Draft Notes

Restoration Advisory Board (RAB) Meeting

September 18, 2008

Attendees **Organization**

See Attachment 1 – Attendance Sheet

Introductory Remarks, Jim McKenna, Radford AAP

The RAB Meeting began at 7:00 pm with Jim McKenna introducing Lieutenant Colonel Jon Drushal, Commander Radford Army Ammunition Plant (RFAAP) and the purpose of the RAB. LTC Drushal then made a brief statement about how the Army and the RAB always encourages open communication and strives to keep as much information about RFAAP as possible available online for everyone to view at any time. He went on to say that RFAAP is always open to new ideas from the public. For instance, RFAAP recently incorporated a suggestion from Ms. Devawn Oberlender to ask the Town of Blacksburg to put the RAB meeting notice on their public access television station (WTOB) and have asked that this notice be added on cable Channels 10 and 11 (City of Radford and Pulaski County public access channels). Jim McKenna then went over the agenda and all meeting attendees introduced themselves. Mr. McKenna provided examples of items that can be found on the Radford AAP IRP website at www.radfordaapirp.org

HWMU 5/RFAAP047 TCE Plume Project Status, Tim Llewellyn, ARCADIS

Tim Llewellyn presented his main discussion about Trichloroethene (TCE) in groundwater at Hazardous Waste Management Unit (HWMU) 5 (the former waste impoundment site). TCE was found underneath a treatment lagoon onsite. The purpose of the work was to determine the source of the TCE and to answer if it was either from HWMU 5 or from solvent usage at the nearby buildings. Results from the work indicated that TCE was not found above screening limits in soil or drinking water nor were the buildings a source. TCE was assessed in the groundwater in a defined plume beneath HWMU 5 and about 200 feet in length and well within the plant boundary. The overall path forward is to submit a Corrective Action Plan to the Virginia Department of Environmental Quality (VDEQ) under the HWMU 5 post closure care permit to address TCE. This will involve a public comment review period. (**See the Attached HWMU 5 Presentation**).

Comment Period regarding the HWMU 5/RFAAP047 Project

- Community Member (Devawn Oberlender) asked if they Army has purchase records of the amount of TCE purchased since RFAAP was built.
    - Army representatives responded by saying it is doubtful those records exist.
    - ATK and Army representatives added that TCE hasn't been used in a long time so any record would be old. TCE itself was not used in the products. It may have been used as a degreaser in a maintenance type activity.
    - This discussion concluded with Ms. Oberlender indicating that she would like to see any TCE purchase records the Army has, but thay they can speak about this at another time.
- Community Member (David Allbee) asked if Arcadis took soil samples at various locations under the liner or a just a few places.
    - Tim Llewellyn, Arcadis, responded by saying that approximately 11 samples were collected from beneath the liner as shown on slide 20.
- Director of Center for Public Environmental Oversight (Lenny Siegel) asked about the soil gas isolated elevated hit. He thought it was odd. He also asked if Arcadis looked for underground utilities at the site.
    - Tim Llewellyn with Arcadis responded by saying that the purpose of the Ground Penetrating Radar (GPR) work was to try to locate utilities in the area which were not found. During the course of the work utilities were looked at and mapped. He also noted as an aside that ARCADIS accidentally hit one utility line during the work. He added that the isolated soil gas hit was odd, but that sampling was conducted to try to confirm the detection and find a source but none was found.
- Devawn Oberlender wondered if she was correct in remembering that the National Academy of Science (NAS) and/or Environmental Protection Agency (EPA) recommended that the Safe Drinking Water Standard Maximum Contaminant Level (MCL) for TCE be decreased from 5 to 0 ppb.
    - Will Geiger, EPA, responded that the MCL is 5 ppb, and the EPA has a goal of 0, but would not recommend that the MCL be changed to 0, since zero cannot be measured in an analytical sample.
    - Lenny Siegel added that the NAS had recently put out a statement saying that the link between TCE and cancer was larger than they had previously thought. However, he never saw them make a statement about changing the MCL.
- Devawn asked about the spikes of TCE at the site and if the TCE extends beyond the limits of RFAAP.

- After a brief discussion the consensus was that the TCE found at HWMU 5 was not leaving the facility. Jim Cutler (VDEQ) explained that the groundwater at the site flows toward New River and away from private residences outside the installation.

- An unidentified community member wondered where the floor drains in Building 1549 go that Tim Llewellyn referenced in his presentation.
  - Tim Llewellyn responded by saying that no TCE was found there and they are unsure where the drains go. He added that there is ongoing testing of the drinking water that comes from the arsenal to the local residents.
- There was a brief discussion of the quantity of TCE that would be required to create the levels and extent of TCE seen at this site. Although no one knew for certain, the consensus was that a gallon or less of TCE could have caused the detections at the site.
- Devawn Oberlender asked the Army if they have ever tested the taps of the local residents using well water.
  - Jim Cutler, VDEQ responded by saying that they don't see a need to test their taps. The extent of TCE has been delineated down to nondetect onsite and has not migrated beyond the installation, so there doesn't seem to be a reason to test the taps. The New River water (the source of the drinking water) is being tested now for TCE and has not been detected. The VDEQ and others look for potential sources with a reasonable pathway to the community. If no such pathway is found, than there is no need for additional testing.
  - Jim McKenna, RFAAP added that the plant is concerned about drinking water and added from the presentation during the September 2006 RAB meeting we indicated qualitatively that the New River is the regional groundwater recharge and the RFAAP groundwater would flow to the New River. Therefore the local residents' wells would be up-gradient from the TCE found at HWMU 5 and they would not be affected by it. This presentation is on the website.

