



TCAAP Groundwater Stakeholder Call

21 April 2021

US Army Environmental
Command (USAEC)



Agenda

- Introductions
- Summary of Activities since October 2020 Stakeholder Meeting
 - General, Operable Unit 1 (OU1) and Operable Unit 2 (OU2)
- Update on OU1 Optimization
- Update on Source Groundwater Recovery System (SGRS)
 - New and Proposed Extraction Wells
 - 90% Design/Specs and Basis of Design
- Update on Restoration Advisory Board
- Actions and Schedule Next Meeting





Introductions





Introductions

- U.S. Environmental Protection Agency (EPA) – Viral Patel, Susan Prout
- Minnesota Pollution Control Agency (MPCA) – Brigitte Hay, Katy Grant
- Army Environmental Command – Linda Albrecht, Robert Reine, Susan Elrod, Cathy Kropp
- USACE – Clay Tallman
- Arcadis – Hoa Voscott, Tim Molitor, Ryan Dorn, Andrew Lorenz, Mike Cobb, Rhonda Stone, Scott Potter
- Arden Hills – Not available
- Atlatus –Bob Lux
- Barr – Greg Keil, Julia Macejkovic, Evan Christianson
- Baywest – Rick Van Allen
- ENVGR – Kay Toye
- Fred Law –Rick Snyder
- Fridley – Jim Kosluchar
- GHD – Shawn Horn
- GPM Law – Rick Kubler
- Kimley-Horn – Jon Horn, Tom Lincoln
- Minnesota Army National Guard – Mary Lee, Josh Pennington
- New Brighton – Craig Schlichting
- Northrop Grumman – Dave Brown
- Parkway Law – Sarah Peterson
- Ramsey County – Martha Faust, Amy Schmidt
- U.S. Geological Survey (USGS) – Mat Pajerowski



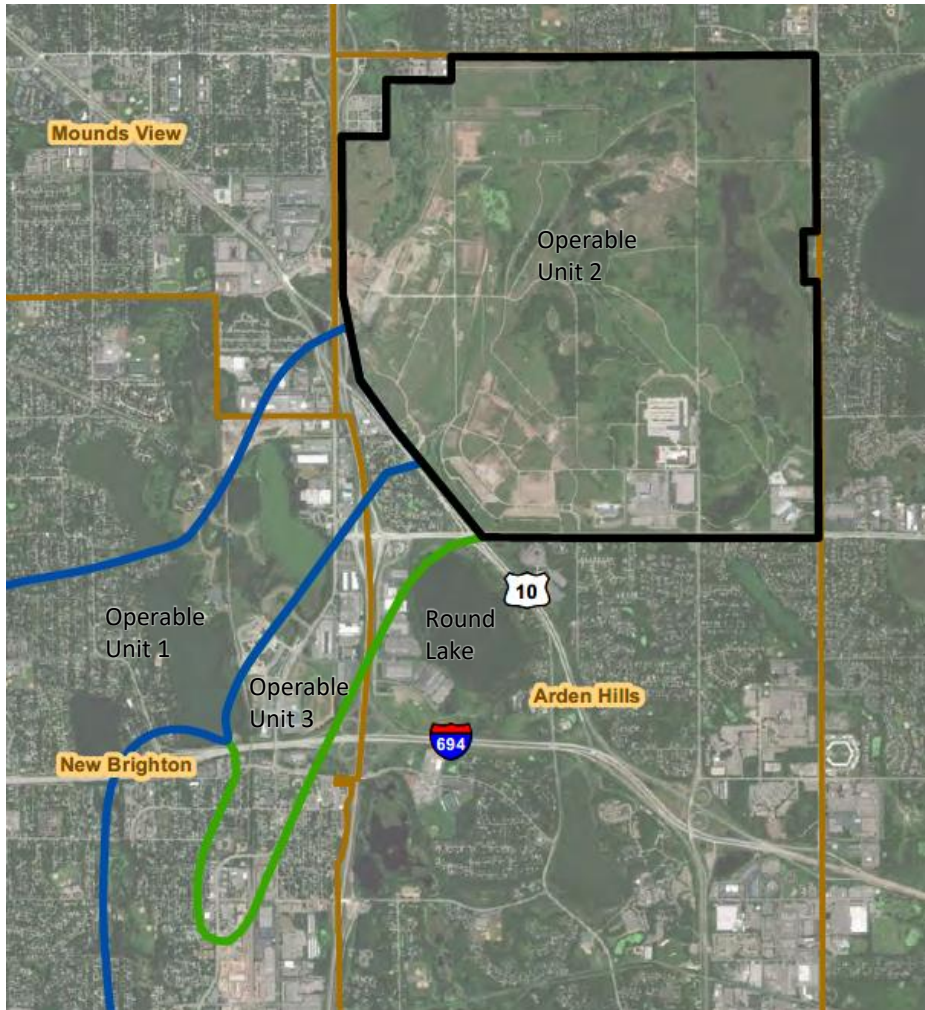


Summary of Activities since October 2020 stakeholder meeting









General Activities



- Submitted FY 2020 Annual Performance Report for regulatory review
- Completed comprehensive well inspection and submitted Report
- Reactivate the Restoration Advisory Board (RAB) meetings
- ESD for OU2
- Public Notice for both ESDs
- GW treatment continues at OU1 and OU2
- MNA continues at OU3

LEGEND:

-  Operable Unit 1 (North Plume)
-  Operable Unit 2 of the New Brighton/ Arden Hills Superfund Site (the same area occupied by the Twin Cities Army Ammunition Plant in 1983, when the Site was placed on the NPL.)
-  Operable Unit 3 (South Plume)
-  Municipal Boundaries





Groundwater Sampling Update

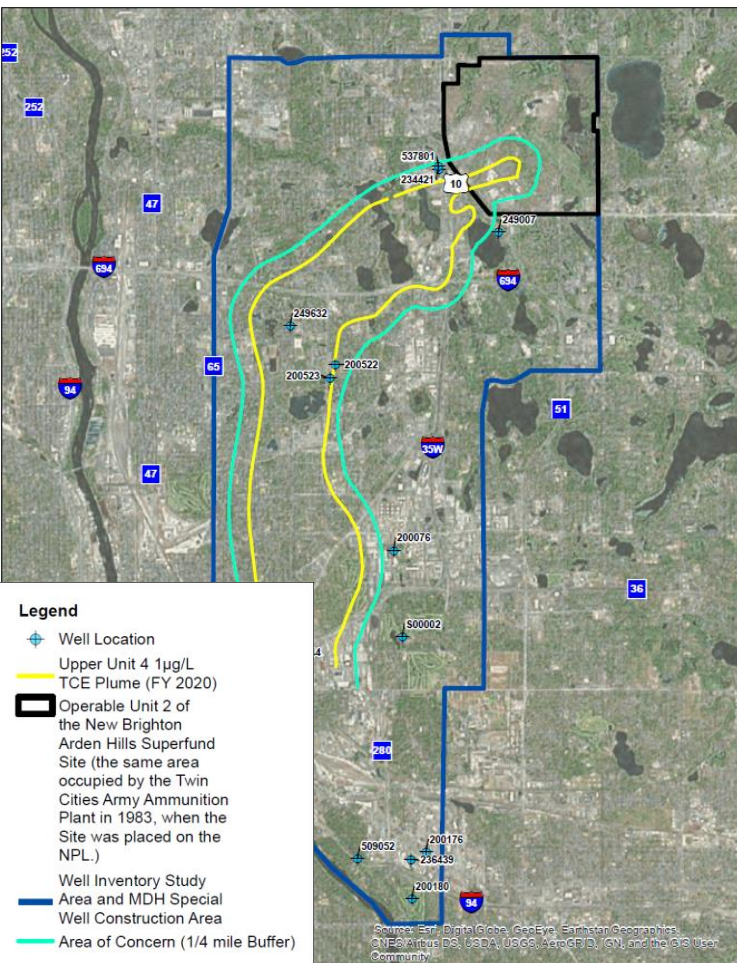
- February 2021 – submitted the Draft Final 2020 Annual Performance Report (APR) to the regulators (will be posted on website after approval).
 - April 2021 – Comments received from USEPA and MPCA
- Completed annual groundwater sampling of 228 Army monitoring and extraction wells June/July 2020.
- Completed groundwater sampling of 2 commercial wells.
- Groundwater sampling allows the Army to monitor the plumes and update the maps.





Groundwater Sampling Update

- Completed sampling of 13 off-site irrigation/industrial wells in 2020.
- This is required every 4 years.

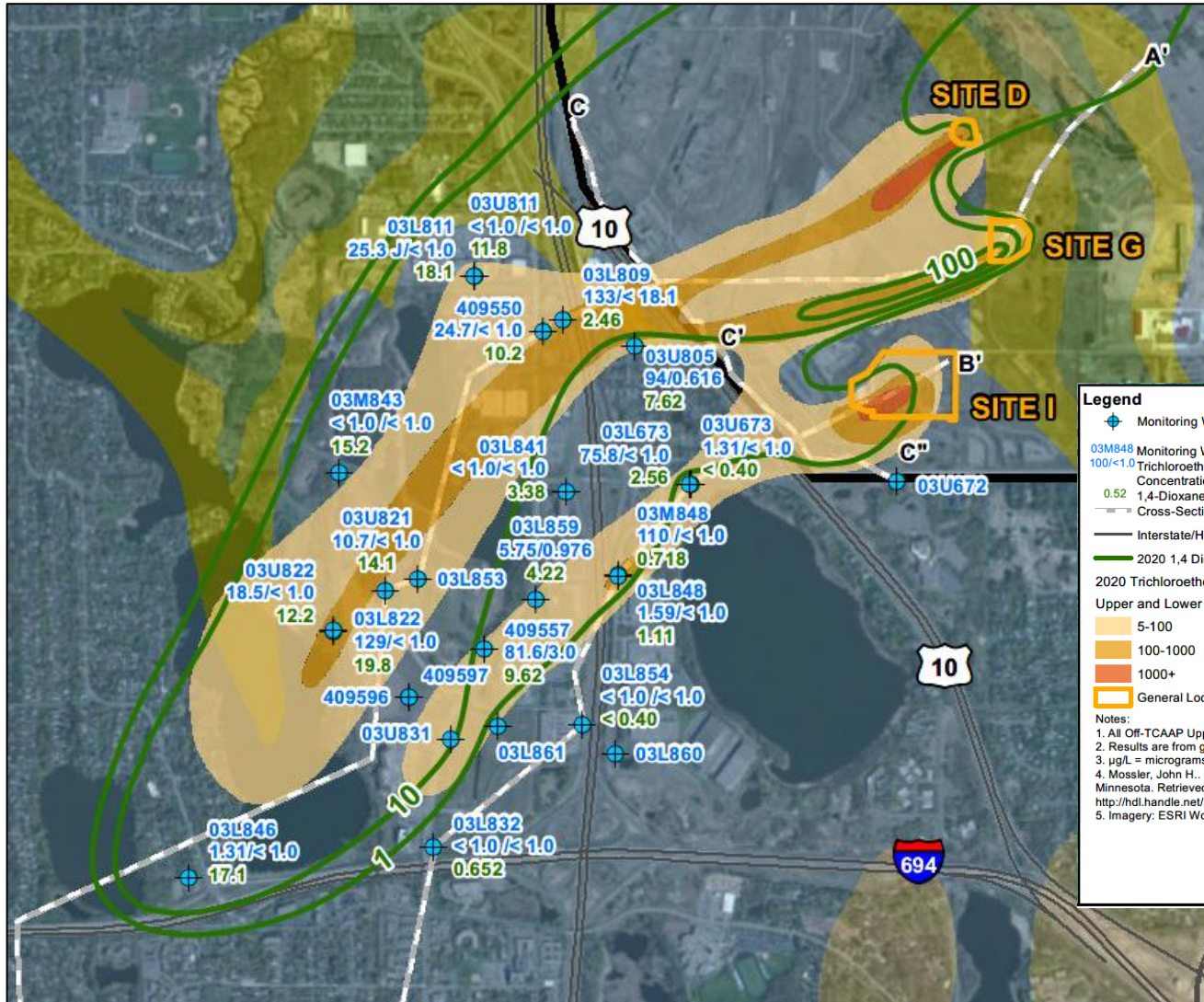


- Results showed 4 wells exceeded cleanup standards.
 - Irrigation, car washing, industrial (paper making), or out of service.
- The Army notified well owners and have requested resampling in accordance with Army Alternative Water Supply Plan.
- Resampling expected to occur Spring 2021.
- None of these wells are used for drinking water.





FY2020 – Unit 3 (Unconsolidated Sediments) Plume Map



Legend

- Monitoring Well Location
- Operable Unit 2
- Bedrock Geology
 - Decorah Shale, Galena Group
 - Platteville and Glenwood Fms
 - St. Peter Sandstone
 - Prairie du Chien Group
 - Jordan Sandstone
 - St. Lawrence Formation
 - Tunnel City Group
- Monitoring Well ID
- Trichloroethene/1,1,1-Trichloroethane Concentration (µg/L)
- 1,4-Dioxane Concentration (µg/L)
- Cross-Section Line
- Interstate/Highway
- 2020 1,4 Dioxane Concentration Contour (µg/L)
- 2020 Trichloroethene Concentrations (µg/L) Upper and Lower Unit 3
 - 5-100
 - 100-1000
 - 1000+
- General Location of Soil Area with LUCs

Notes:

