconsolidated partially transparent
Basalt A is transparent

- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement
- Data Gap Areas

vertical exaggeration 10x



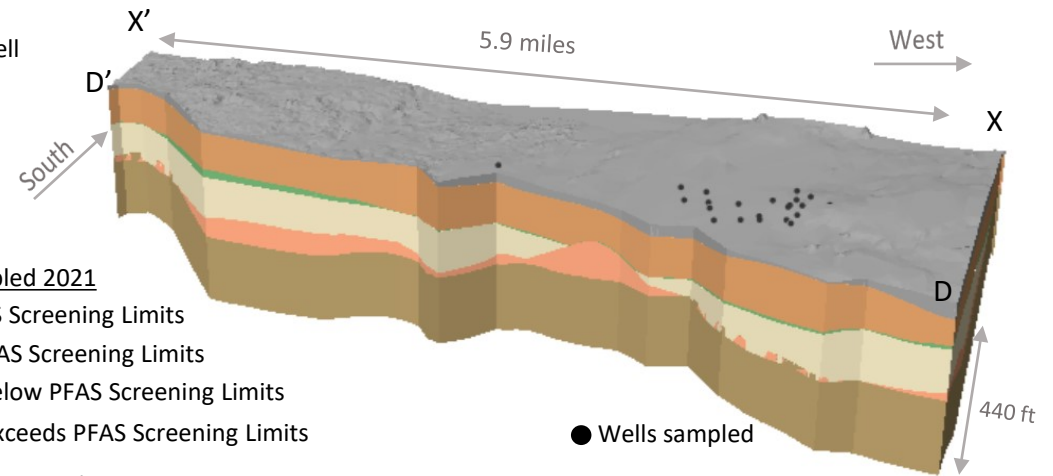
Location of Cross Sections



★ Municipal Well

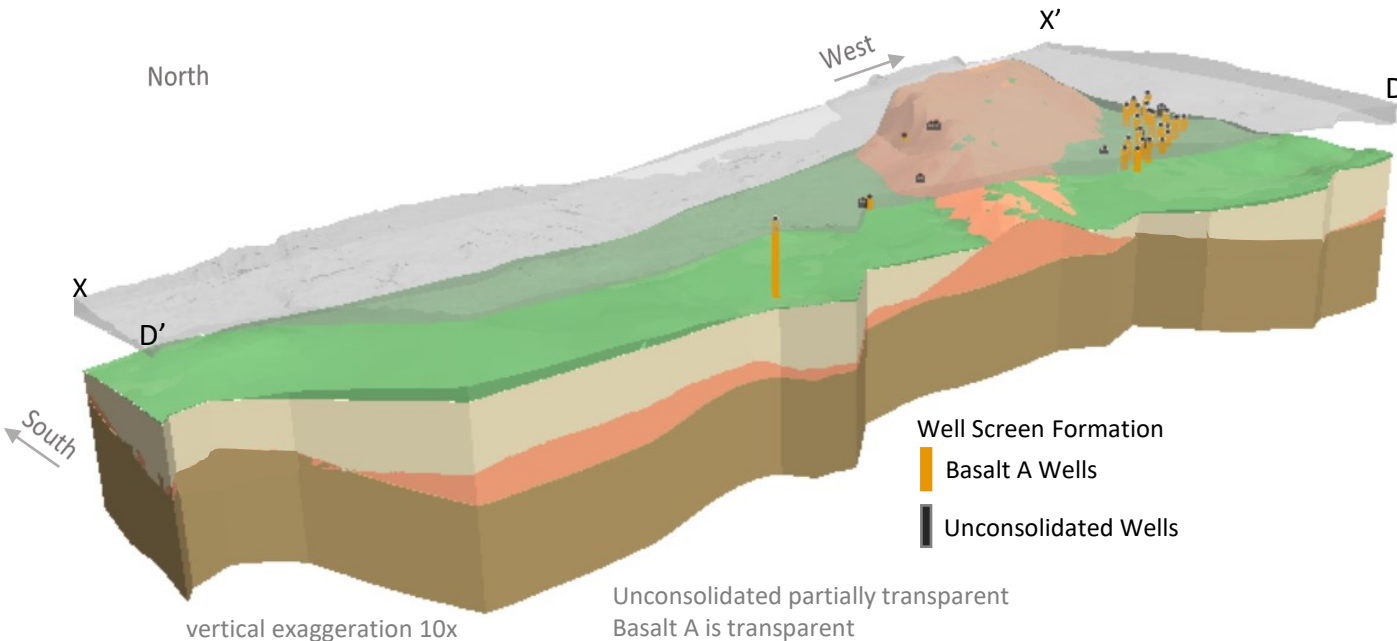
100 wells sampled 2021

- Below PFAS Screening Limits
- Exceeds PFAS Screening Limits
- Round 2: Below PFAS Screening Limits
- Round 2: Exceeds PFAS Screening Limits