SWMU 51 RFI/CMS and IMWP Project Status – Shaw Environmental, Tim Leahy

Tim Leahy presented information about Solid Waste Management Unit (SWMU) 51, The TNT Waste Acid Neutralization Pit, and its Interim Action Work Plan (IMWP). There were elevated levels of metals, dioxins, trinitrotoluene (TNT), dinitrotoluene (DNT), and related compounds found in the sludge and soil immediately below the sludge. Groundwater has not been affected. The selected remedial alternative is to excavate the sludge and grossly contaminated soil with off-site disposal. Excavation is anticipated to start in October and may take 2 months or more to complete (**See the Attached SWMU 51/39 Presentation**).

Comment Period regarding the SWMU 51 Project

- Devawn Oberlender asked a general question as to how this site was originally ranked with the Class 1A rating.
    - Lenny Siegel responded by saying that the Army did not assign priority ratings until the mid/late 90's.
    - Jim McKenna added that from the discussion this appeared to be relative risk scores and they were assigned by the Army primarily for internal prioritization to allocate funds to each site.

SWMU 39 Interim Action Work Plan – Shaw Environmental, Tim Leahy

Tim Leahy presented information about SWMU 39, the Wastewater Ponds from the Propellant Incinerators, and its Interim Action Work Plan. There were elevated levels of metals (lead, arsenic, and vanadium) and dioxins/furans found in the pond sediment. Groundwater has not been affected by this site. The selected remedial alternative is excavation of the site to residential clean-up levels and off-site disposal. Remediation field work is to follow after the effort for SWMU 51 is complete (**See the Attached SWMU 51/39 Presentation**)

Comment Period regarding the SWMU 39 Project

- The Sierra Club representative asked to which landfills Shaw was planning on sending the contaminated soils.
    - Tim Leahy responded by explaining that the waste characterization samples will have to be analyzed first in order to determine how contaminated the soil is. Then, once the contamination level is determined, Shaw will determine which type of landfill the soil needs to be sent to. If there are highly contaminated soils, they will be sent to a more secure landfill. If it ends up being Class 2 Hazardous Waste, then the typical locations of landfills used are Alabama or Michigan. Shaw has to coordinate with ATK to see which landfills they approve for use.
- Devawn Oberlender asked what the Health Based Number (HBN) exceedance was and why it has taken so long to start work on this site.
    - Tim Leahy explained that the Health-Based Number was referenced from the 1989 RCRA corrective action permit. They were Radford-specific numbers that were used many years ago in conjunction with the 1989 permit. The HBN have been over come by the 2000 RCRA corrective action permit which utilizes EPA screening numbers.
    - RFAAP added that the IRP began the remediation process before the first RCRA permit was obtained. Since the RCRA permits were

issued, RFAAP has had to follow the RCRA process which can be a lengthy one.

  - Lenny Siegel added that he believes that the RFAAP clean-up program is a well-regulated, professional program that methodically identifies and addresses risks posed by these types of sites. He has seen Army programs in the past that were not well run; however this is not one of them. He does think that the regulatory screening limits for perchlorate and TCE may be too high, but that isn't really relevant to this meeting. He does think the clean up process takes too long.
  - Jim Cutler, VDEQ, added that since four years ago, when he began working on the Radford site projects, he has noticed that all stakeholders have picked up their pace. There have been more partnering meetings recently, which allow everyone to discuss issues face-to-face instead of taking forever to send comments back and forth over email. He believes this is helping to speed up the process greatly.

- Devawn Oberlender asked why there is no advertising budget for the RAB meetings.
  - RFAAP responded by saying this question was discussed during her site tour of the plant earlier on Sep 18. They would take it under consideration. After the meeting it appears this may be addressed within the scopes of work of the Installation Restoration Program (IRP) contractors. RFAAP will work with the Corps of Engineers, Baltimore District to confirm.
- Devawn Oberlender asked the Dept of Health representative if they would be willing to test residential wells around the Plant.
  - The Dept of Health representative responded by saying that they would look into it.

Closing Remarks

Jim McKenna began his closing remarks by saying that the next RAB meeting is planned for December 11, 2008 and will consider adding the URS ground water presentation from the September 2006 RAB meeting.

At approximately 9:00 pm, the meeting was adjourned. Attendees were invited to stay for an additional question/answer session on any additional topics, if so desired. This discussion was not part of the RAB meeting notes.