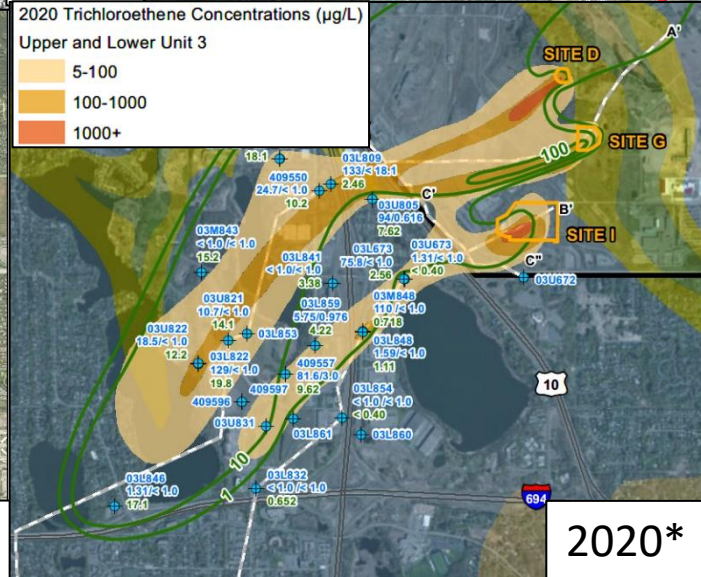
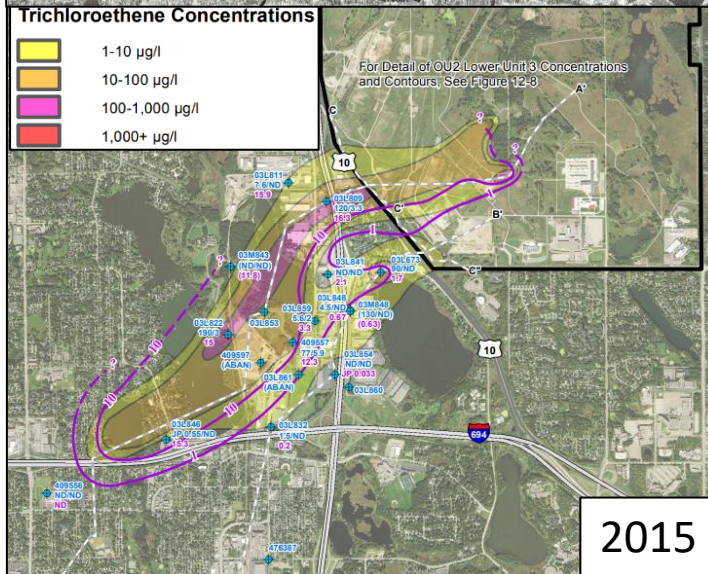
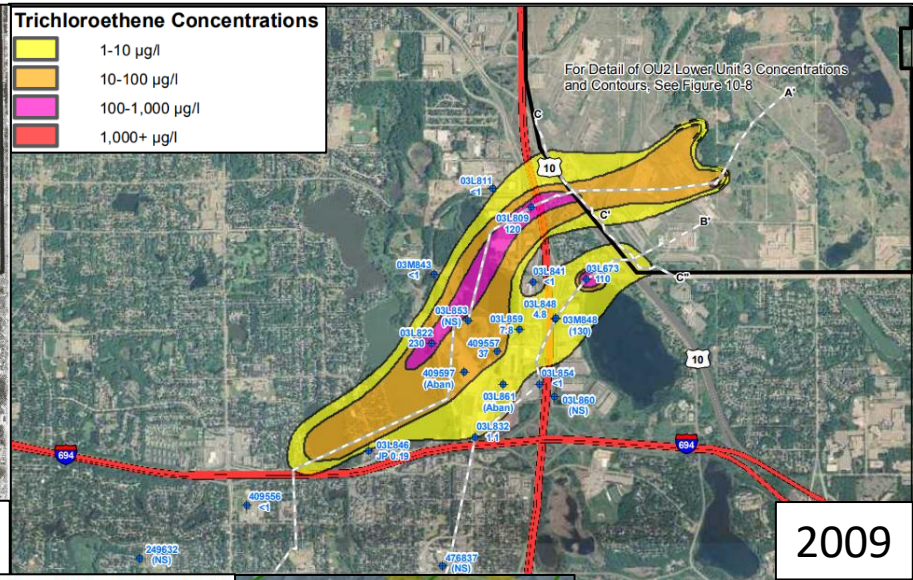
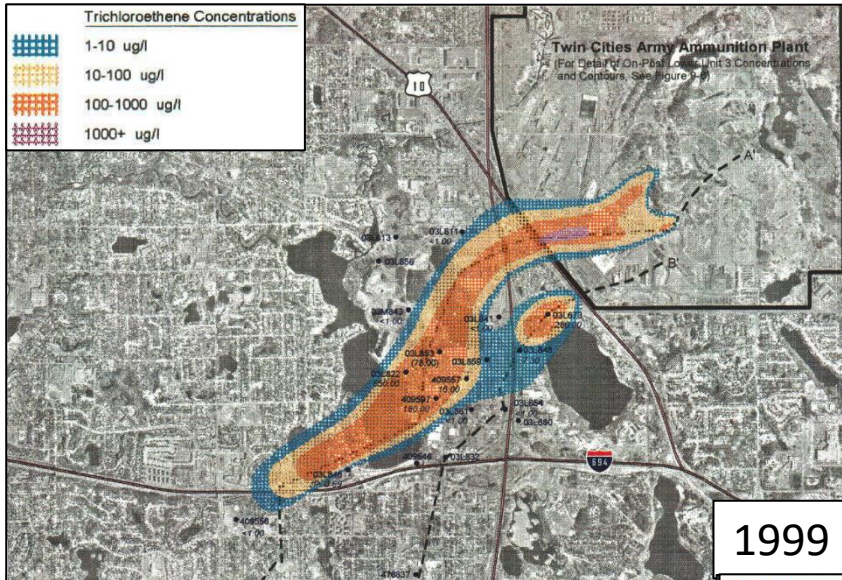
- All Off-TCAAP Upper and Lower Unit 3 wells are shown
- Results are from groundwater samples collected in June 2020.
- µg/L = micrograms per liter
- Mossler, John H., (2013), M-194 Bedrock Geology of the Twin Cities Ten-County Metropolitan Area, Minnesota. Retrieved from the University of Minnesota Digital Conservancy, <http://hdl.handle.net/11299/154925>
- Imagery: ESRI World Imagery