● Wells sampled

- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement
- Data Gap Areas



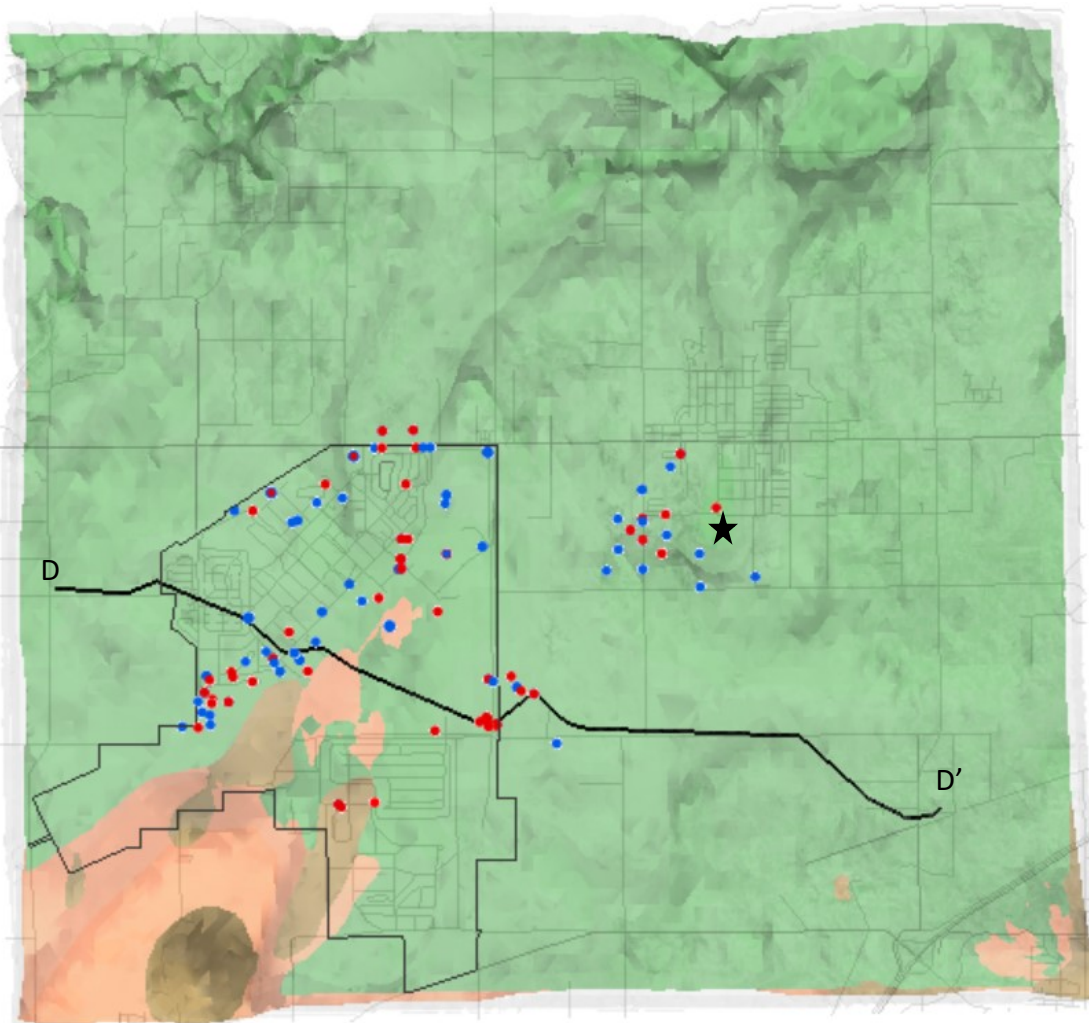
- Well Screen Formation
- Basalt A Wells
- Unconsolidated Wells

vertical exaggeration 10x

Unconsolidated partially transparent
Basalt A is transparent

Date: 09/22/2021 **DRAFT**

Potential exists for contaminated groundwater to enter the lower formations where Interbed A is absent.