Radford Army Ammunition Plant

Restoration Advisory Board Meeting
Attendance Sheet

Thursday, September 18, 2008

Name (Please Print)	Organization	Contact info (email or tel. #)
Jim Mckenna	Radford AAP ACO	jim.mckenna@us.army.mil 540 731 5782
Jerry Redder	RadfordAAP-ATK	Jerome.Redder@ATK.com
Tim Llewellyn	ARCADIS	TIM.LLEWELLYN@ARCADIS.COM
Tim Leahy	Shaw	timothy.leahy@shawgrp.com
Robin Sims	Shaw Environmental	robin.sims@shawgrp.com
ROBERT OBERLENDER	public	robobe@verizon.net
Jeremy Flint	ATK	Jeremy.Flint@ATK.com
DAVID ALLEN		zzentuck@comcast.net
Maria Bowling		maria.bowling@gmail.com
Phillip Lockard	ATK	
Matt Habersack	ATK	Matthew.Habersack@ATK.com
RON COAKE	PULASKI CAUNTY	RCOAKE@PULASKICOUNTY.ORG
BOB FRONK	MONTGOMERY CO. PSA	fronkrc@montgomerycountyva.gov
Brad Jennings	REAAP ACO ENV	brad.jennings@us.army.mil

Radford Army Ammunition Plant

Restoration Advisory Board Meeting
Attendance Sheet

Thursday, September 18, 2008

Name (Please Print)	Organization	Contact info (email or tel. #)
STEVE COLE	RAB	SCOLE@MOOG.COM
Joe Parrish	RAB	parrish@and assoc.com
Jim Cutler	VDEQ	jlcutler@deq.virginia.gov
Matt Stepien	VDEQ	mmstepien@deq.virginia.gov
David Jenkins		djenkins-bburg@hotmail.com
Aziz Farhat	DEQ	
Luis Pizarro	EPA	pizarro.luis@epa.gov
Will Geiger	EPA	geiger.william@epa.gov
Robert Weld	DEQ	
BETH LOHMAN	DEQ	
Gary Coggins	NRHS (VDH)	Gary.Coggins@vdh.virginia.gov
Patty Holt	RFAAP	
Lenny Siegel	CPEO	LSIEGEL@CPEO.ORG
Joy Case	GCO Staff	joy.case@us.army.mil

Radford Army Ammunition Plant

Restoration Advisory Board Meeting
Attendance Sheet

Thursday, September 18, 2008

Name (Please Print)	Organization	Contact info (email or tel. #)
DRUSHAL, JON	RFAAP	731-5760
Devawn Oberlender		devawno@gmail.com
Thomas Meyer	US Army Corps of Engrs	410 962 7677
David Bernard	Sierra Club	davide aquariusplumbing.com

HWMU 5 and RAAP 47 Site Investigations--Summer 2008

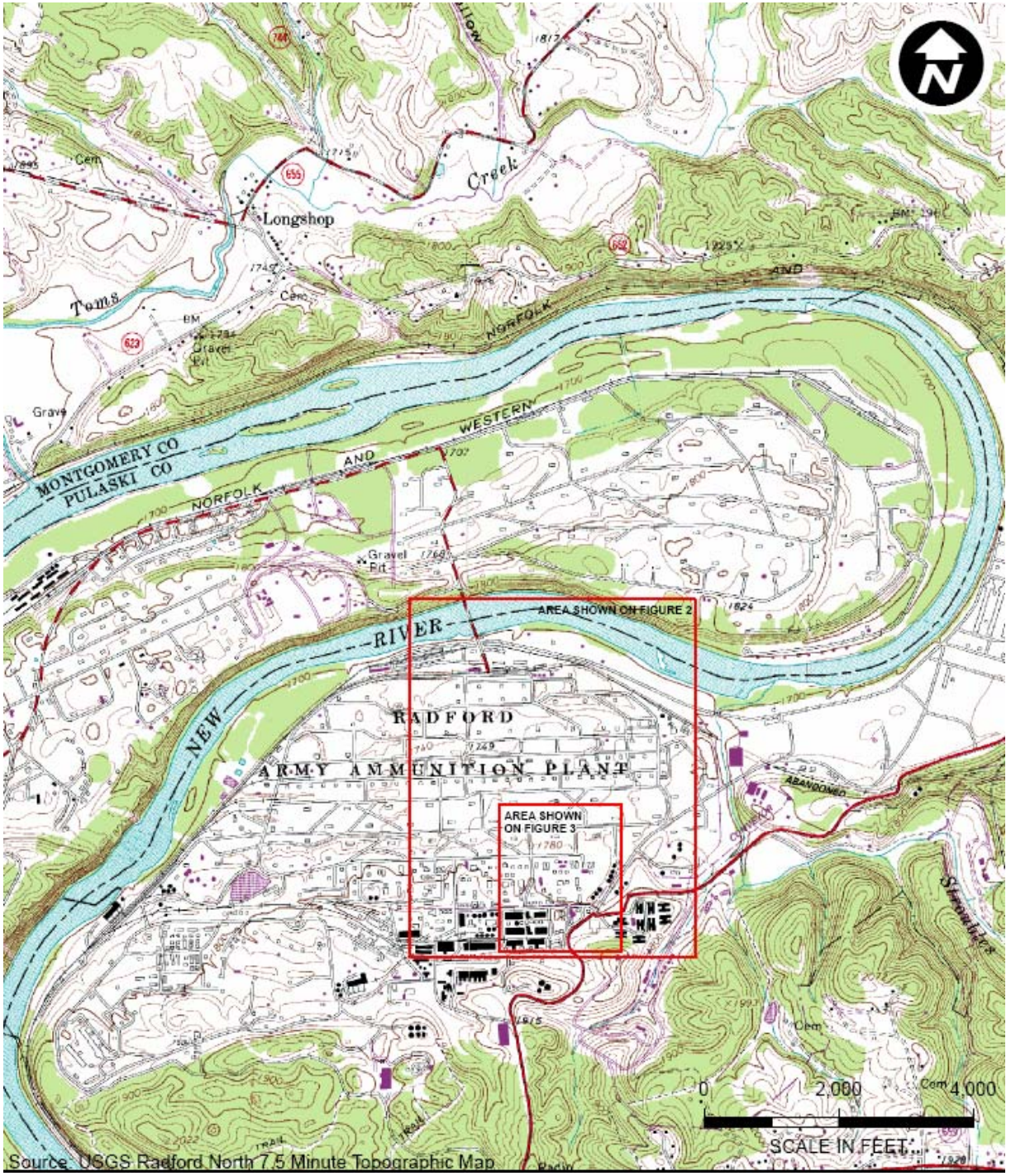
- Objectives of the Study
- Background of Sites
- Overview of the Work
- Results and Path Forward