FY2020 – Unit 3 Plume Maps Over Time

TCE concentrations shown over time, visual plume of the Lower Unit 3

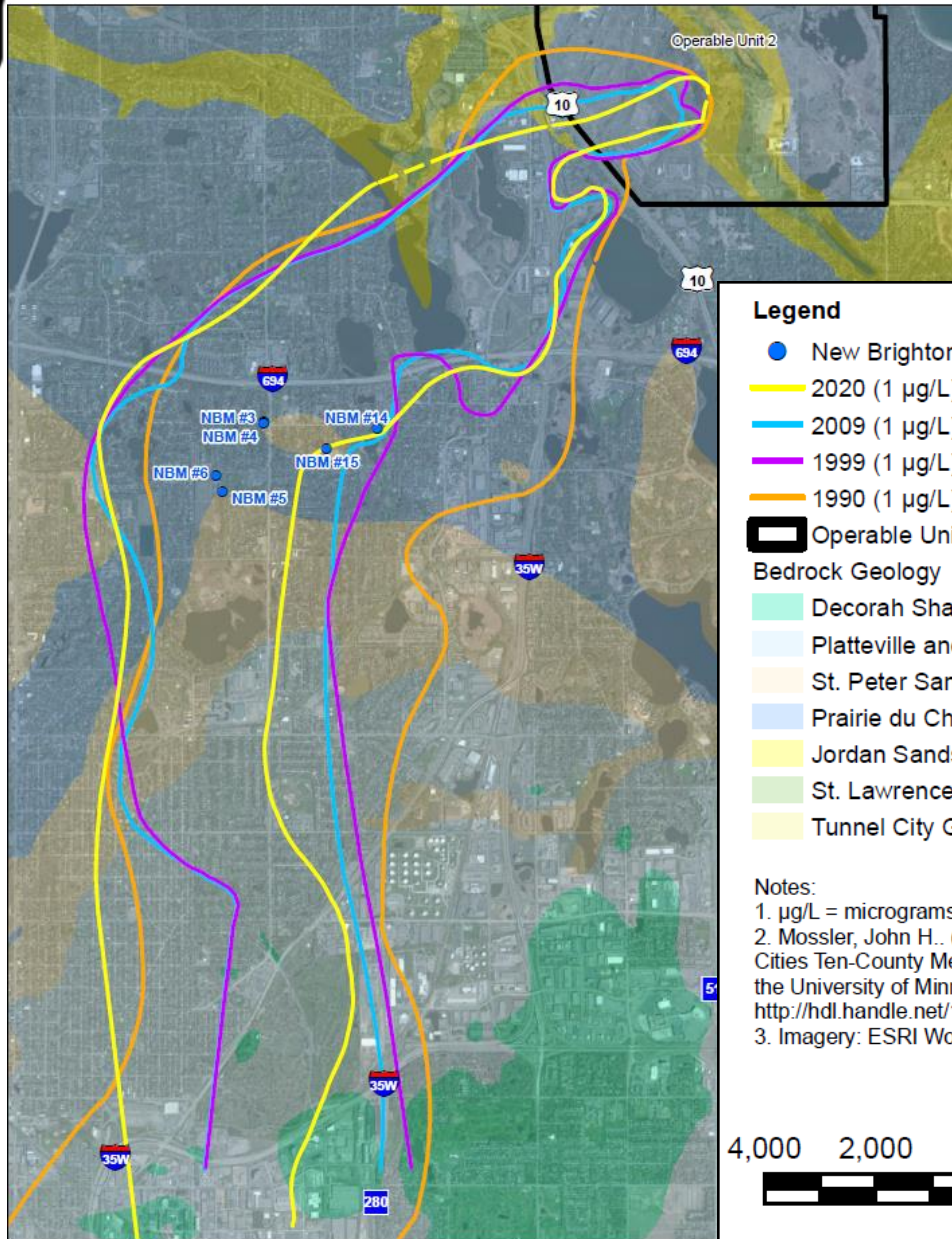


*2020 shows combined upper and lower Unit 3





FY2020 – Upper Unit 4 (Prairie du Chien) Plume Map

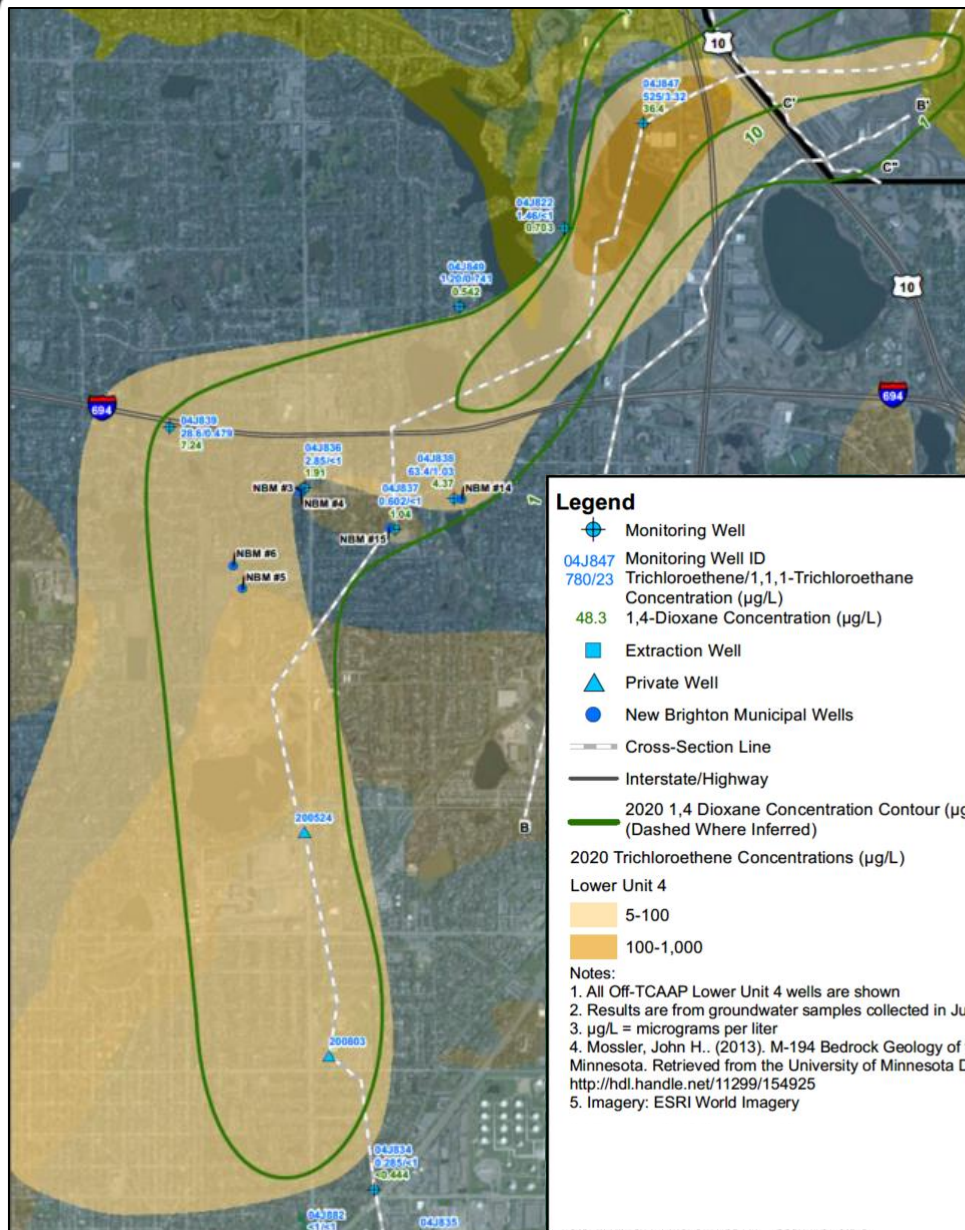


TCE concentrations, as shown by plume outlines since 1990



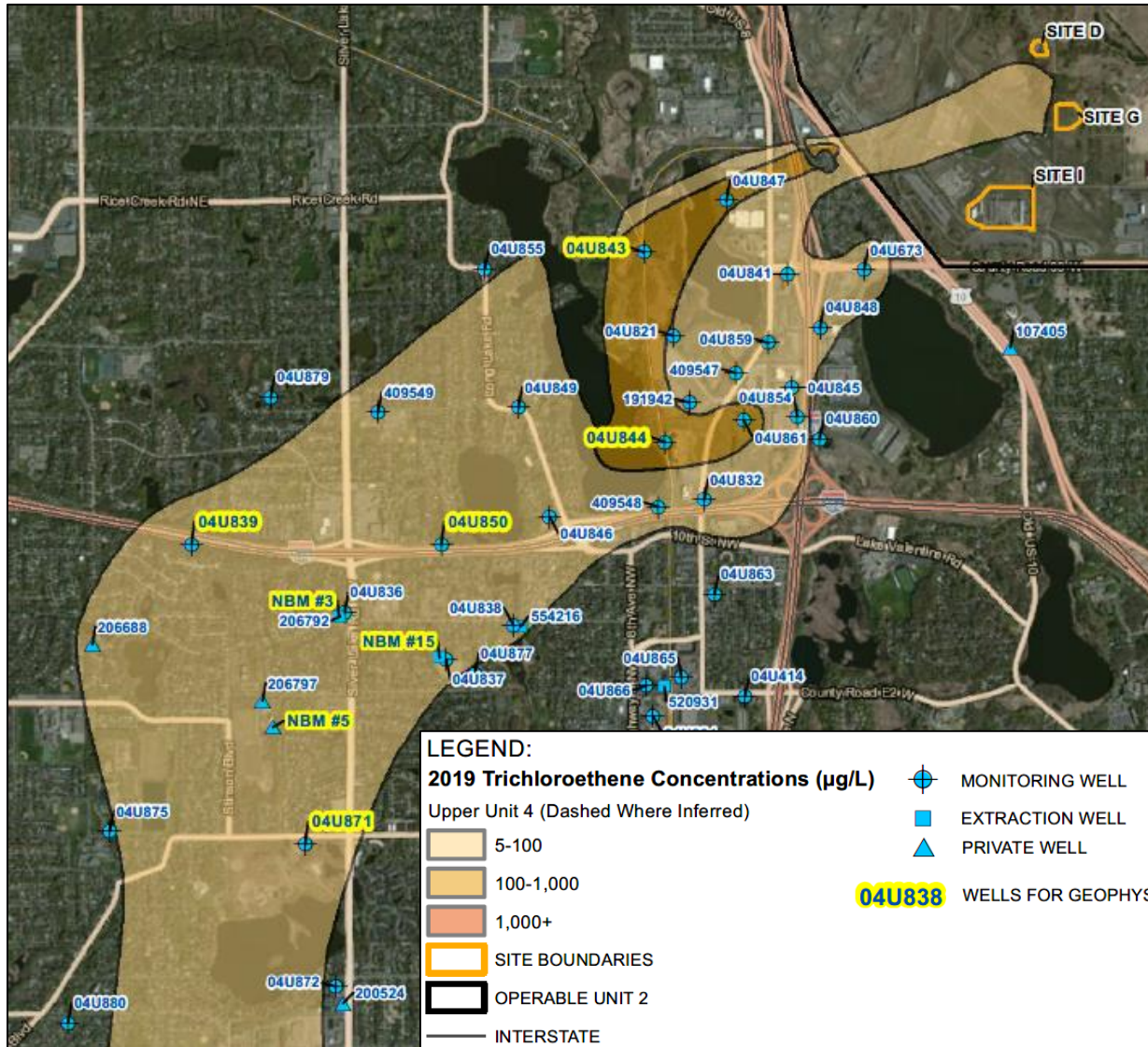


FY2020 – Lower Unit 4 (Jordan) Plume Map





Summary of Activities: OU1 Optimization



Phase 1 - Completed downhole geophysics field work November-December 2020

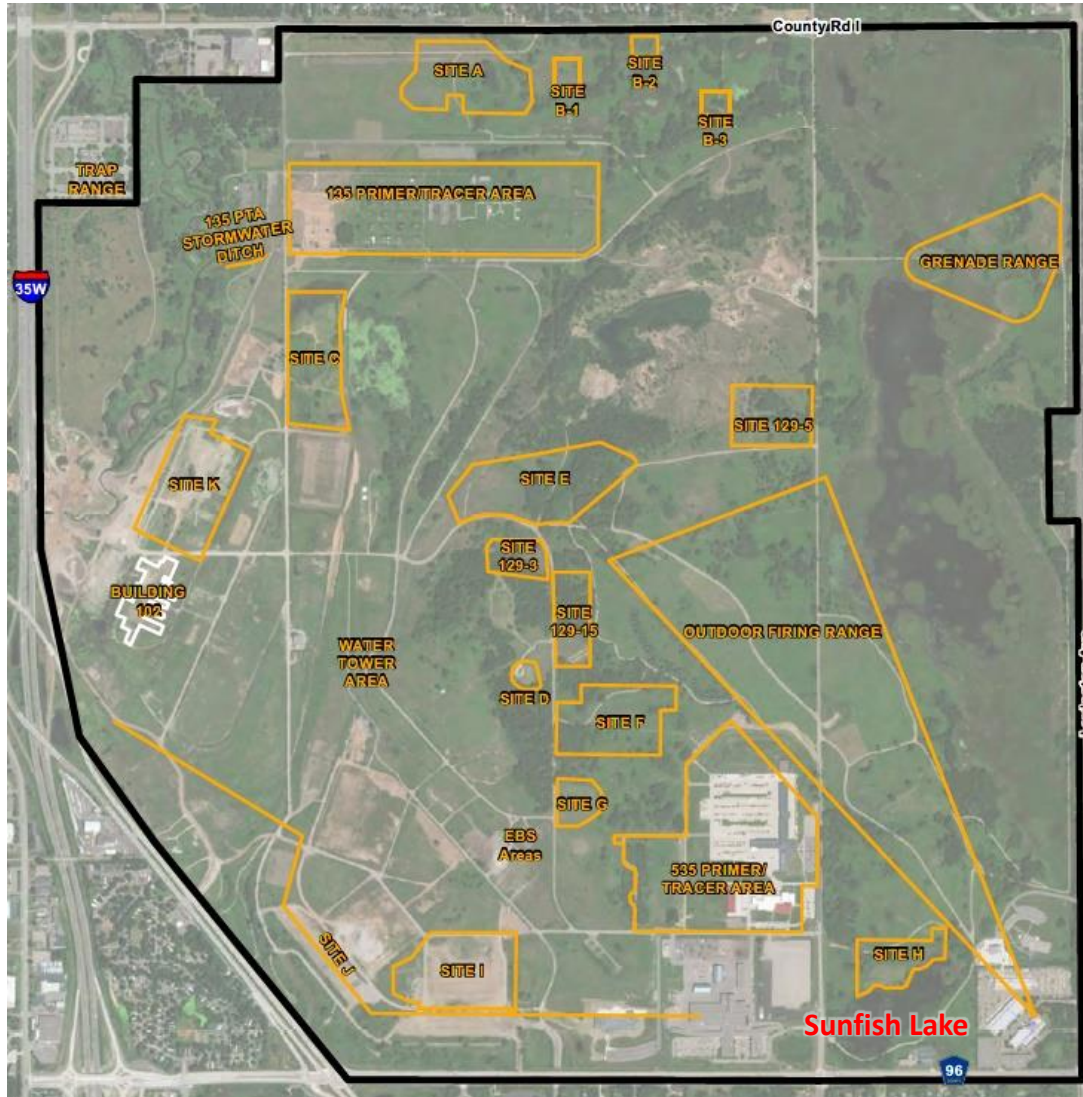
- 3 New Brighton Municipal wells
- 5 bedrock monitoring wells

Phase 2 – Complete up to two borings with downhole geophysics May 2021





Summary of FY 2021 Activities: OU2



Sunfish Lake Trail:

- Completed new trail field implementation October – December 2020
- Will complete asphalt cover May/June 2021

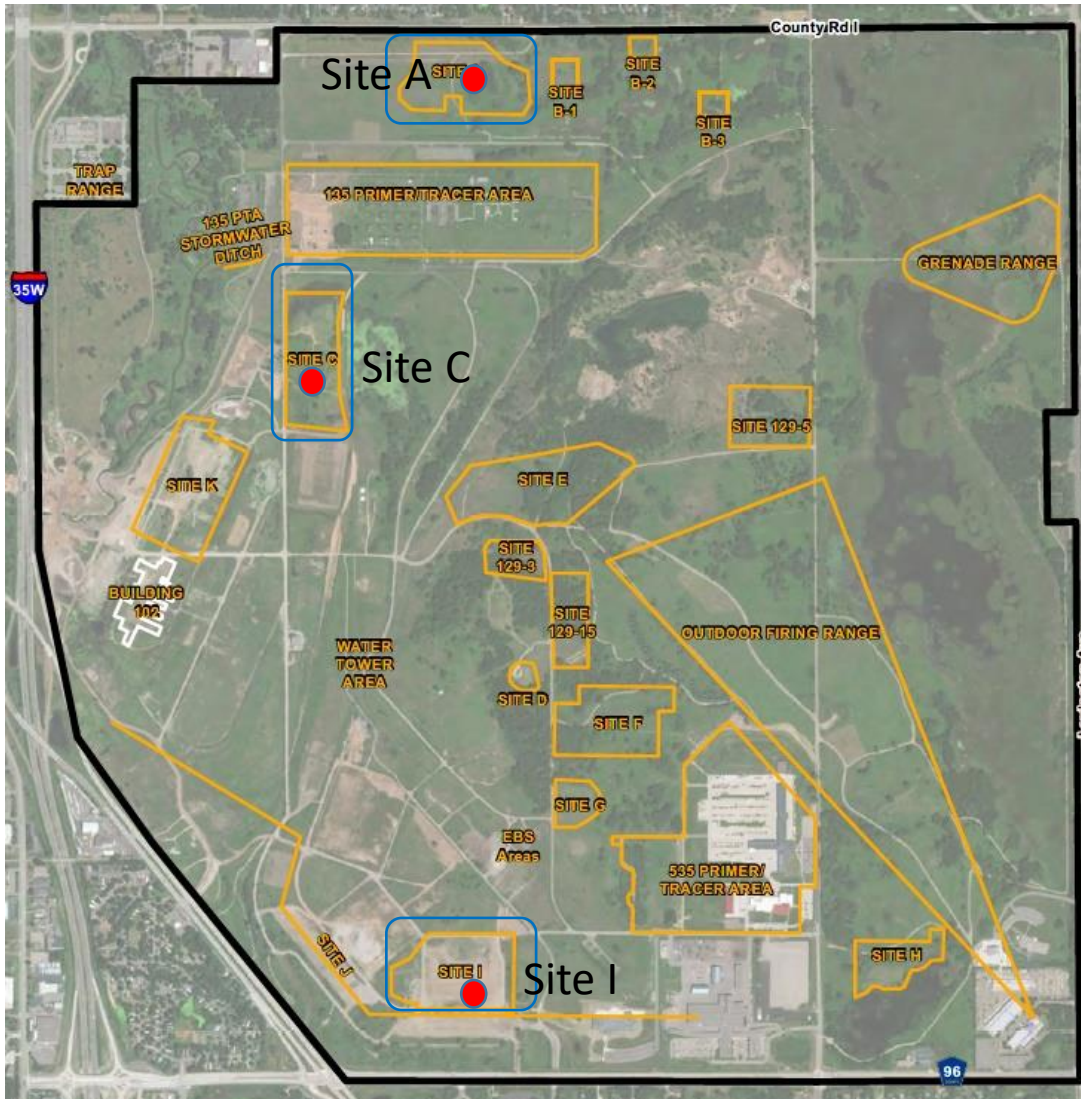
Shallow Soil Sites: ongoing implementation of LUCs

Deep Soil Sites: ongoing implementation of LUCs





Summary of FY 2021 Activities: OU2 Continued



Site A Shallow Groundwater:

- Contingency locations below trigger level
- Final Work Plan approved for groundwater and vapor intrusion investigation
- Completed first VI field work March 2021

Site C Shallow Groundwater and Surface Water:

- MNA continues
- No surface water impacts noted

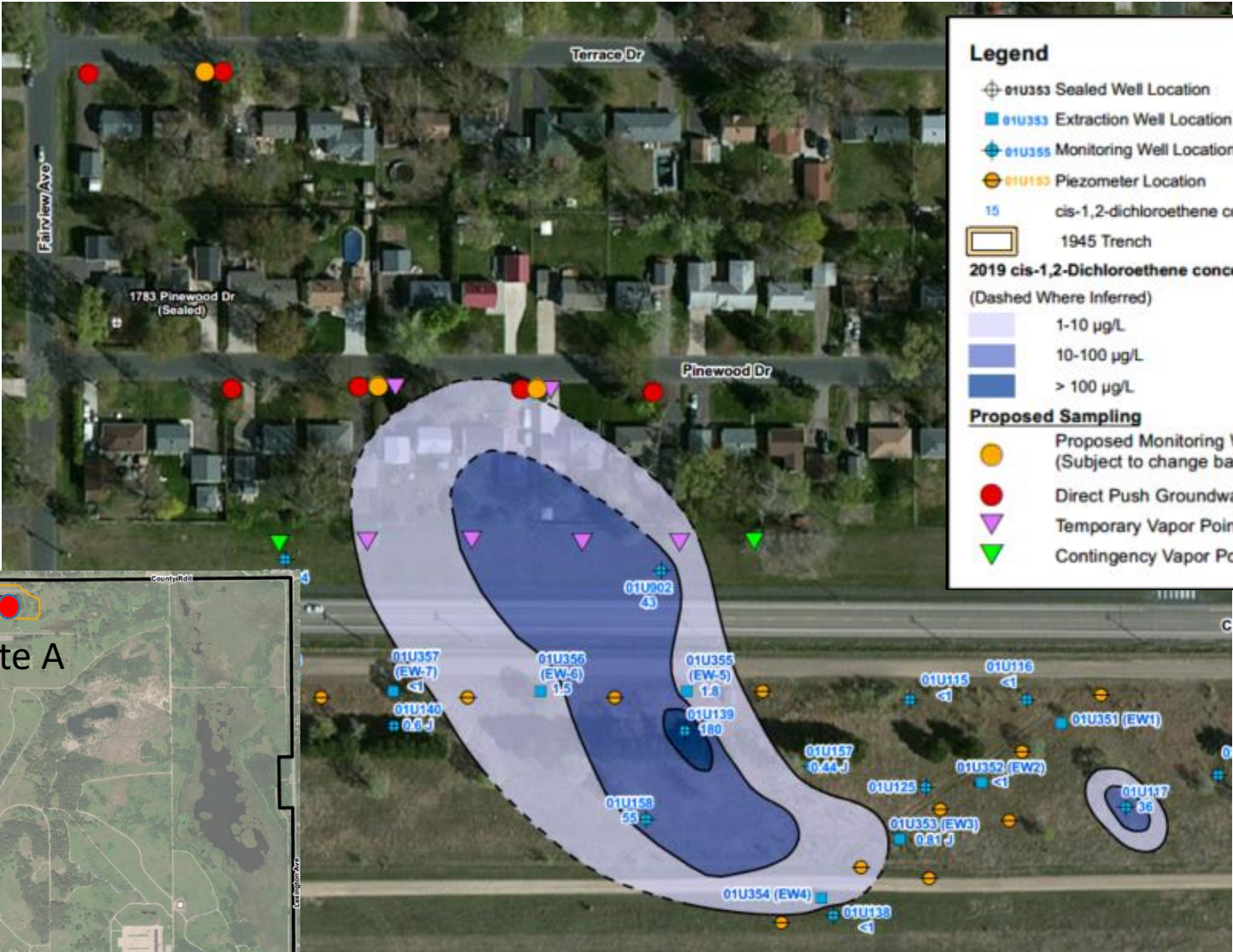
Site I Shallow Groundwater:

- Reinstallation of 01U667 remains delayed





OU2 – Site A



Legend

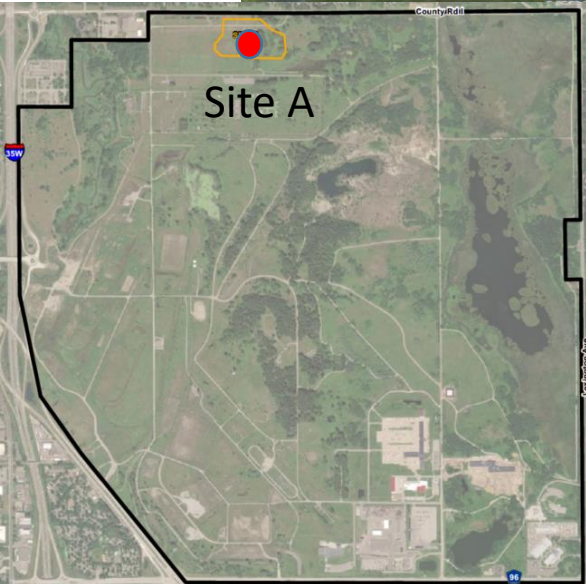
- ⊕ 01U353 Sealed Well Location
- 01U353 Extraction Well Location
- ⊕ 01U355 Monitoring Well Location
- ⊙ 01U153 Piezometer Location
- 15 cis-1,2-dichloroethene concentration (µg/L)
- ▭ 1945 Trench

2019 cis-1,2-Dichloroethene concentrations
(Dashed Where Inferred)

- 1-10 µg/L
- 10-100 µg/L
- > 100 µg/L

Proposed Sampling

- Proposed Monitoring Well Location (Subject to change based on field data)
- Direct Push Groundwater Sample
- ▽ Temporary Vapor Point
- ▽ Contingency Vapor Point

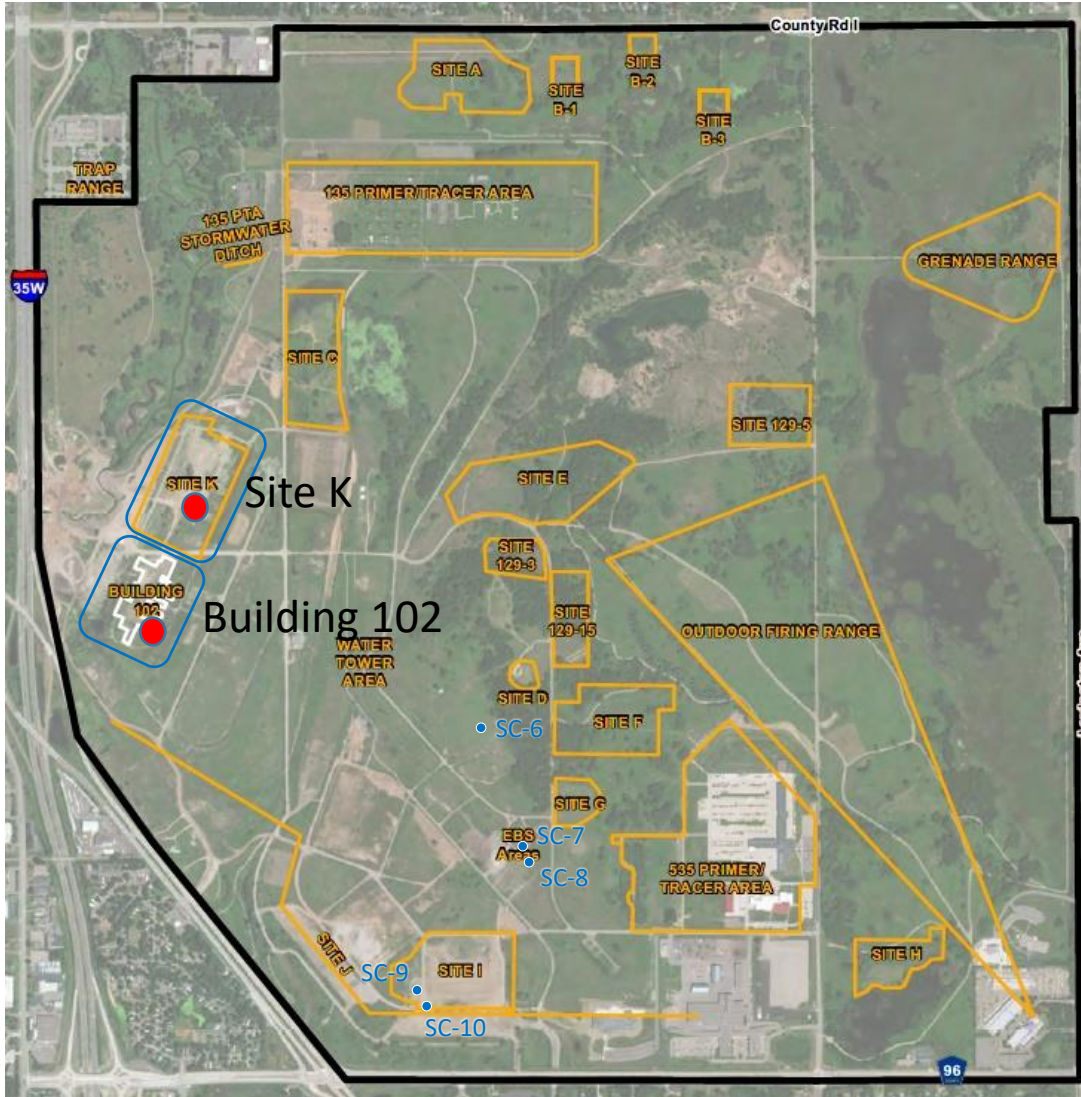


Soil vapor and groundwater samples collected March 2021





Summary of FY 2021 Activities: OU2 Continued



Site K Shallow Groundwater:

- Treatment system operating as designed
- USGS is funded and initiated treatability study to improve groundwater remediation

Building 102 Shallow Groundwater:

- MNA continues

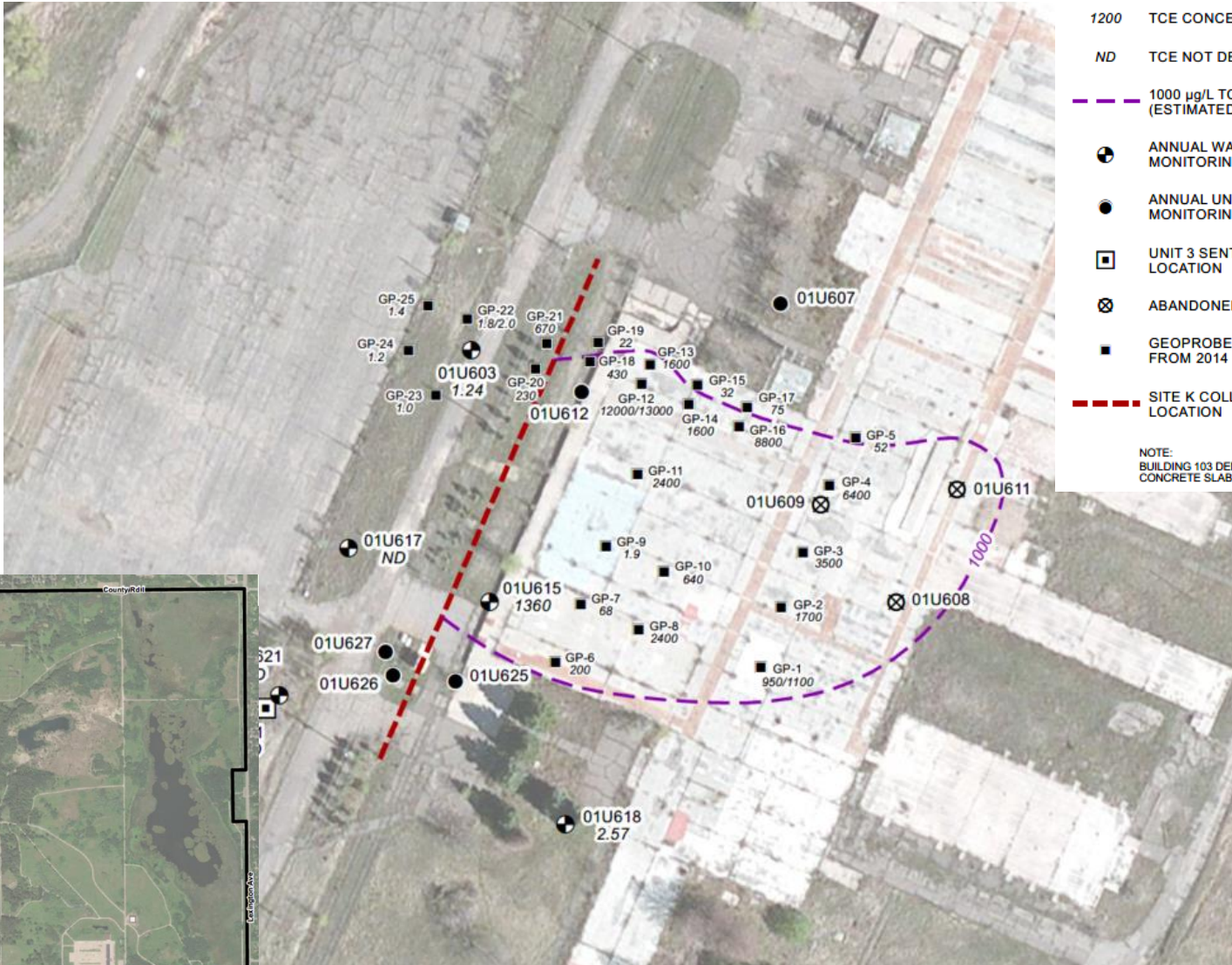
Deep Groundwater:

- TGRS operating in accordance with Record of Decision
- TGRS control upgrades complete
- Five new source area extraction wells installed (SC-6, -7, -8, -9, -10)



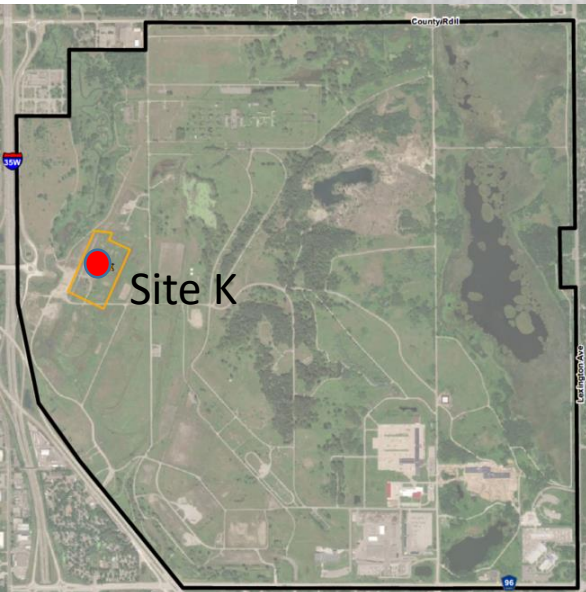


OU2 – Site K



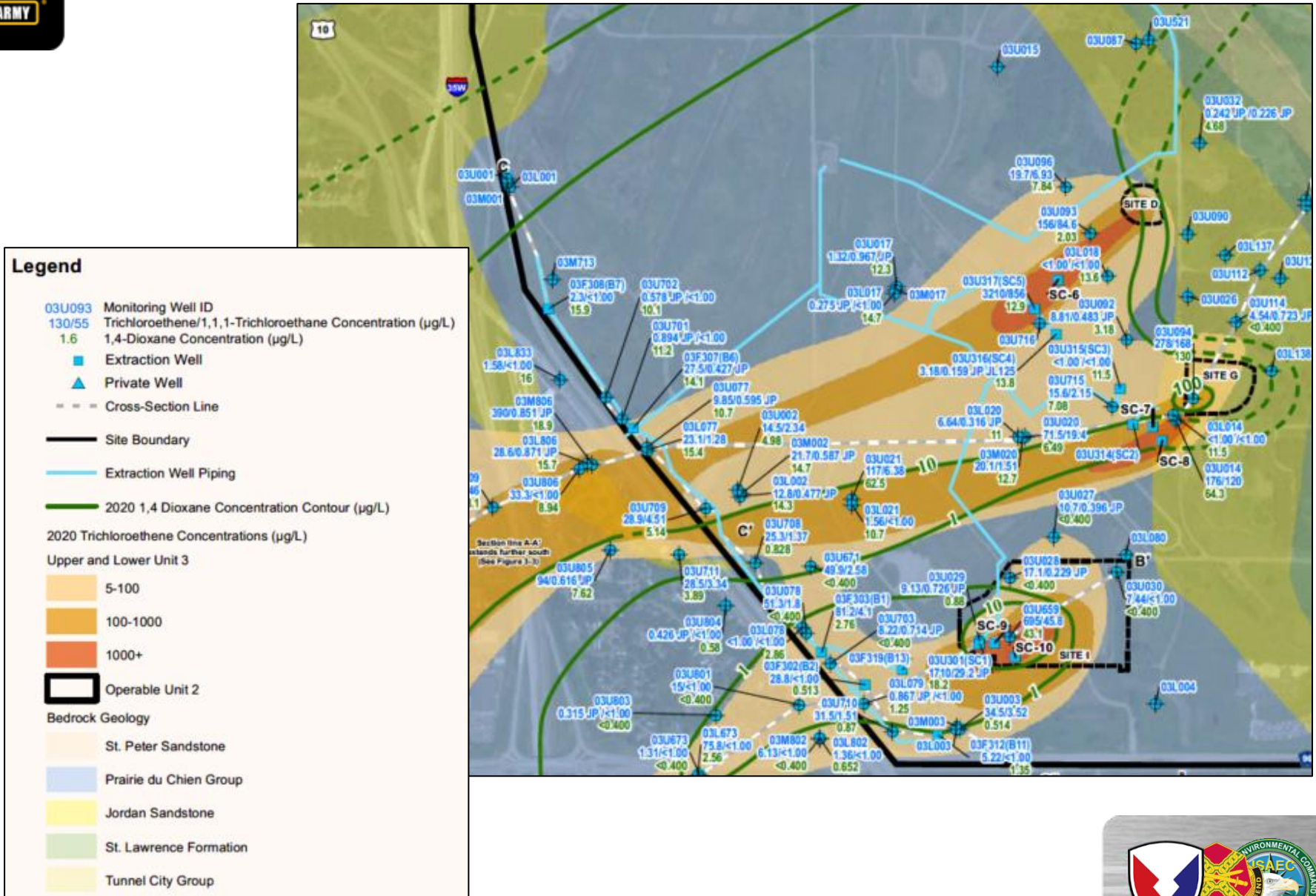
- 1200 TCE CONCENTRATION
- ND TCE NOT DETECTED
- 1000 µg/L TCE PLUME LIMIT (ESTIMATED BASED ON 2014 DATA)
- ⊕ ANNUAL WATER QUALITY MONITORING WELL LOCATION
- ANNUAL UNIT 1 WATER LEVEL MONITORING WELL LOCATION
- UNIT 3 SENTINAL WELL LOCATION
- ⊗ ABANDONED WELL
- GEOPROBE BORING LOCATION FROM 2014 INVESTIGATION
- - - SITE K COLLECTION TRENCH LOCATION

NOTE:
BUILDING 103 DEMOLISHED IN 2006;
CONCRETE SLAB REMOVED IN 2014





FY2020 – OU2 Unit 3 (Unconsolidated Sediments) Plume Map





Update on OU1 Optimization

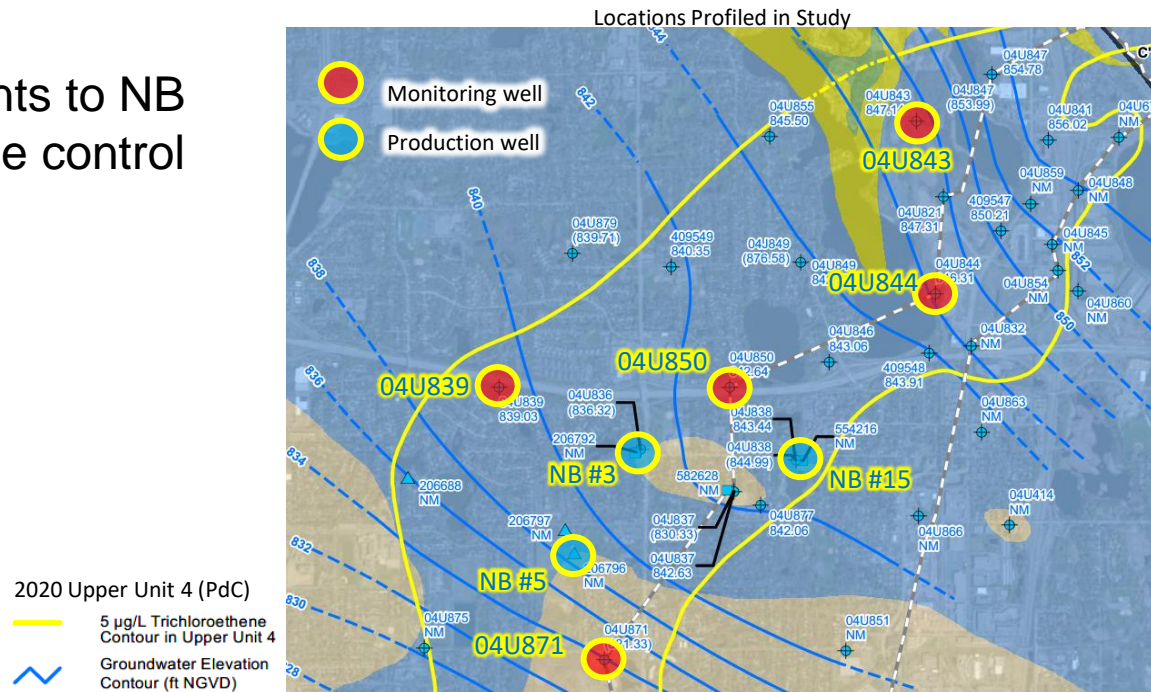
Upgrades improve operational control and reliability, cost effectiveness





Objectives

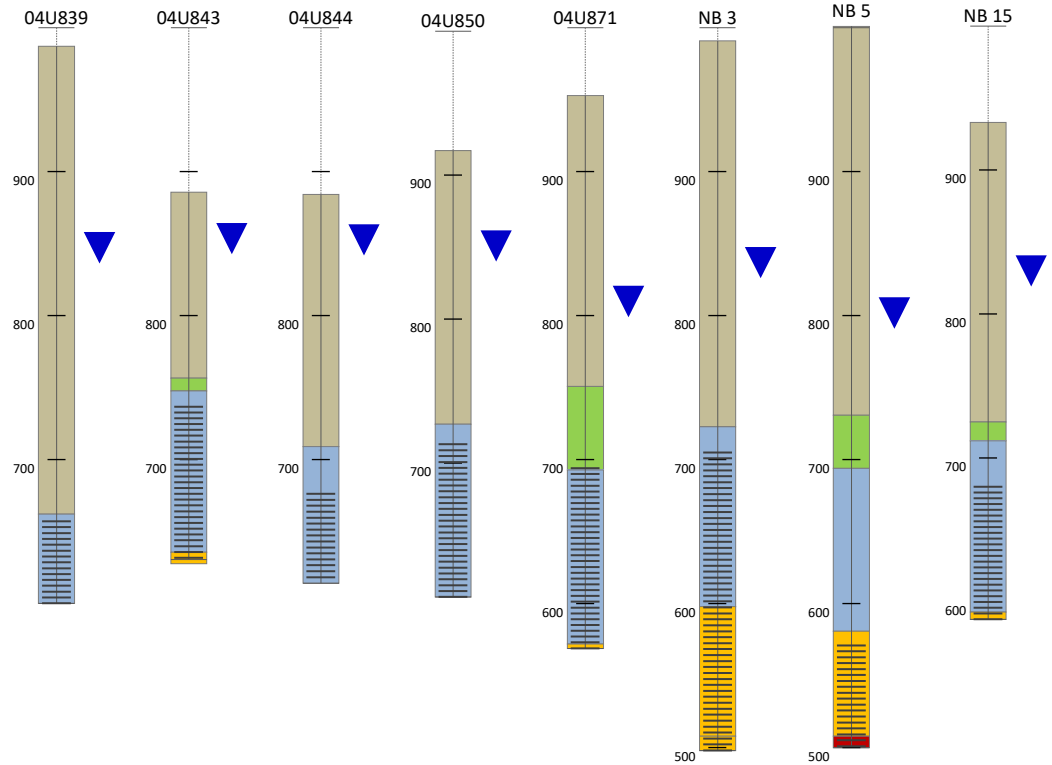
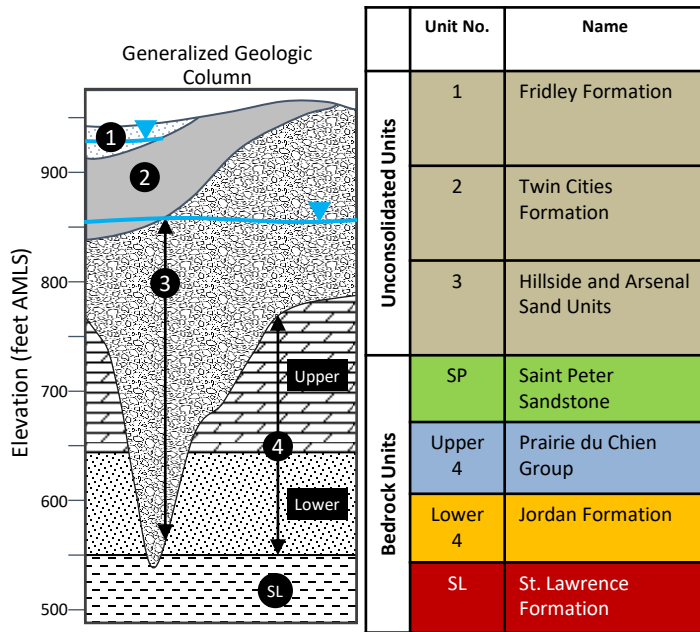
- Generate data to support siting and design of a potential New Brighton (NB) recovery well:
 - Optimize plume control and mass recovery
 - Meet NB requirements for production volume and integration with existing drinking water system
- Identify potential refinements to NB operation to optimize plume control and mass recovery