100 wells sampled 2021

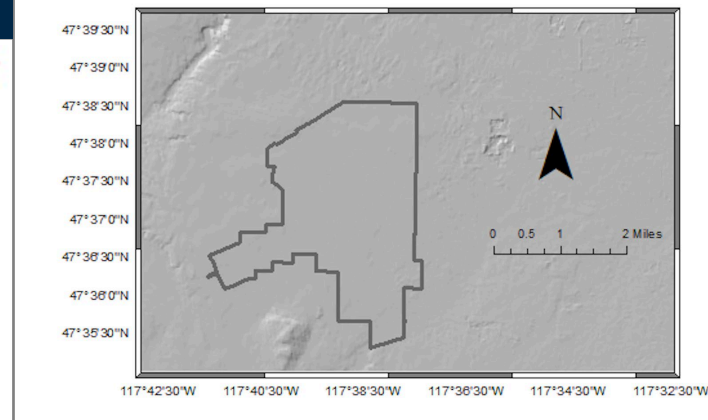
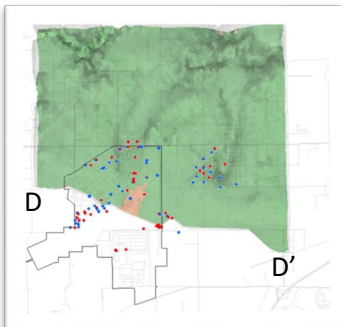
● Below PFAS Screening Limits

● Exceeds PFAS Screening Limits

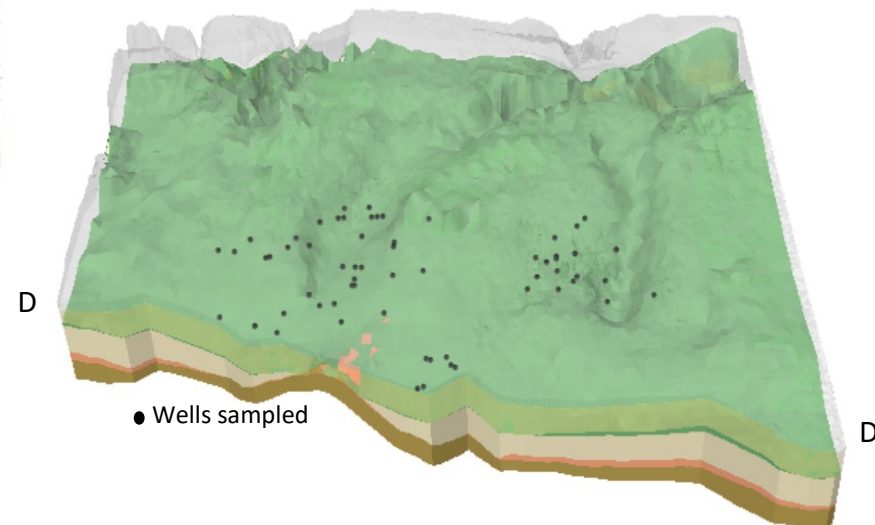
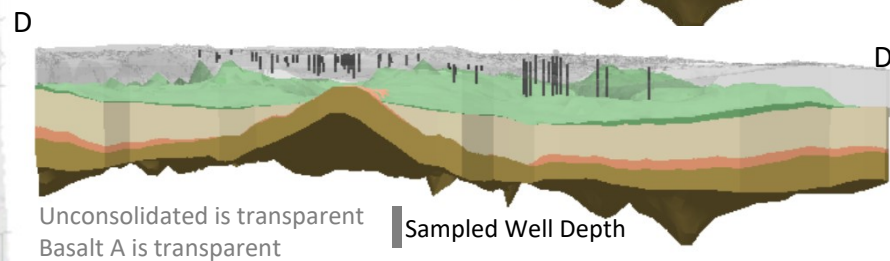
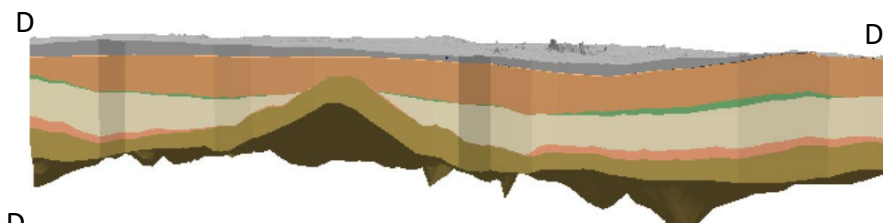
★ Municipal Well