Overall Study Objectives

- TCE has been detected in groundwater near a former treatment lagoon (HWMU 5) at concentrations up to 26 parts per billion (drinking water standard is 5 parts per billion)
- Investigations discussed tonight were designed to identify where the TCE was coming from and to determine its extent
- Work was conducted with oversight and approval of the EPA and DEQ

HWMU 5 and RAAP 47 Site Investigations--Summer 2008

- Objectives of the Study
- **Background of Sites**
- Overview of the Work
- Results and Path Forward


N
Longshop
Creek
Toms
MONTGOMERY CO
PULASKI CO
NORFOLK AND WESTERN
NORFOLK AND
Gravel Pit
NEW RIVER
AREA SHOWN ON FIGURE 2
RADFORD
ARMY AMMUNITION PLANT
AREA SHOWN ON FIGURE 3
ABANDONED
Cem
0
2,000
4,000
SCALE IN FEET
Source: USGS Radford North 7.5 Minute Topographic Map

ARCADIS


NEW RIVER
HWMU 5
BLD 1549
BLD 1034
BLD 1041
0
600
1,200
SCALE IN FEET
LEGEND
RAAP-47 Building

ARCADIS

Background of Sites
Former Waste Impoundment (HWMU 5)

- HWMU 5 operated between 1970 and 1986 to receive acid wash down water from an acid tank farm and storm water runoff
  - Lined in 1981
  - 1986 removed from service
  - 1989 stabilization of contents with fly ash and an impermeable cover placed over the HWMU
- Previous work has documented the materials likely discharged to the impoundment. TCE was unlikely to have been in the materials discharged to the treatment lagoon
- However, low levels of TCE was reported in groundwater wells nearby HWMU 5

Background of Sites
Former Waste Impoundment (HWMU 5)

PREVIOUS WORK

- Army has been monitoring groundwater in vicinity of HWMU 5 since mid 1990's
- Investigations in and around HWMU conducted in 2002 and 2004 to determine nature of the waste within the closed lagoon (Draper Aiden)
- Soil and residual material in HWMU was sampled during these studies

HWMU -5

HWMU -5 and RAAP 47

Background of Sites
Buildings

- **Building 1034**. 10,000 sq ft former nitrocellulose laboratory, now an electrical and refrigeration shop. Records indicate that DuPont Cleaning Solvent #49 which contains tetrachloroethene (PCE) was used for electrical motor cleaning

- **Building 1041.** 1,200 sq ft former degreasing shop, now a scale maintenance and cleaning shop. The building formerly contained a solvent dip tank, and may have drained via a terracotta pipe to an underground storage tank

- **Building 1549.** 2,400 sq ft maintenance shop. Employee interviews suggested that in the past, spent solvents may have been disposed of in floor drains.

HWMU -5 / RAAP 42

HWMU 5 and RAAP 47 Groundwater Investigations--Summer 2008

- Objectives of the Study
- Background of Sites
- **Overview of the Work**
- Results and Path Forward

Overall Overview of Work and Objectives

- Conducted phased investigations to:
  - Determine the source of TCE in groundwater near HWMU 5
    - Buildings 1034, 1041 or 1549?
    - HWMU 5?
  - If the buildings are acting as the source then determine migration pathways to area east of HWMU-5
  - In either case determine extent of TCE in groundwater

Phase 1 Work

- Conducted soil gas, soil, and groundwater sampling
- Work conducted in vicinity of buildings and along ditch alignment
- Direct Push techniques

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HWMU 5 and RAAP 47 Site Investigations--Summer 2008