Profiled Wells

Visually shows where the wells that were evaluated are screened across aquifers





Pump Removed from New Brighton Well #5



DRAFT





Ambient Sampling



New Brighton Well #15



New Brighton Well #03





Temporary Pumps Installed



New Brighton Well #03



New Brighton Well #15





Dynamic Point Sampling



Bladder pump for sample collection (04U844)



3-inch submersible pump for simultaneous purging





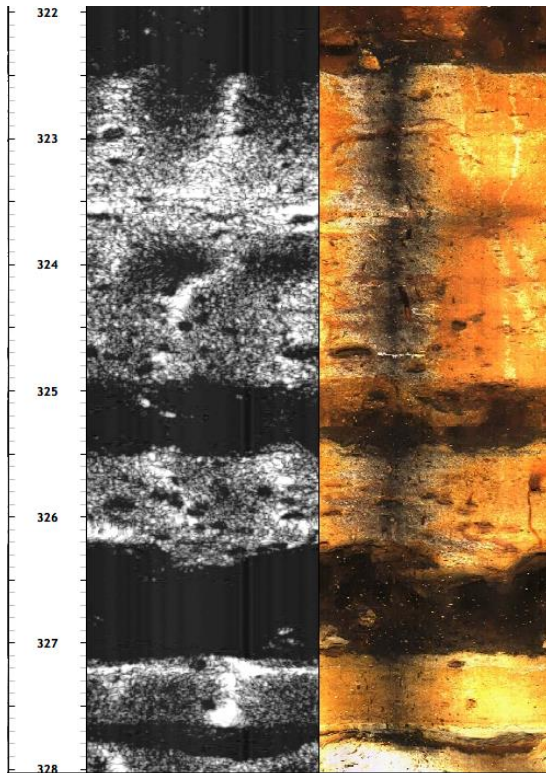
Study Results



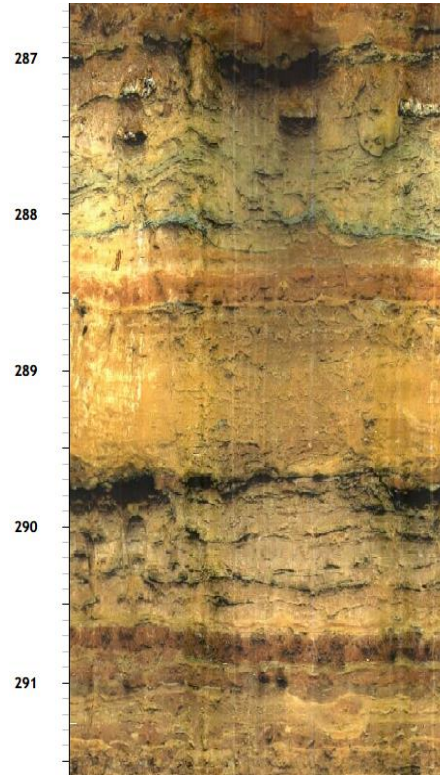


Geophysical - Televiewers

Geophysical televiewer logs across multiple wells – all within the Prairie du Chien.



ATV/ OTV image 04U871



OTV image NB-15



Hi-Res borehole video - NB-3

Vertical scale shown in feet below top of well casing

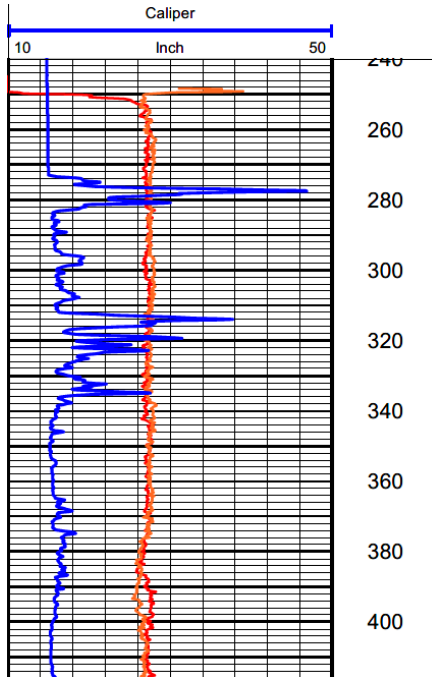




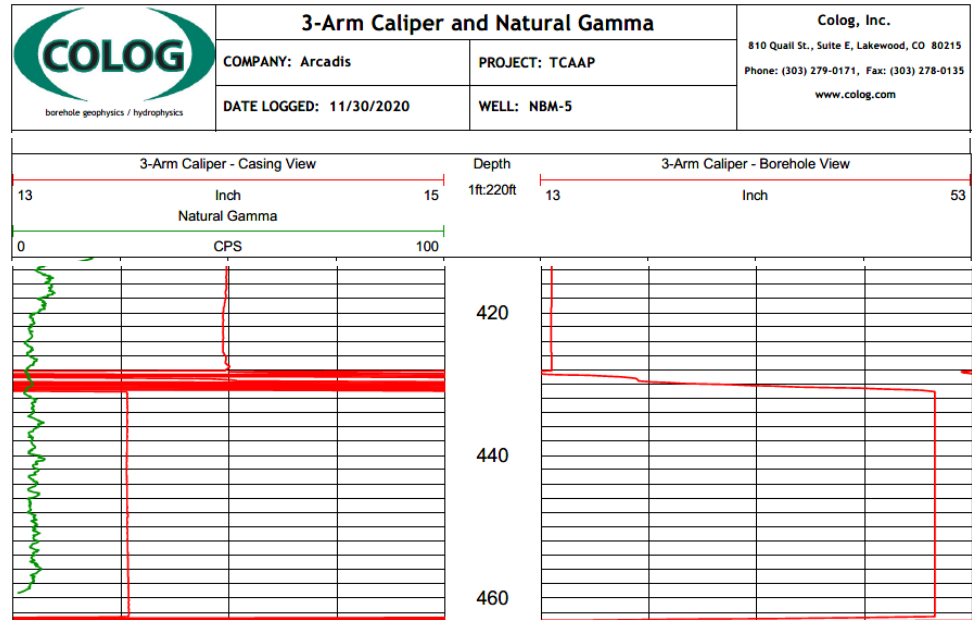
Geophysical - Caliper

Caliper logs show borehole diameter and are used to identify fractures and voids

NB # 03



NB # 05



Vertical scale shown in feet below top of well casing

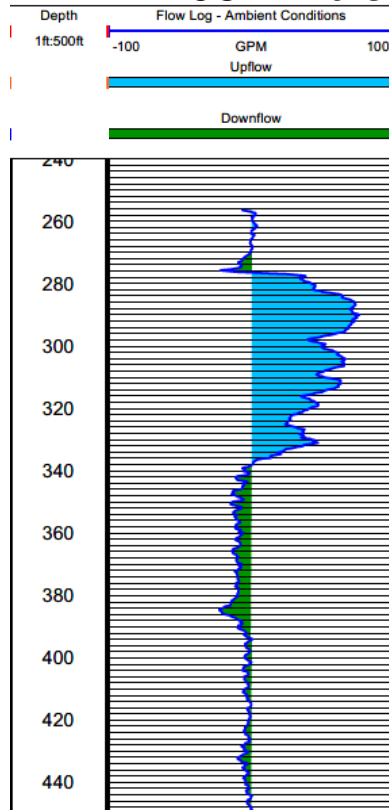




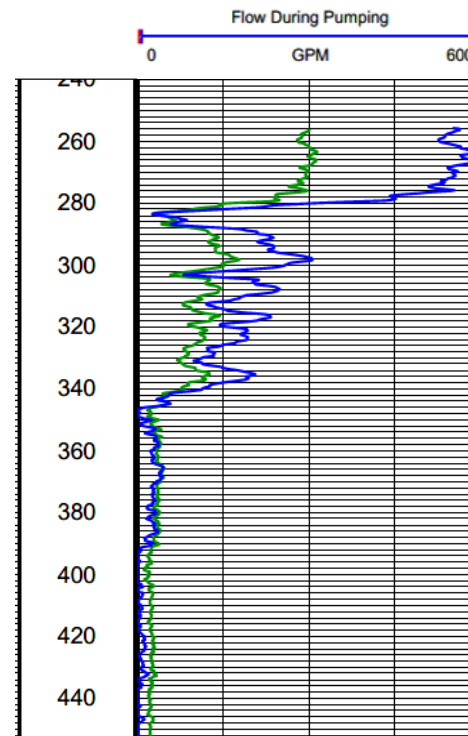
Geophysical – Flow Meter

Flow meter logging helps identify where groundwater is entering the wells

NB # 03 Ambient



NB # 03 Pumping

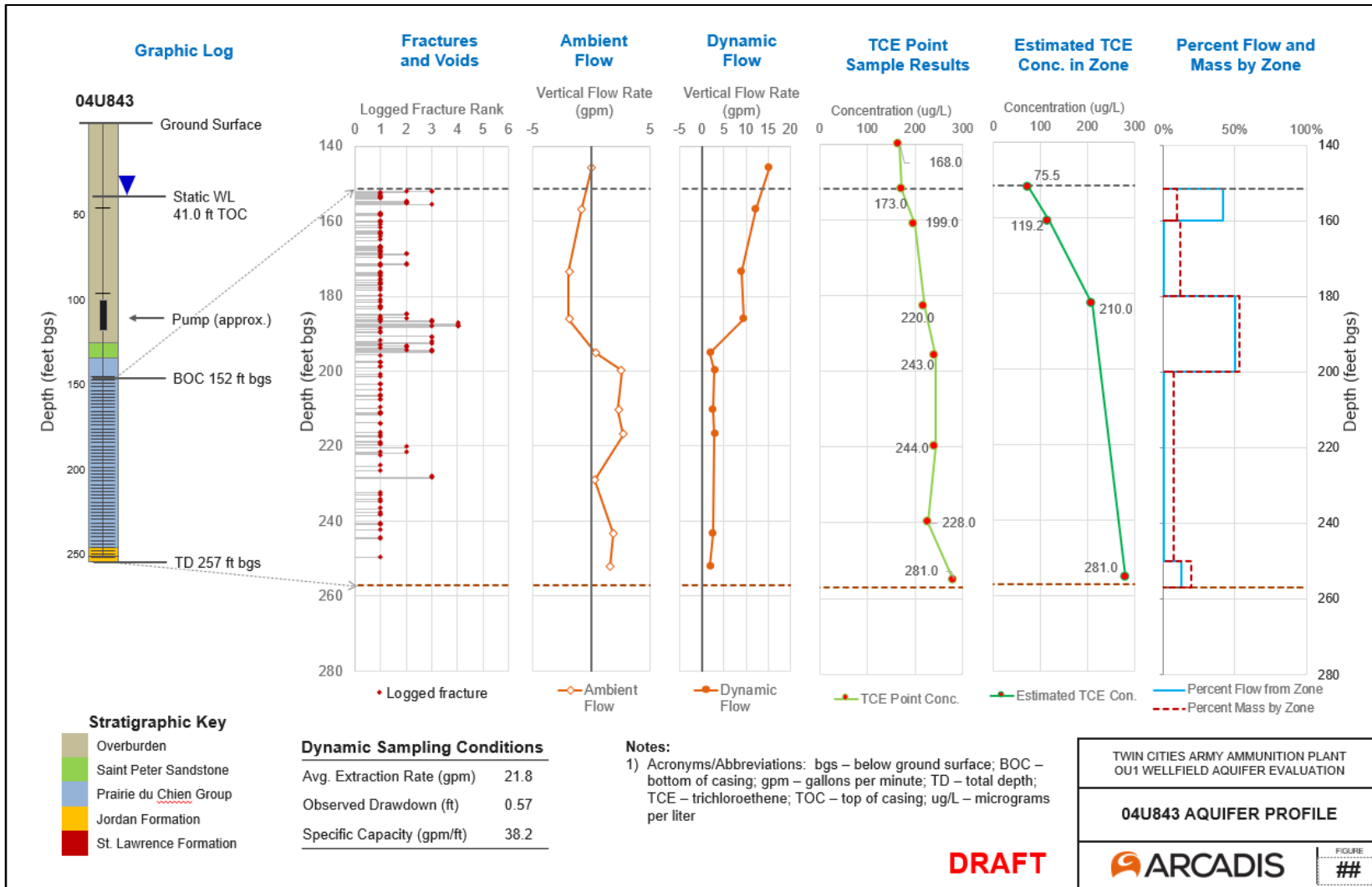


Vertical scale shown in feet below top of well casing





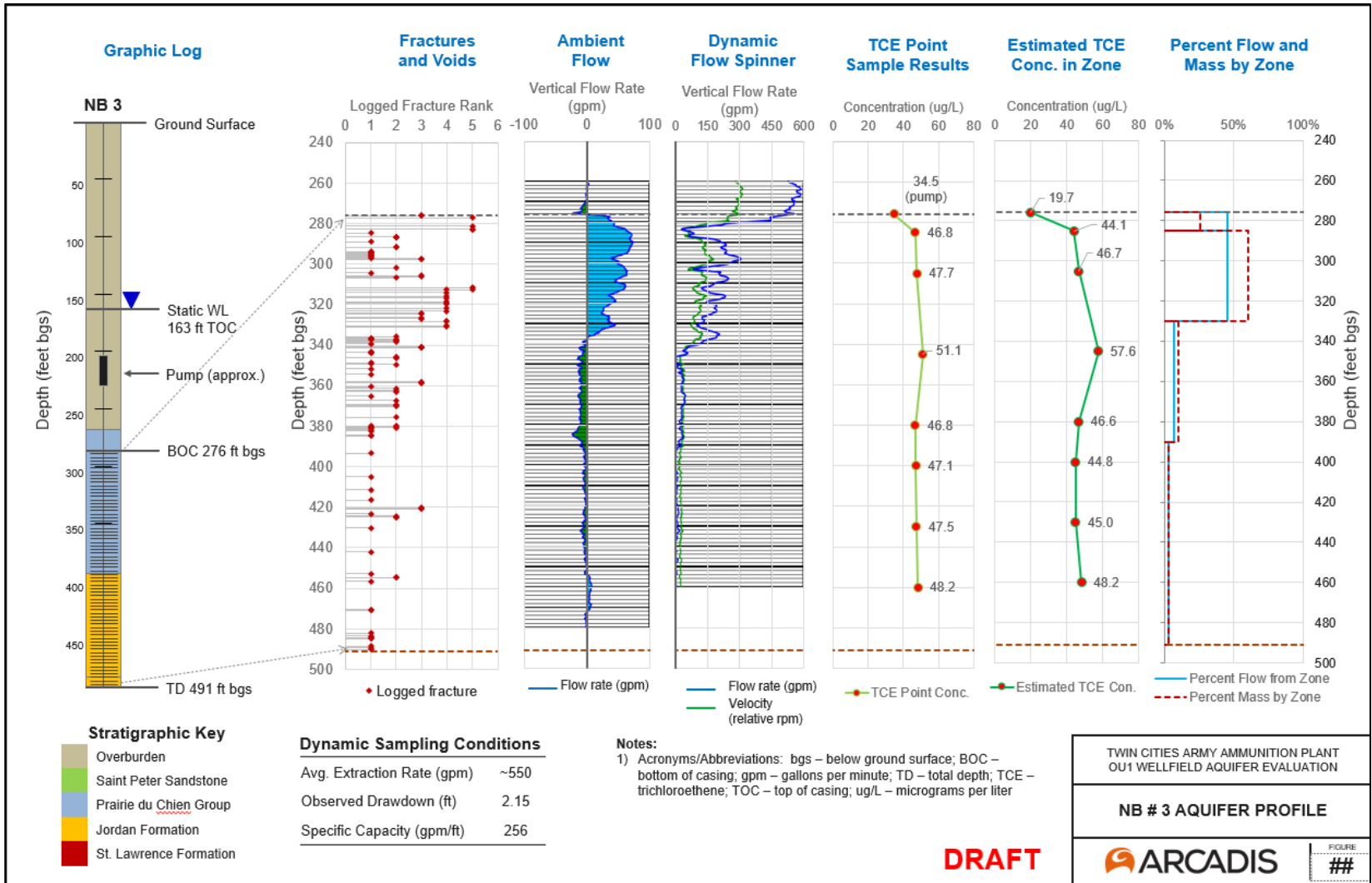
04U843 – Vertical Profiling Analysis



DRAFT



NBM-3 – Vertical Profiling Analysis



DRAFT



Conclusions and Next Steps

CONCLUSIONS

- Greatest mass recovery potential closer to TCAAP – however, likely impractical for integration with wellfield
- Concentration profiles in New Brighton wellfield generally uniform across Prairie du Chien and Jordan aquifers
- Highest transmissivity and mass recovery potential in cavernous zones in Upper Prairie du Chien