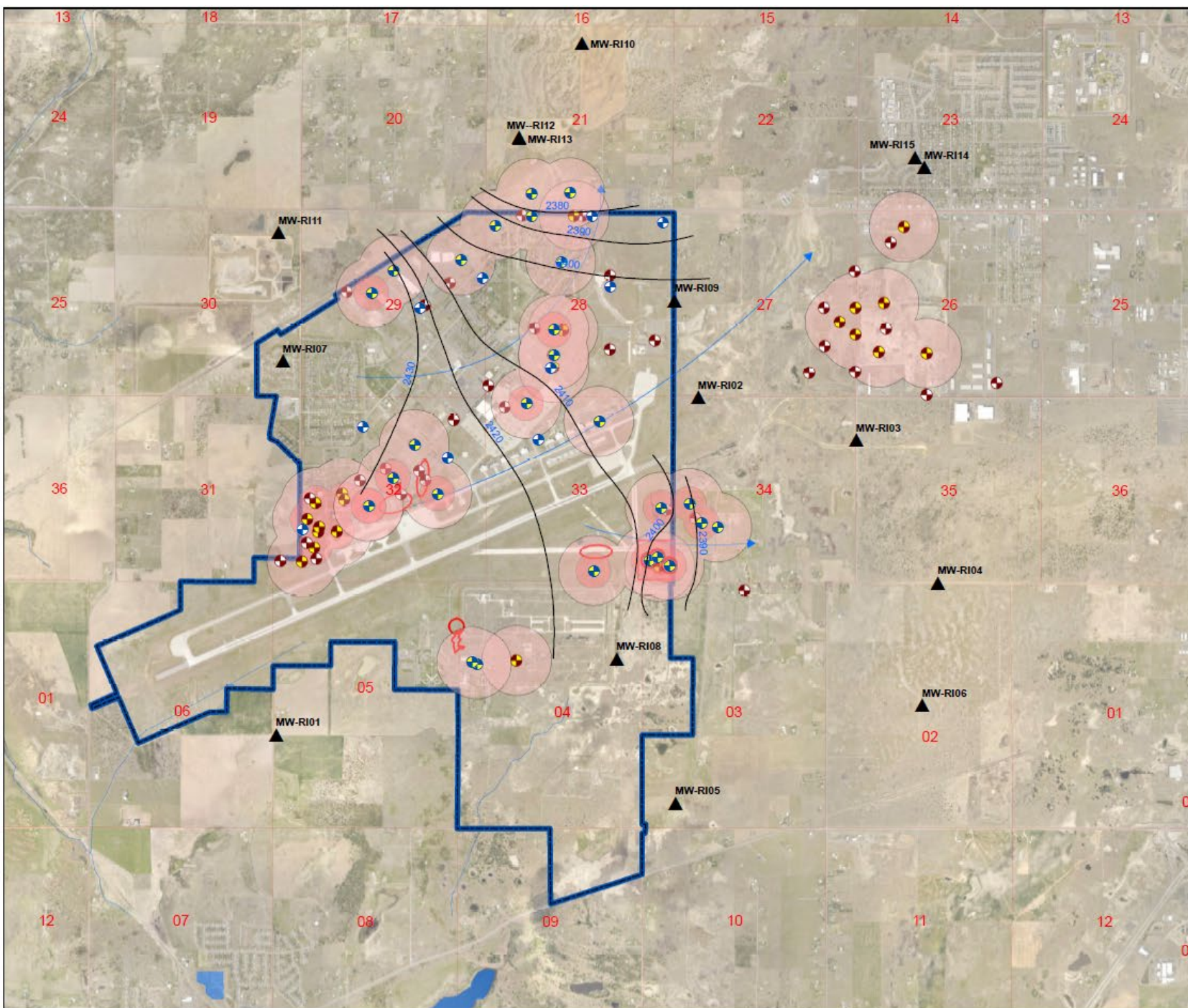
Unconsolidated is transparent
Basalt A is transparent