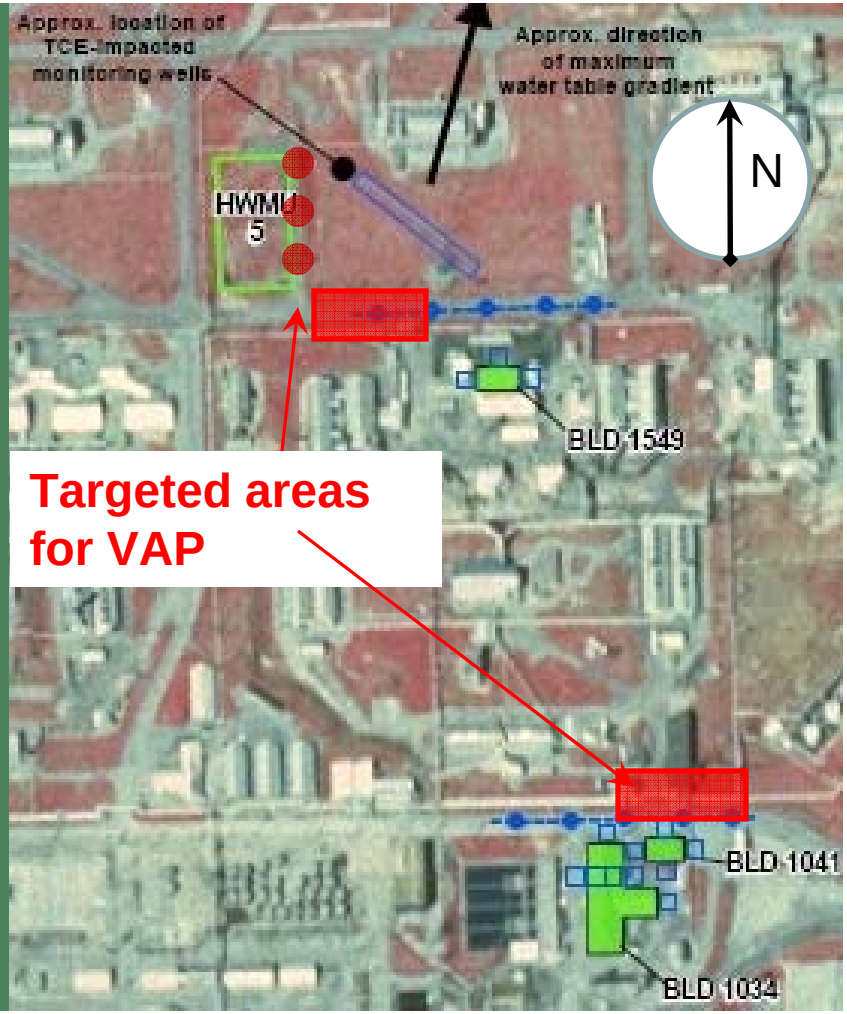
- Objectives of the Study
- Background of Sites
- Overview of the Work
- **Results** and Path Forward

Phase 1 Results (Buildings)

- No TCE detections above EPA Regional Screening Levels for soil (ORNL 2008)
- No TCE detections above EPA promulgated drinking water standards (MCLs)
- One detection above sub-slab Regional Screening Level for soil vapor
    - TCE in soil gas east of Building 1041 at 3,300 ug/cubic meter
    - Screening level for sub-slab vapor is 61 ug/cubic meter (industrial)
- Based on these results Phase 2 was initiated

Phase 2 Investigation Plan

- Building 1041
  - Subsurface scan using GPR
  - Soil and groundwater samples around soil gas detection
  - Focused Vertical Aquifer Profiling (VAP) transect north of Building 1041 extending to the east of the building foot print
  - Building 1549 area
  - An additional focused transect west of Building 1549
  - HWMU-5
  - Additional GW profiles on east side