NEXT STEPS

- Prepare Field Summary Report
- Prepare Addendum to the OU1 Work Plan with pilot borehole location(s)
- Complete drilling of pilot boring(s) and complete geophysics May 2021
- Review new well siting/design options with New Brighton





Update on Source Groundwater Recovery System (SGRS)

**New Extraction Wells
90% Design Basis**





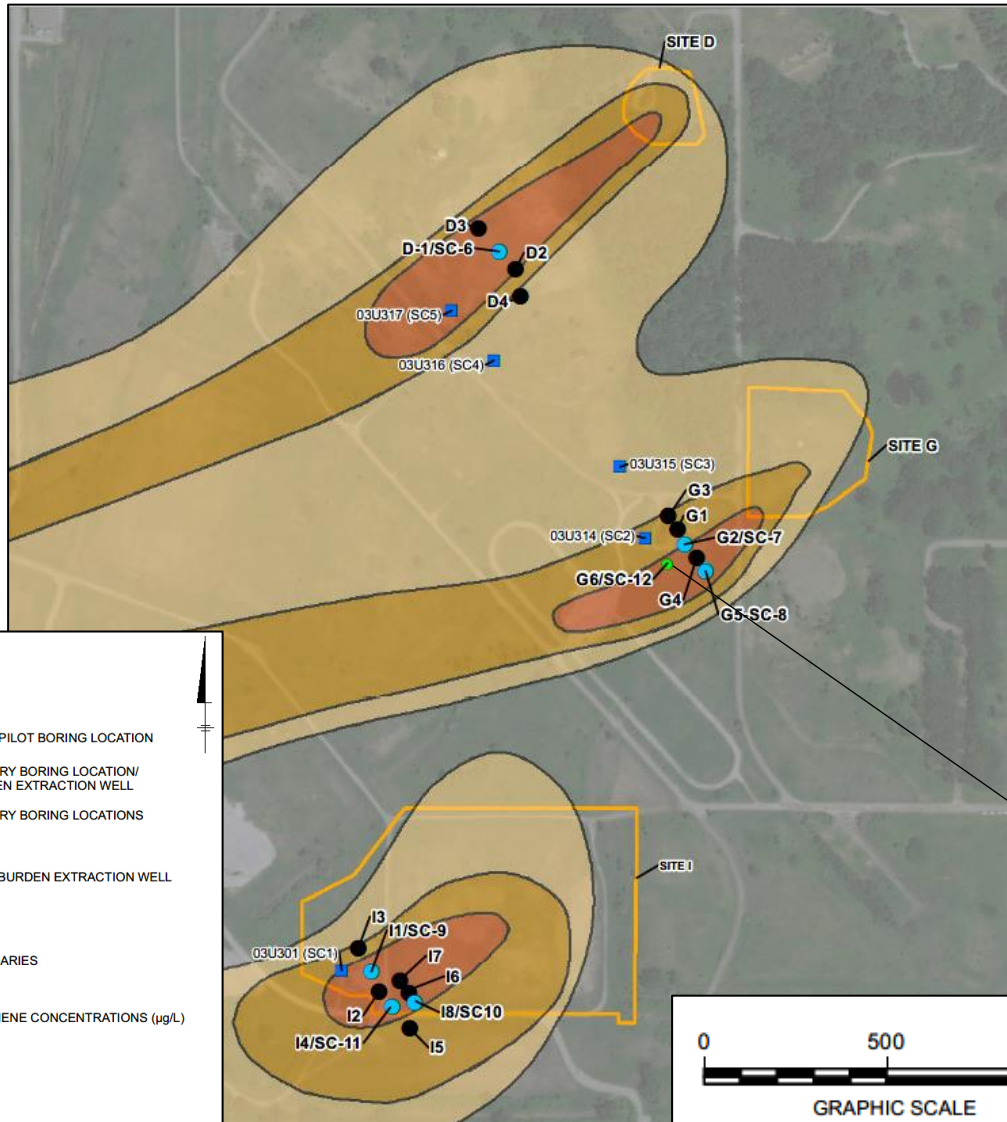
Timeline for the Source Groundwater Recovery System (SGRS)

September 2020	• 30% Design Completion
December 2020	• 60% Design Completion
March, May 2021	• 90%, 100% Design Completion
April – June 2021	• Procurement – Request For Proposal and Bid Evaluation and Selection
May – Winter 2021	• SGRS Construction – Earthwork and Piping, Wellhead Buildings, SGRS Equipment and Building Installation
TBD	• SGRS Start-up and O&M





Source Investigation Locations



Sonic drill rig set up at G-6

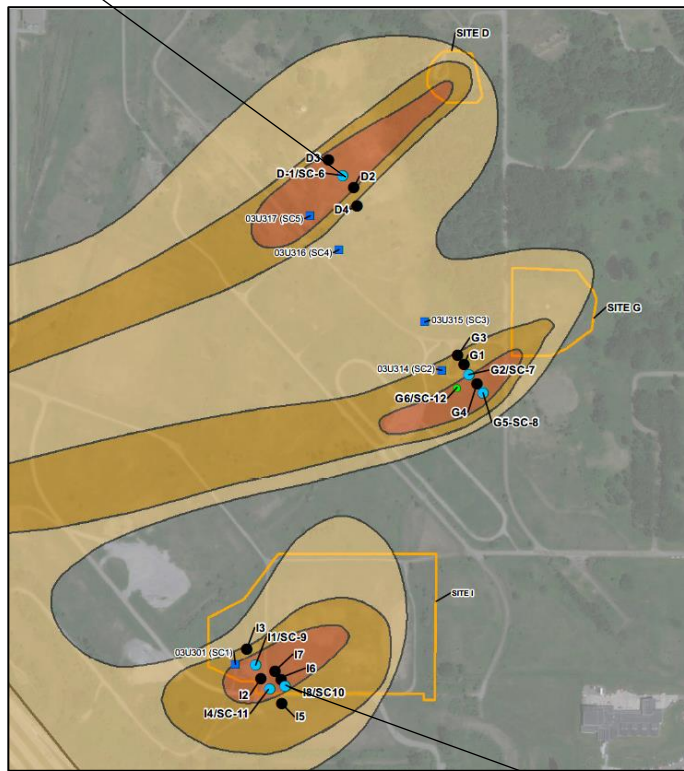




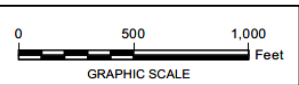
Well Installation



Mud Rotary Rig Installing SC-6



- LEGEND:
- PROPOSED PILOT BORING LOCATION
 - EXPLORATORY BORING LOCATION/ OVERBURDEN EXTRACTION WELL
 - EXPLORATORY BORING LOCATIONS
 - TGRS BEDROCK EXTRACTION WELL
 - TGRS OVERBURDEN EXTRACTION WELL
 - ◆ UPPER UNIT 4 WELL
 - ◆ MONITORING WELL
 - SITE BOUNDARIES
 - OPERABLE UNIT 2
- 2020 TRICHLOROETHENE CONCENTRATIONS (µg/L)
- 5-100
 - 100-1,000
 - 1,000+