- Unconsolidated
- Basalt A
- Interbed A
- Basalt B
- Interbed B
- Basement



vertical exaggeration 10x





Legend

- Unconsolidated Deposits Well Sampled
- Unsol. Dep. Well > PFOS Screening Level
- Basalt A Well Sampled
- Basalt A Well > PFOS Screening Level
- Proposed Monitoring Well Location
- Release Areas
- PFOS in Unconsolidated and Basalt A
 - > PFOS Screening Level
 - 10X PFOS Screening Level
 - 100X PFOS Screening Level
- Fairchild AFB Boundary
- Streams
- Sections
- General GW Flow Direction
- Unconsolidated Deposits GW Contours

PFOS Screening Level = 0.040 u/L

0 0.5 1 Miles **DRAFT**

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United States Air Force
Fairchild AFB, Washington

**Figure XX: Fairchild AFB
Proposed Monitoring Well Locations
First 15 Monitoring Wells**

Fairchild AFB
Phase I Remedial Investigation (RI)

Proposed New Monitoring Wells					
Well ID	TRS	Aquifer	Estimated Depth	Area	Purpose
MW-RI01	SW ¹ / ₄ NW ¹ / ₄ Sec 5 T24N/R41E	Unconsolidated	25-30 Feet	Southwest of base along South Graham Road (or closer to base)	Establish up-gradient monitoring location for background water quality and groundwater flow direction.
MW-RI02	NW ¹ / ₄ NW ¹ / ₄ Sec 34 T25N/R41E	Unconsolidated	15-20 Feet	East of base near West McFarlane Road	Define eastern extent of shallow GW PFOS and groundwater flow direction.
MW-RI03	NE ¹ / ₄ NE ¹ / ₄ Sec 34 T25N/R41E	Unconsolidated	15-20 Feet	East of base along South Craig Road	Define eastern extent of shallow GW PFOS and groundwater flow direction.
MW-RI04	SE ¹ / ₄ SW ¹ / ₄ Sec 35 T25N/R41E	Basalt A	120 Feet	East of base along West Thorpe Road	Define eastern extent of shallow GW PFOS and groundwater flow direction.
MW-RI05	SW ¹ / ₄ SW ¹ / ₄ Sec 03 T24N/R41E	Basalt A	100 Feet	East of base along West Thorpe Road	Define southern extent of shallow GW PFOS and groundwater flow direction.
MW-RI06	Center of Sec 02 T24N/R41E	Unconsolidated	40 Feet	East of base	Define eastern extent of shallow GW PFOS and groundwater flow direction.
MW-RI07	SE ¹ / ₄ SE ¹ / ₄ Sec 30 T25N/R41E	Unconsolidated	40 Feet	West of base	Define western extent of shallow GW PFOS and groundwater flow direction.
MW-RI08	SE ¹ / ₄ NE ¹ / ₄ Sec 04 T24N/R41E	Unconsolidated	15-20 Feet	Southeastern portion of base	Define southern extent of shallow GW PFOS and groundwater flow direction.
MW-RI09	SE ¹ / ₄ NE ¹ / ₄ Sec 04 T25N/R41E	Unconsolidated	40 Feet	Northeastern portion of base	Evaluate groundwater quality downgradient of source areas, groundwater flow direction.
MW-RI10	Northern ¹ / ₂ Sec 21 T25N/R41E	Unconsolidated	50 Feet	North of base	Define northern extent of shallow GW PFOS and groundwater flow direction.
MW-RI11	NE ¹ / ₄ NE ¹ / ₄ Sec 30 T25N/R41E	Unconsolidated	50 Feet	Northwest of base	Upgradient location to define background water quality and refine groundwater flow directions.
MW-RI12	SW ¹ / ₄ NW ¹ / ₄ Sec 21 T25N/R41E	Unconsolidated	75 Feet	North of base	Shallow nested well to define GW quality and gradient in East Deep Creek paleochannel.
MW-RI13	SW ¹ / ₄ NW ¹ / ₄ Sec 21 T25N/R41E	Basalt A	150 Feet	North of base	Deep nested well to define GW quality and gradient in East Deep Creek paleochannel.
MW-RI14	SW ¹ / ₄ Sec 23 T25N/R41E	Unconsolidated	75 Feet	North Airway Heights	Shallow nested well to define GW quality and gradient in Airway Heights paleochannel.
MW-RI15	SW ¹ / ₄ Sec 23 T25N/R41E	Basalt A	150-200 Feet	North Airway Heights	Deep nested well to define GW quality and gradient in Airway Heights paleochannel.