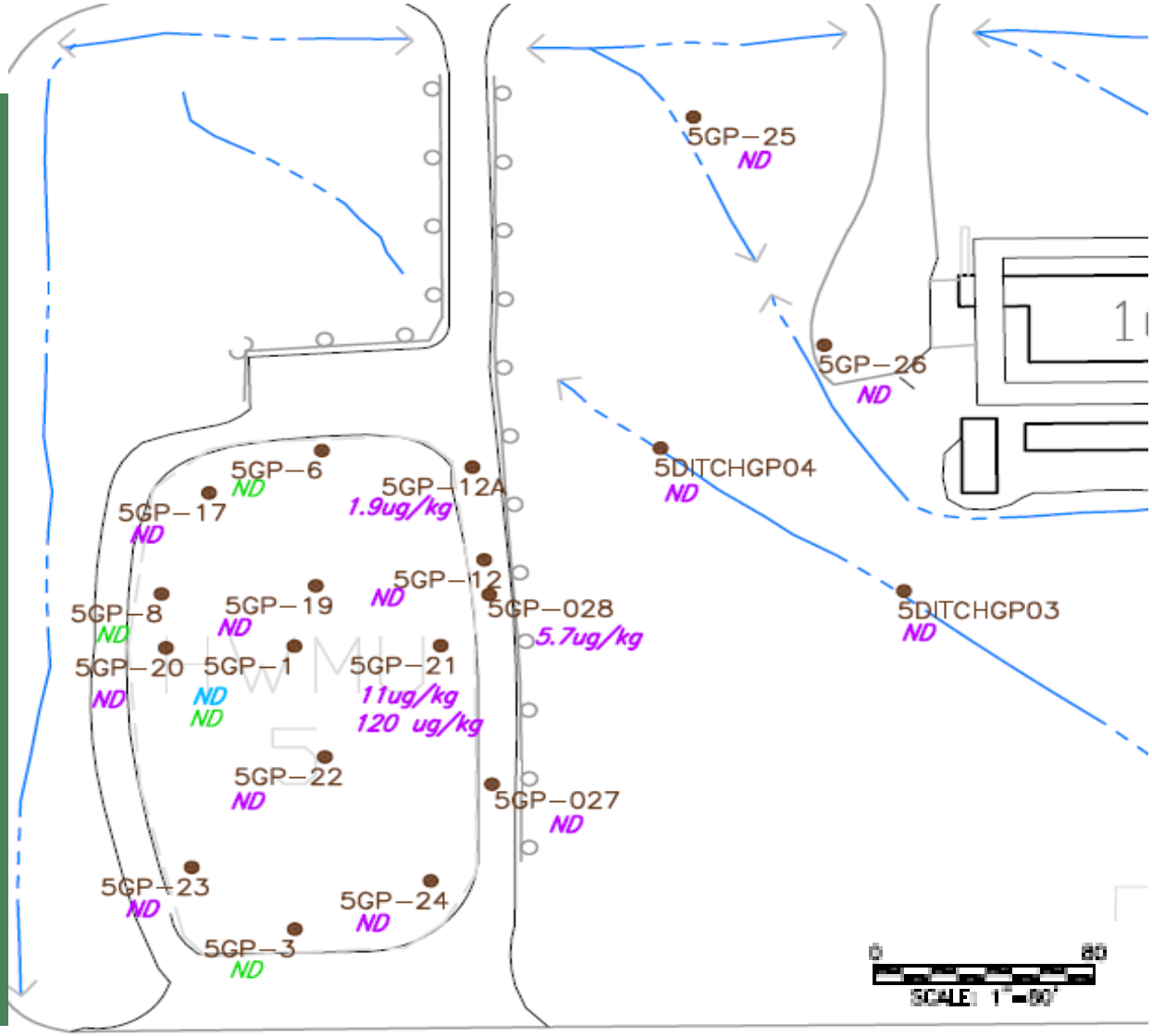


Phase 2 Results (Buildings)

- 8 soil samples collected around soil vapor detection east of Building 1041
  - 2 detections for TCE at 1.5 and 1.1 ppb (Industrial EPA RSL 14,000 ppb/residential RSL 2,800 ppb)
- 7 groundwater samples collected in same vicinity
  - 1 detection for TCE at 0.32 ppb (EPA MCL drinking water standard 5 ppb)

HWMU Area Soil Results ug/kg (ppb)

- No TCE detected in stabilized material in HWMU
- 120 ug/kg or 11 ug/kg (duplicate) TCE detected in 2004 in soils beneath liner
- 5.7 ug/kg and 1.9 ug/kg TCE detected in wet soils in 2008 east of HWMU
  - Blue = Cap
  - Green = Residual Material (9 to 11 feet below surface)
  - Magenta = Soil beneath HWMU (13 to 14 feet below surface)