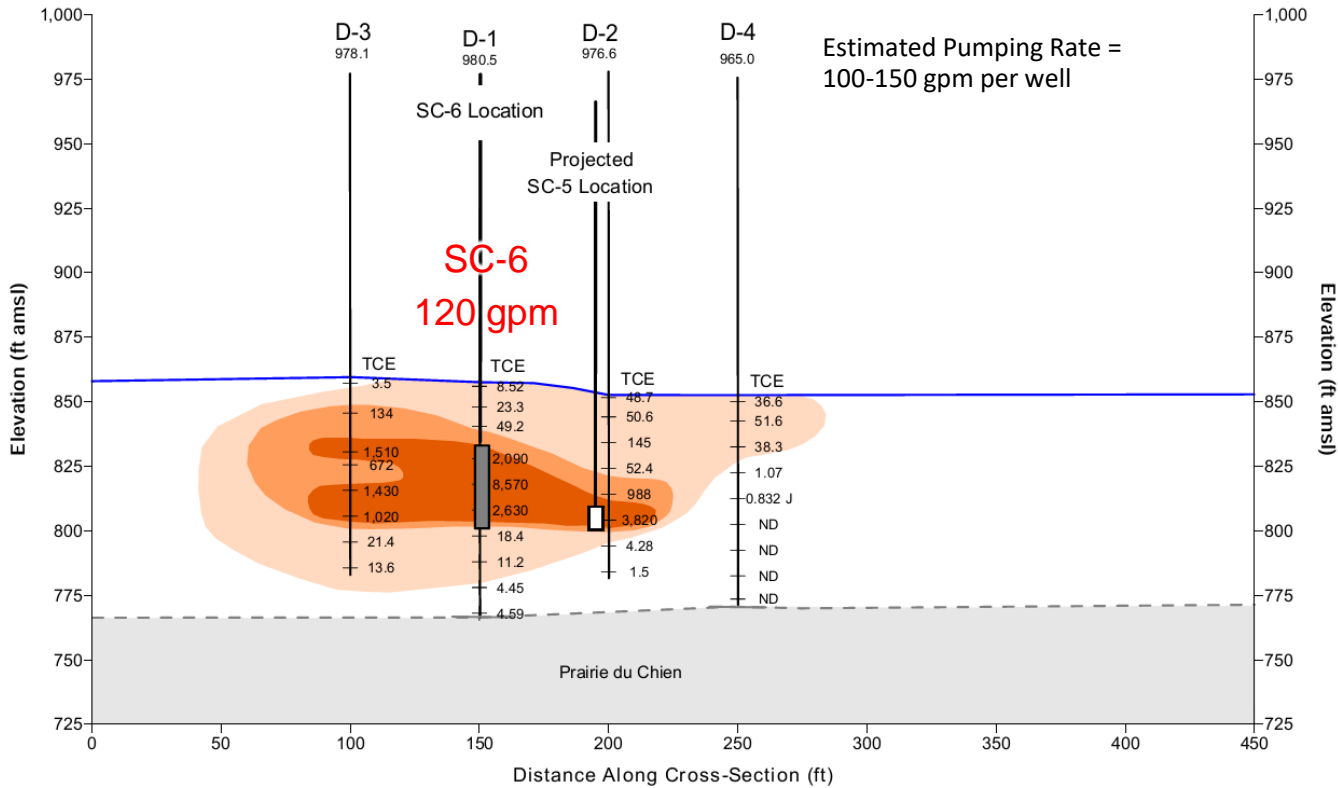


Newly Constructed SC-10



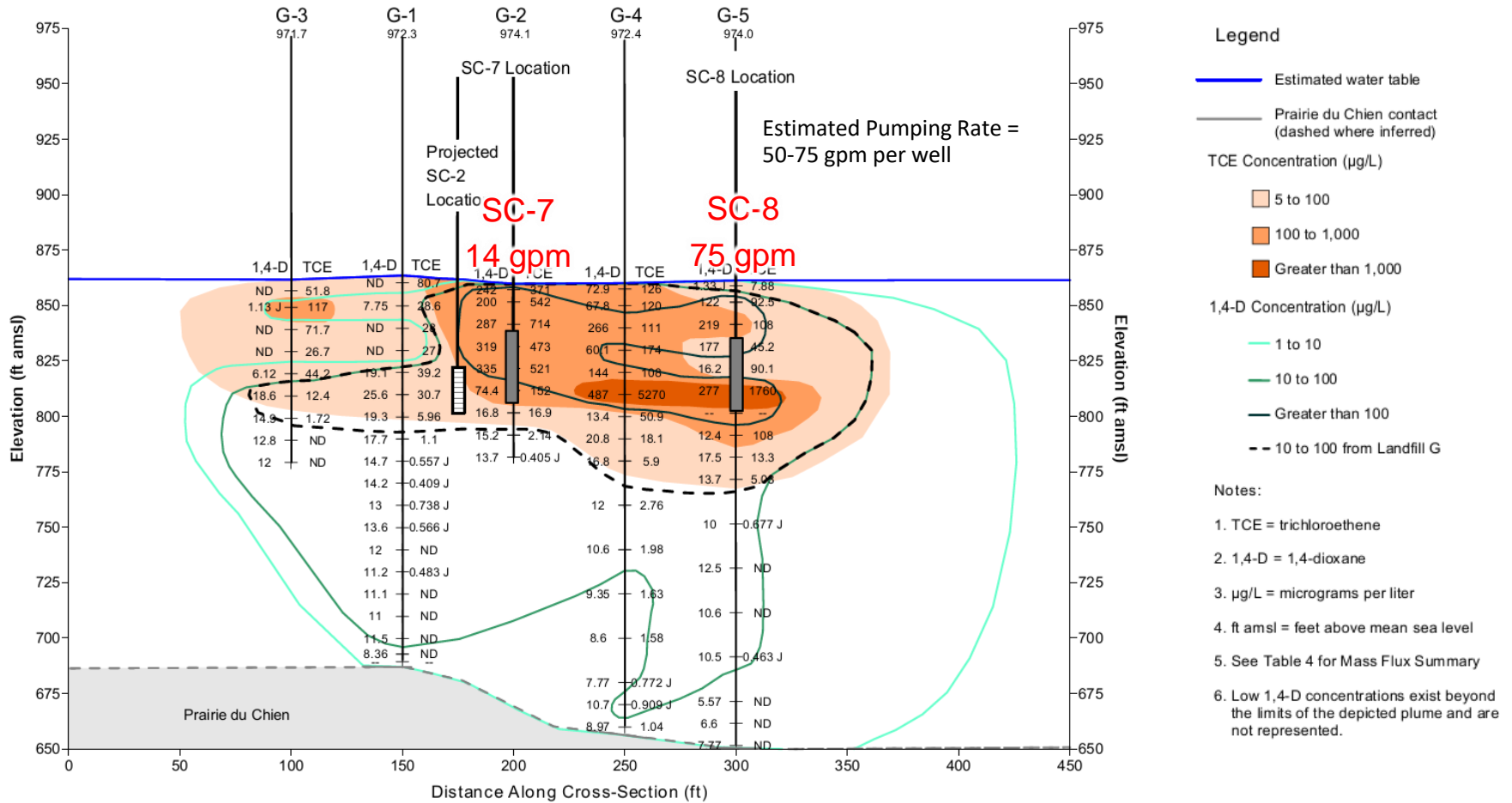


Site D - Completed Extraction Well



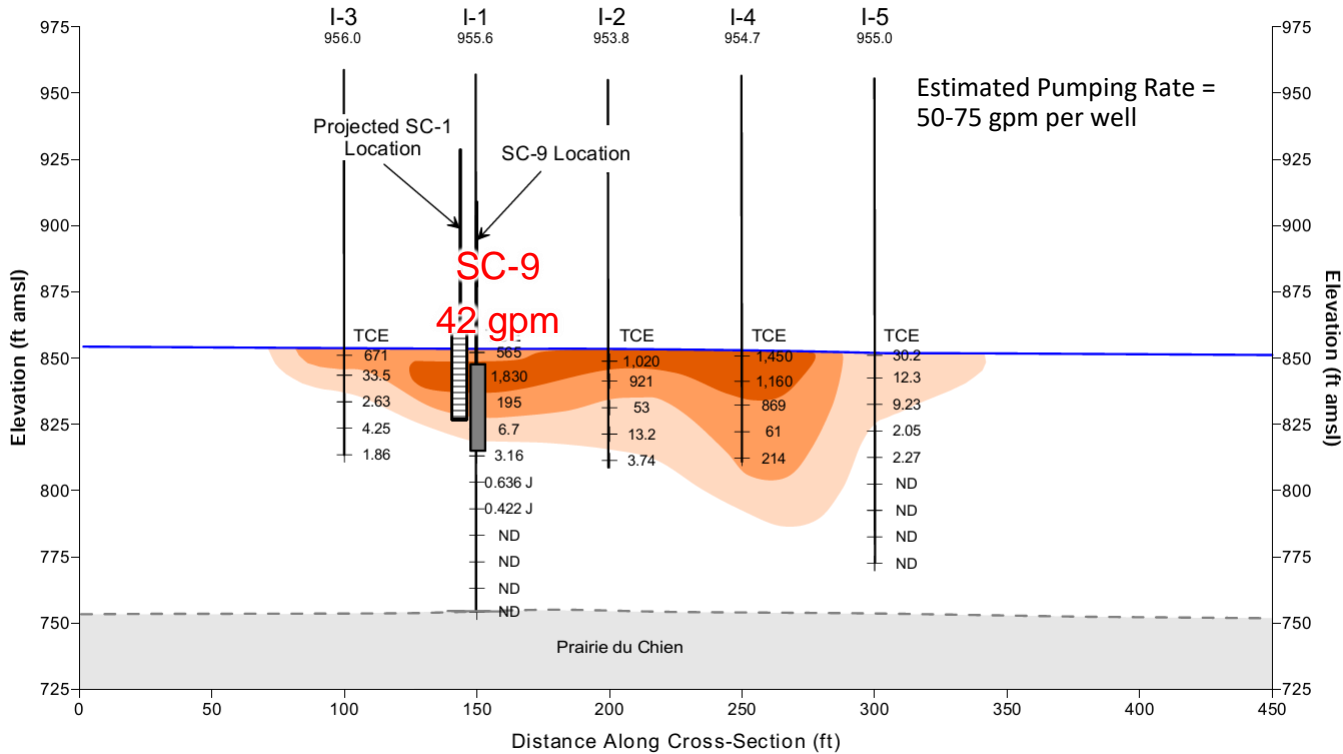


Site G – Completed Extraction Wells





Site I – Completed Extraction Well



Legend

- Estimated water table
- Prairie du Chien contact (dashed where inferred)
- TCE Concentration (µg/L)**
 - 5 to 100
 - 100 to 1,000
 - Greater than 1,000

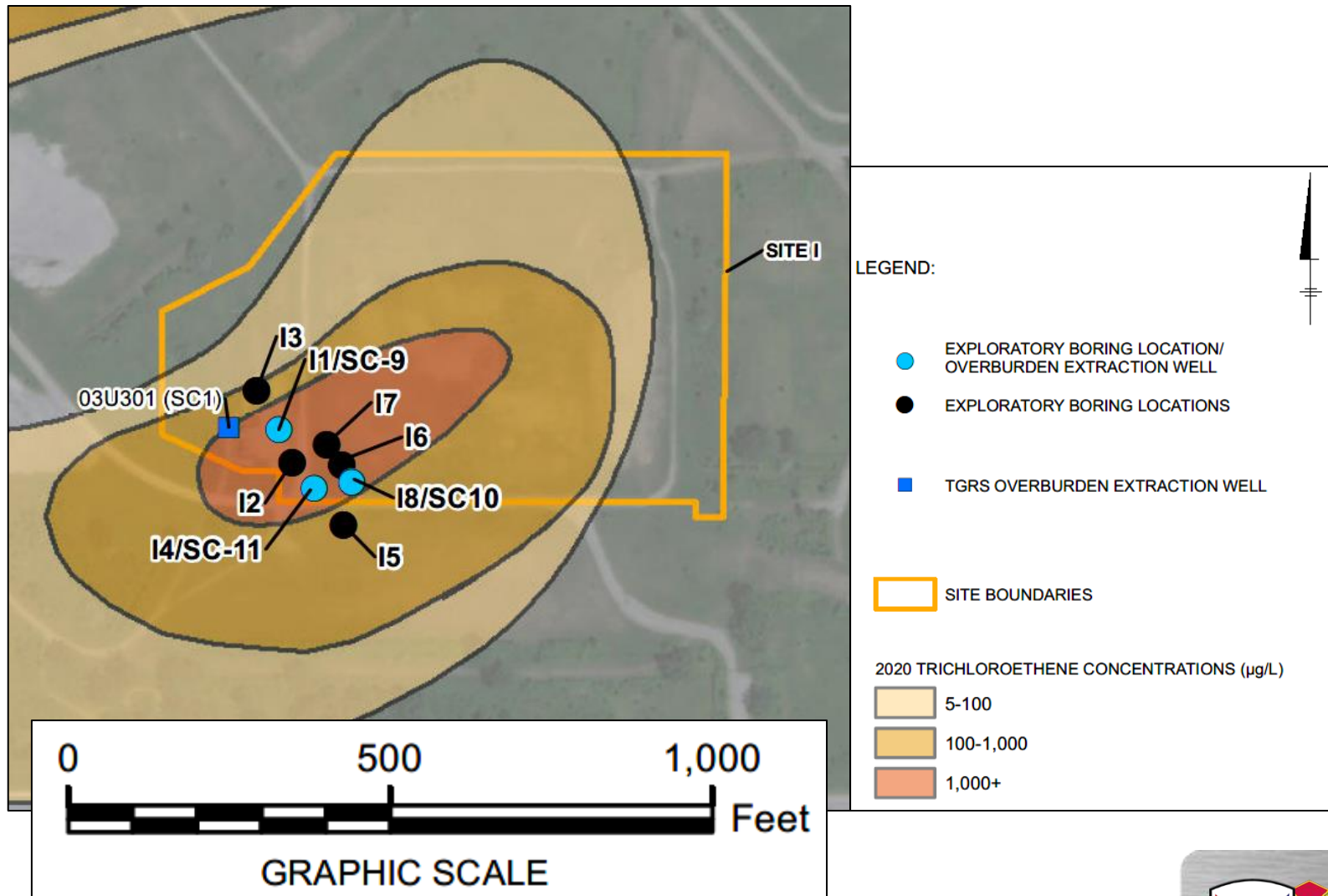
Notes:

1. TCE = trichloroethene
2. µg/L = micrograms per liter
3. ft amsl = feet above mean sea level



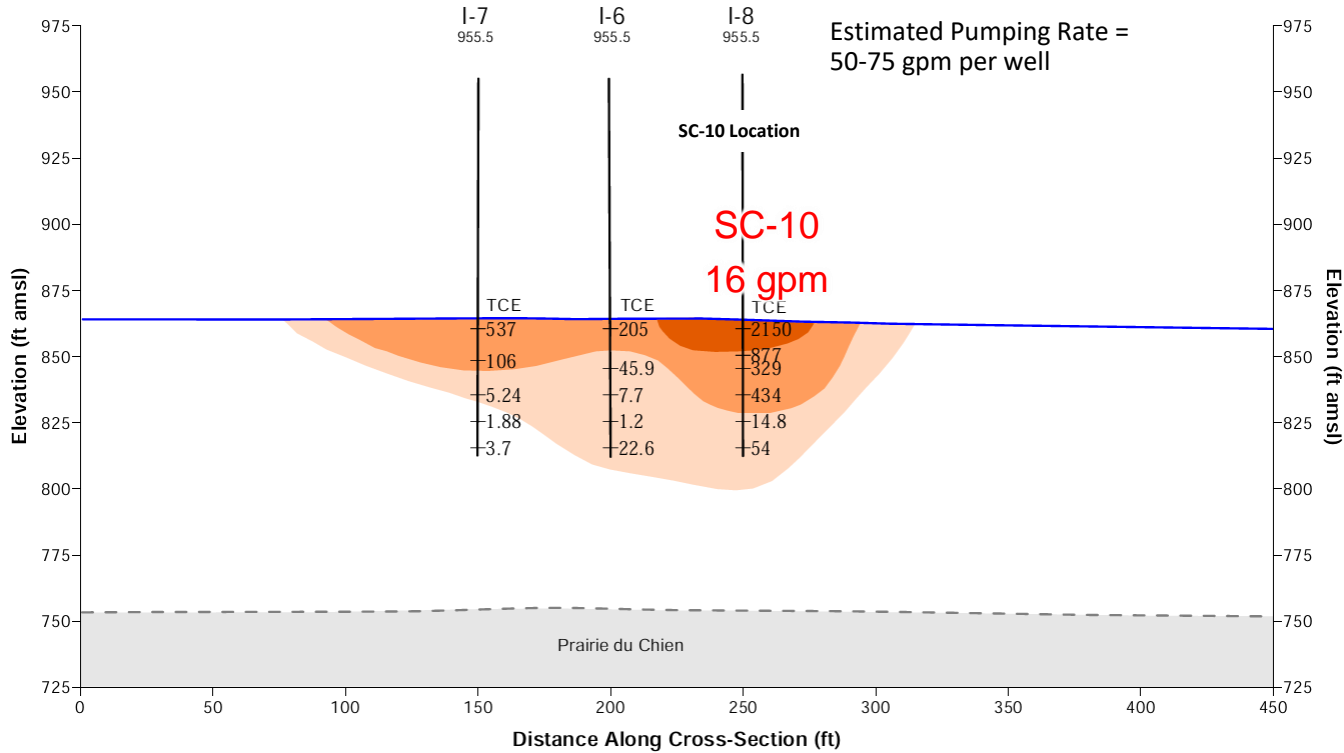


Additional Site I Investigation Borings





Site I – Completed Extraction Well



Legend

- Estimated water table
- Prairie du Chien contact (dashed where inferred)
- TCE Concentration (µg/L)
 - 5 to 10
 - 100 to 1,000
 - Greater than 1,000

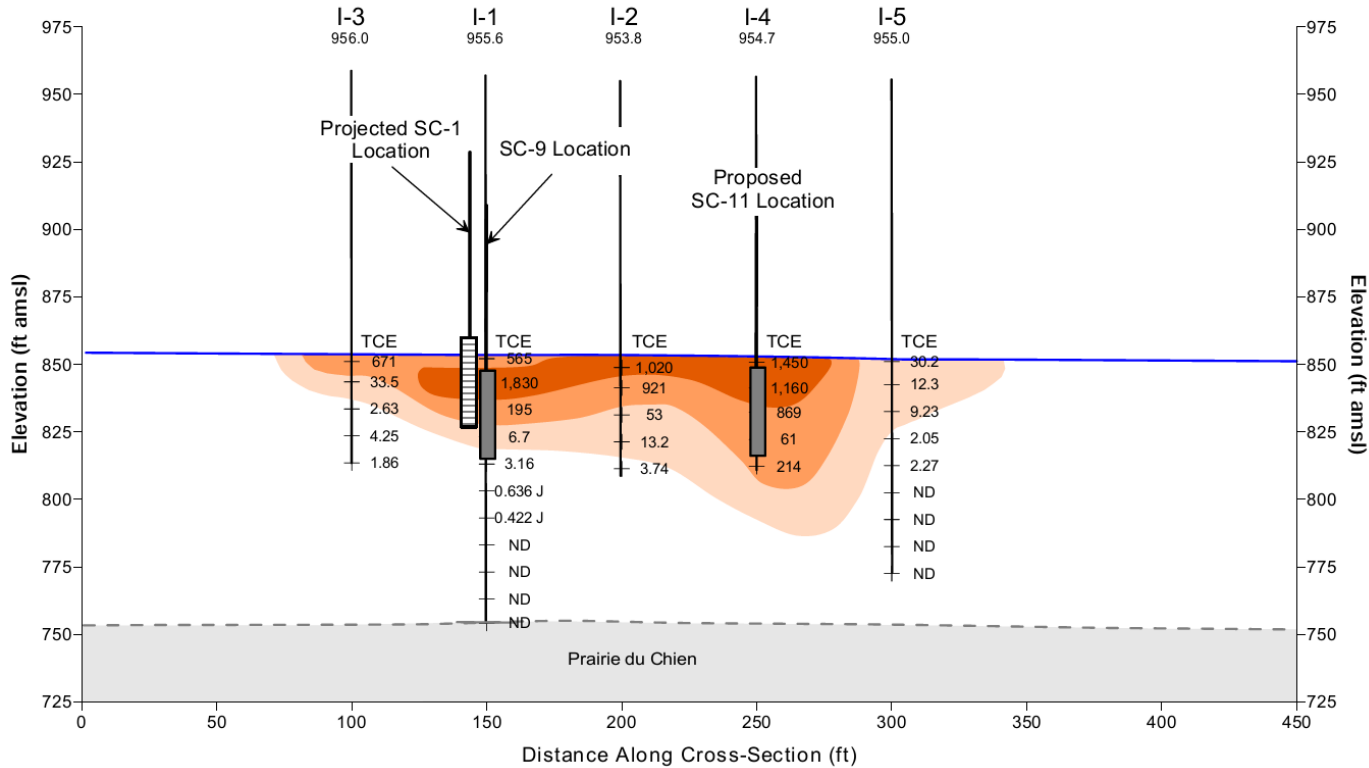
Notes:

1. TCE = trichloroethene
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Site I – Additional Extraction Well



Legend

- Estimated water table
- Prairie du Chien contact (dashed where inferred)
- TCE Concentration (µg/L)**
 - 5 to 100
 - 100 to 1,000
 - Greater than 1,000

Notes:

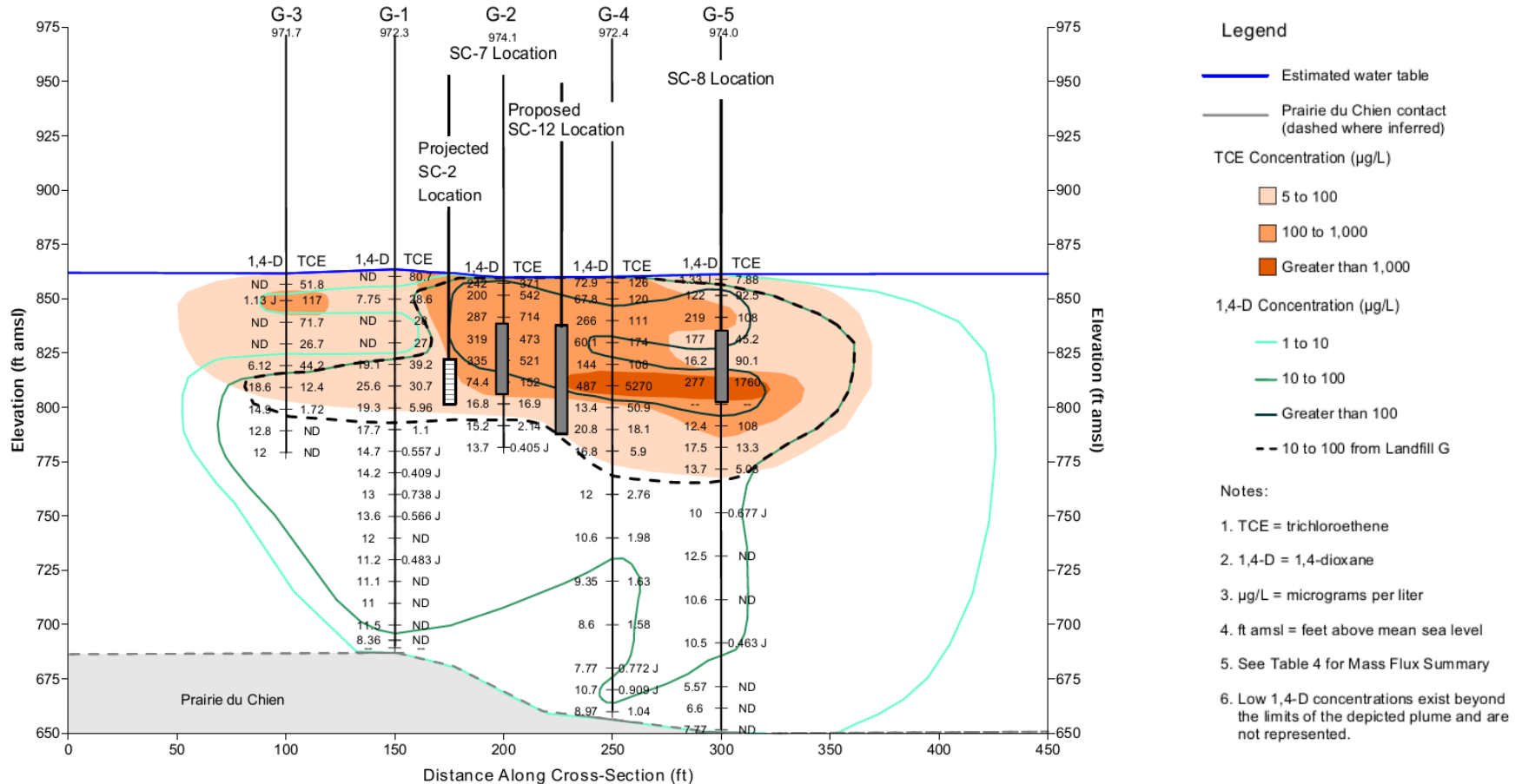
1. TCE = trichloroethene
2. µg/L = micrograms per liter
3. ft amsl = feet above mean sea level