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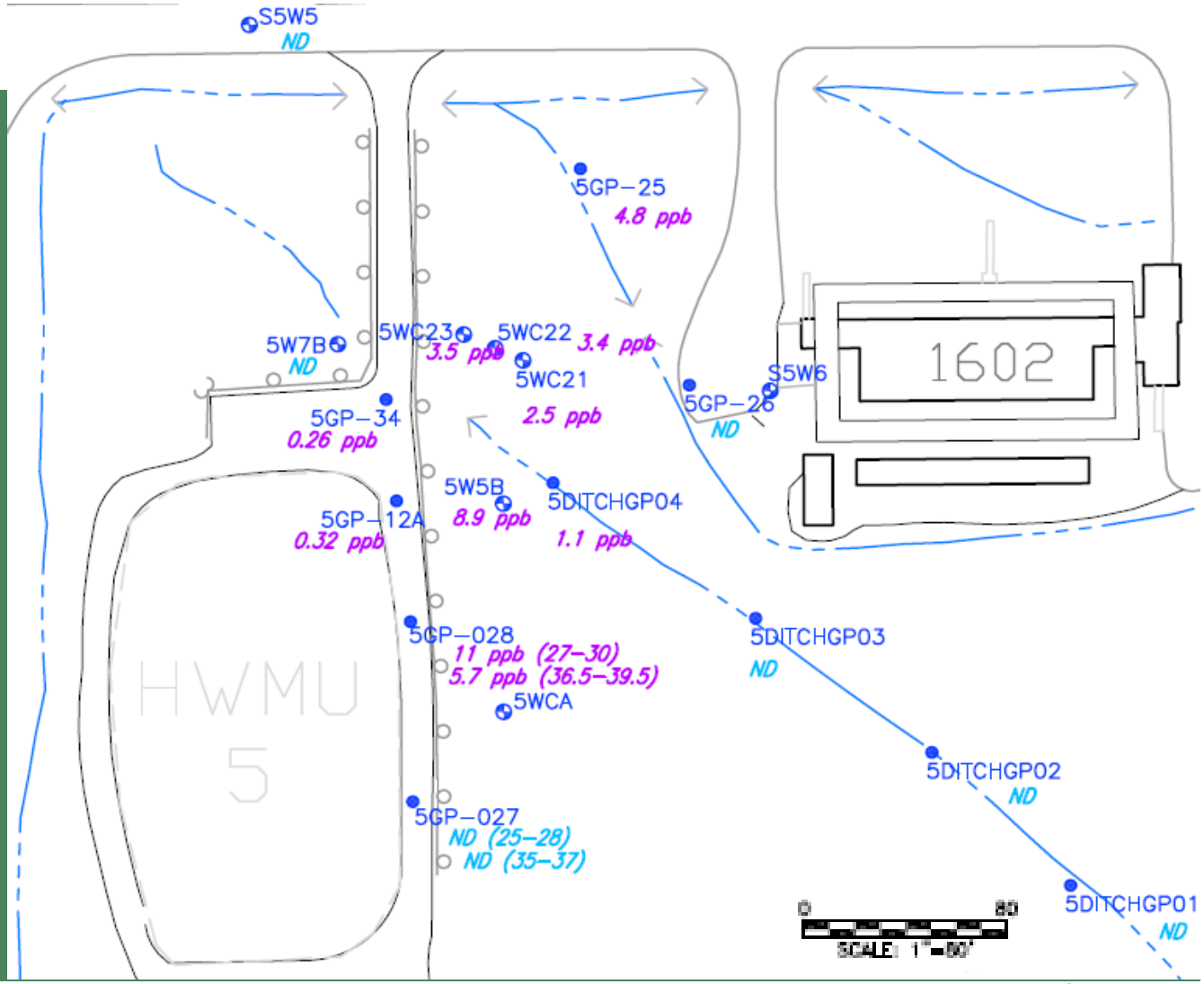
HWMU Area Groundwater Results ug/L (ppb)

- 11 ug/l TCE maximum detection in 2008
- Decreasing concentrations with depth (cross section to follow)
- Minimal areal distribution of TCE in subsurface