SC-11 to be installed May 2021





Site G – Additional Extraction Well

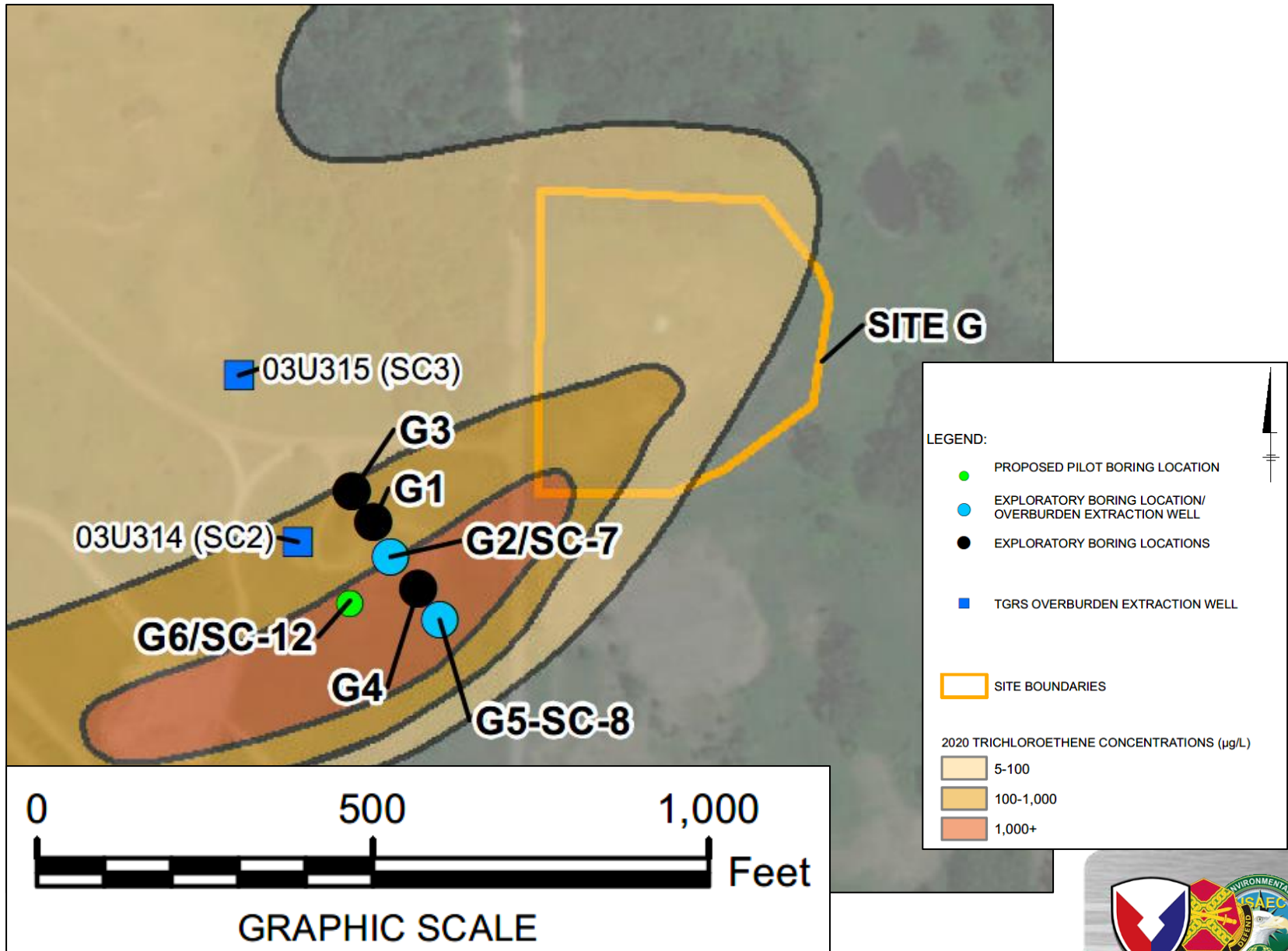


SC-12 to be installed May 2021





Site G – Additional Extraction Well





SGRS – 90% Design Basis

Design Flow Rate = 400 to 600 gpm

- Modeling estimated 500 gpm from source wells
- Additional capacity testing at SC-11 and SC-12 to be performed to verify flow rates

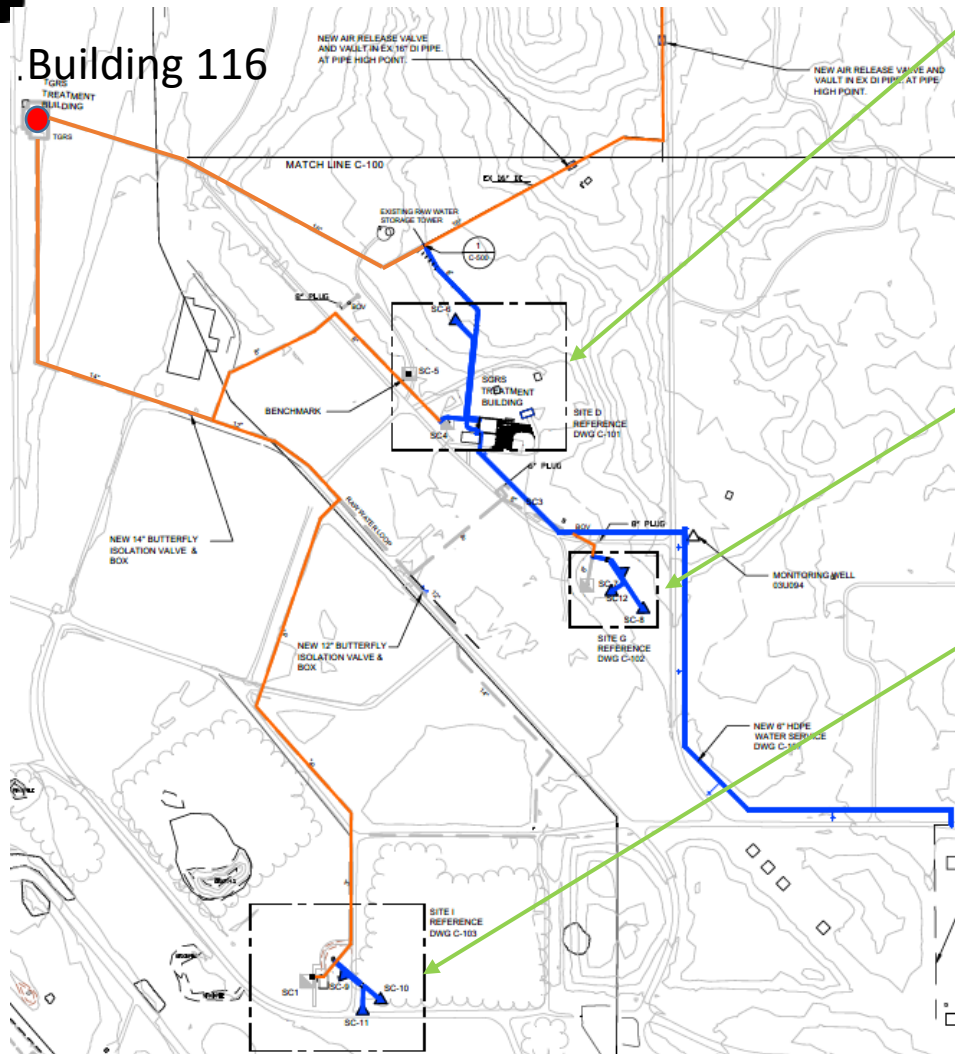
Design Concentration Loading

- Concentrations based on site monitoring wells
- Design concentrations higher than mass flux-derived concentrations estimates for TCE and 1,4-dioxane
- Confirmation samples to be collected at SC-11 and SC-12 during capacity testing
- Second bench test demonstrated bromate control





SGRS – Pumping Plan



Site D

- Location of SGRS Building for road and electrical access
- SC-5 uses existing wellhouse; SC-6 manifold inside SGRS building
- Discharge to Sand and Gravel Pit

Site G

- One wellhouse serving three extraction wells (SC-7, SC-8, and SC-12)

Site I

- One wellhouse serving four extraction wells (SC-1, SC-9 through SC-11)

Pipe Routing

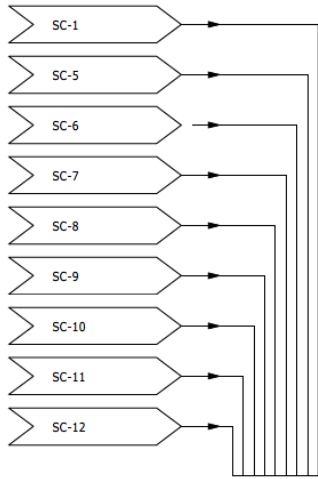
- New piping in **blue**
- Existing piping in **orange**



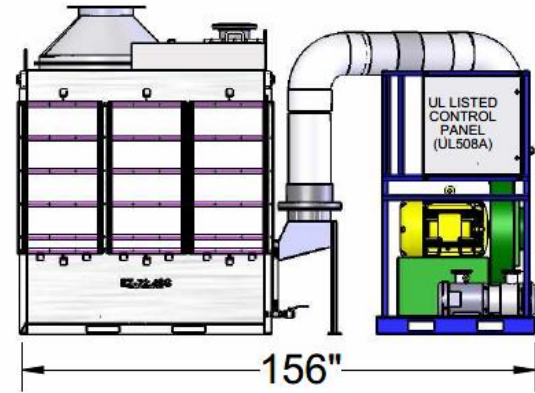
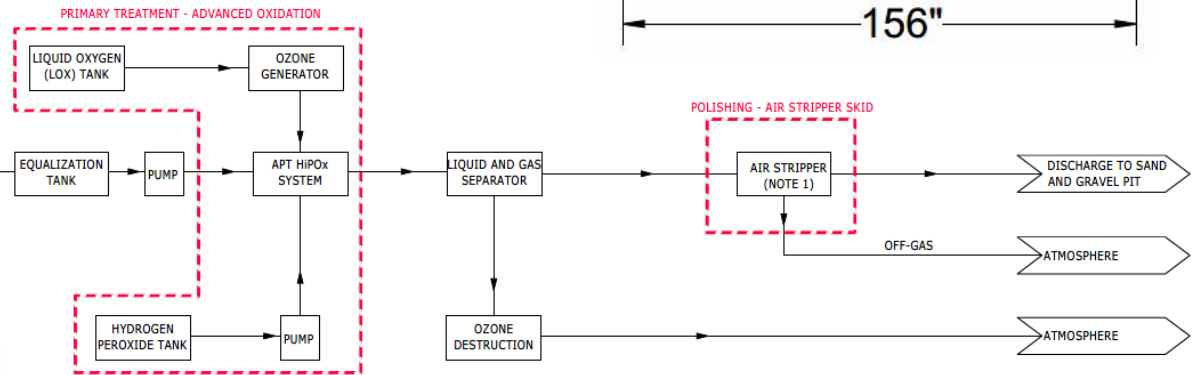


SGRS – Process Flow

SGRS will treat for both
1,4-Dioxane and TCE



New source control wells: 2021



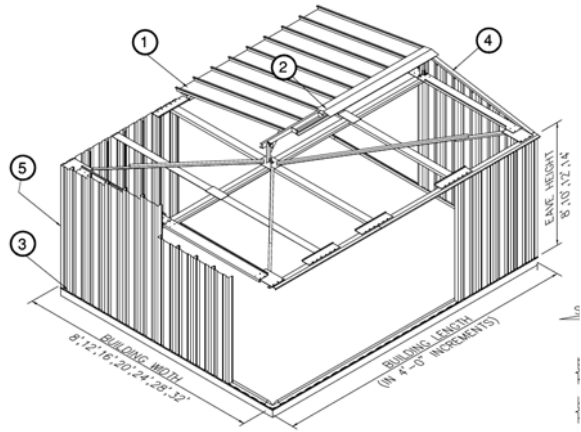
NOTE 1

Transfer pumps on Air Stripper Skid sized to discharge to Sand and Gravel Pit

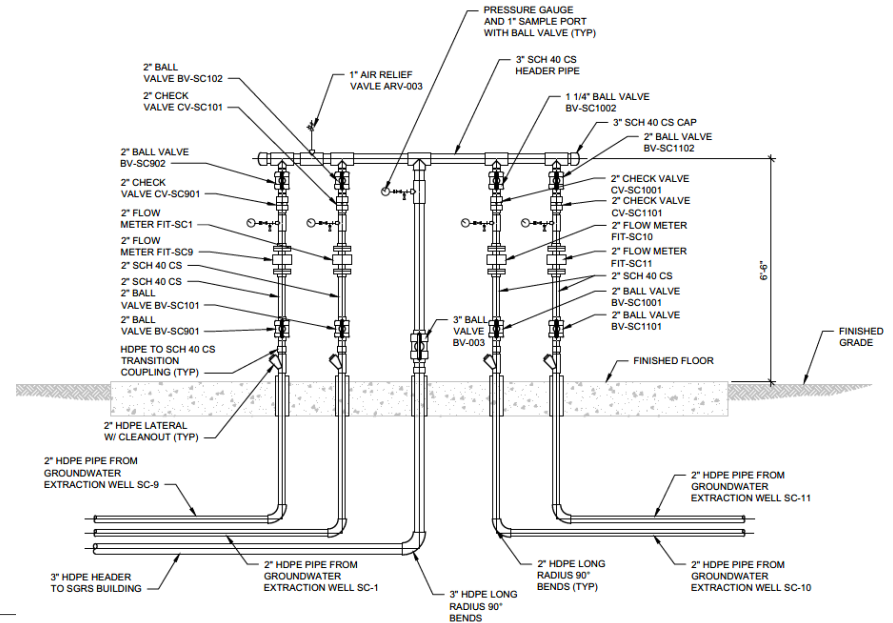
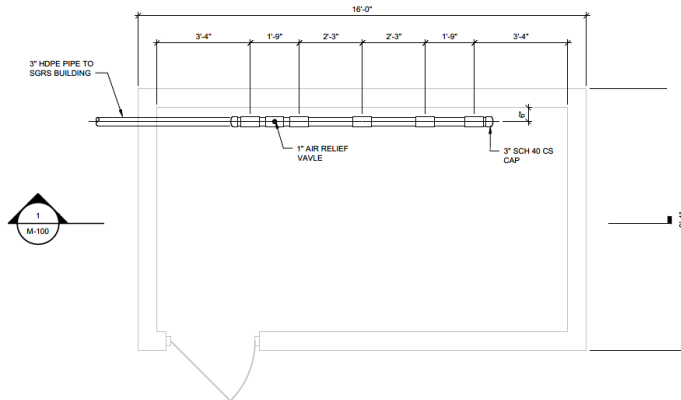




SGRS – 90% Design Wellhead Building



Pre-Engineered Metal Building (Typ.)



Site I Wellhead Building – Manifold Layout





Update on Restoration Advisory Board





RAB Update

- In October we released the revised website
- That website reached members of the community who contacted USAEC to ask how to get involved
- Though Army solicitation for interest didn't receive sufficient interest; the website and community members generated enough interest
- Army contacted local communities to provide opportunity to appoint RAB members
- New members were added in January; new RAB co-chairs were selected (community and Army)
- February administrative meeting updated Operating Procedures and Mission Statement
- April meeting included update on cleanup and voting on changes from February meeting





Actions and Schedule Next Meeting





Questions/Discussion