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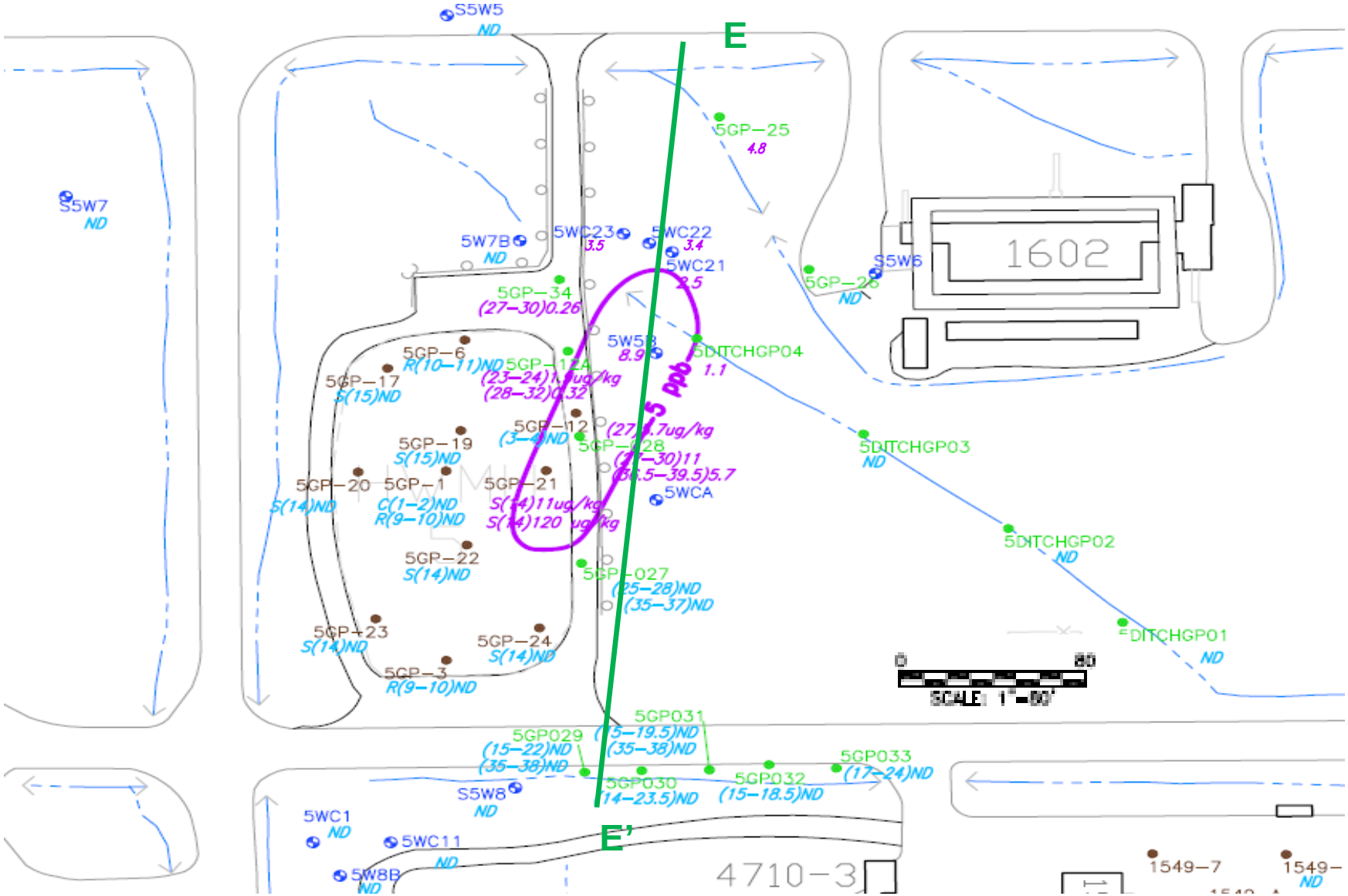
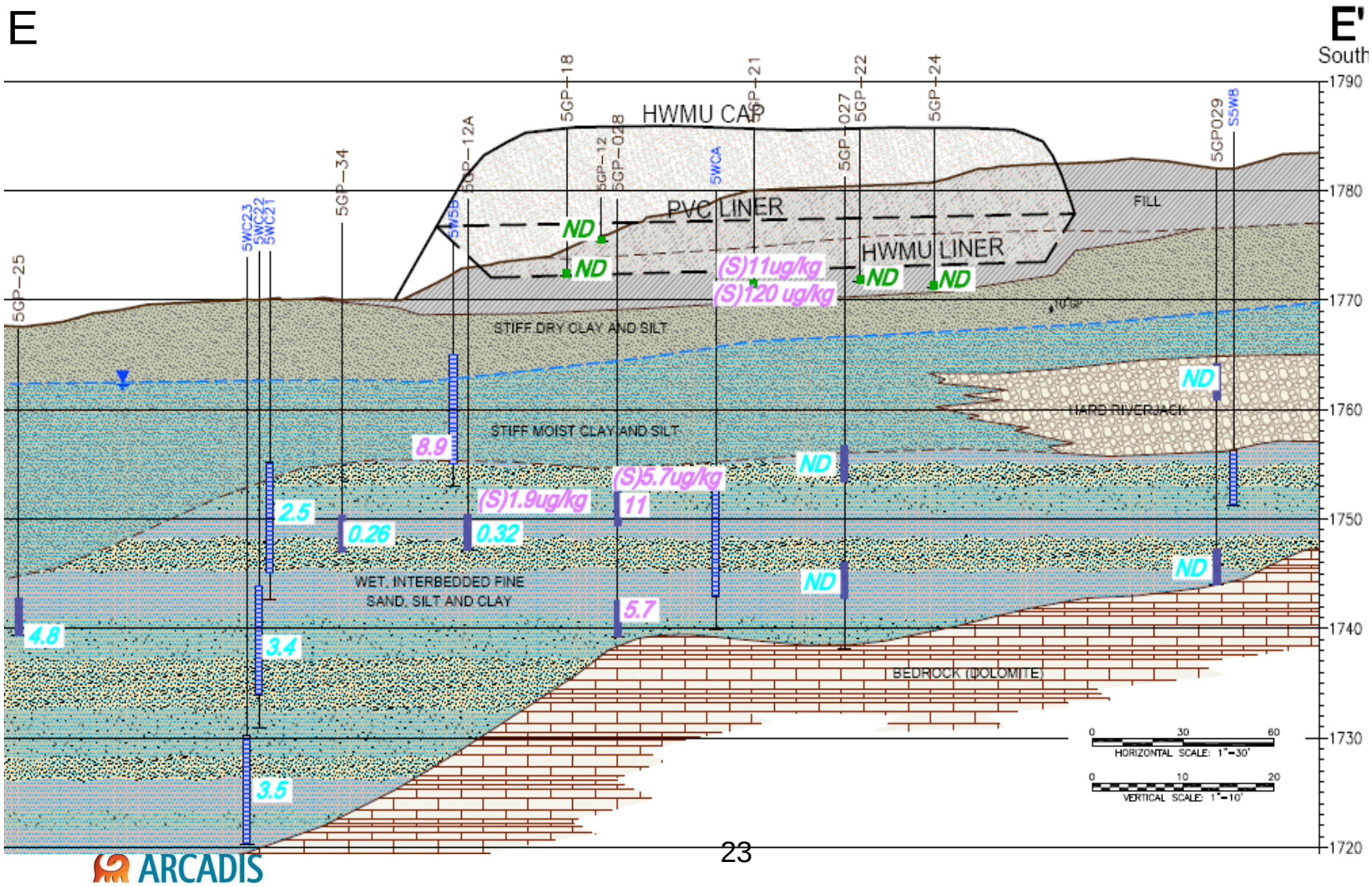
Groundwater Plume (162 ft end to end)

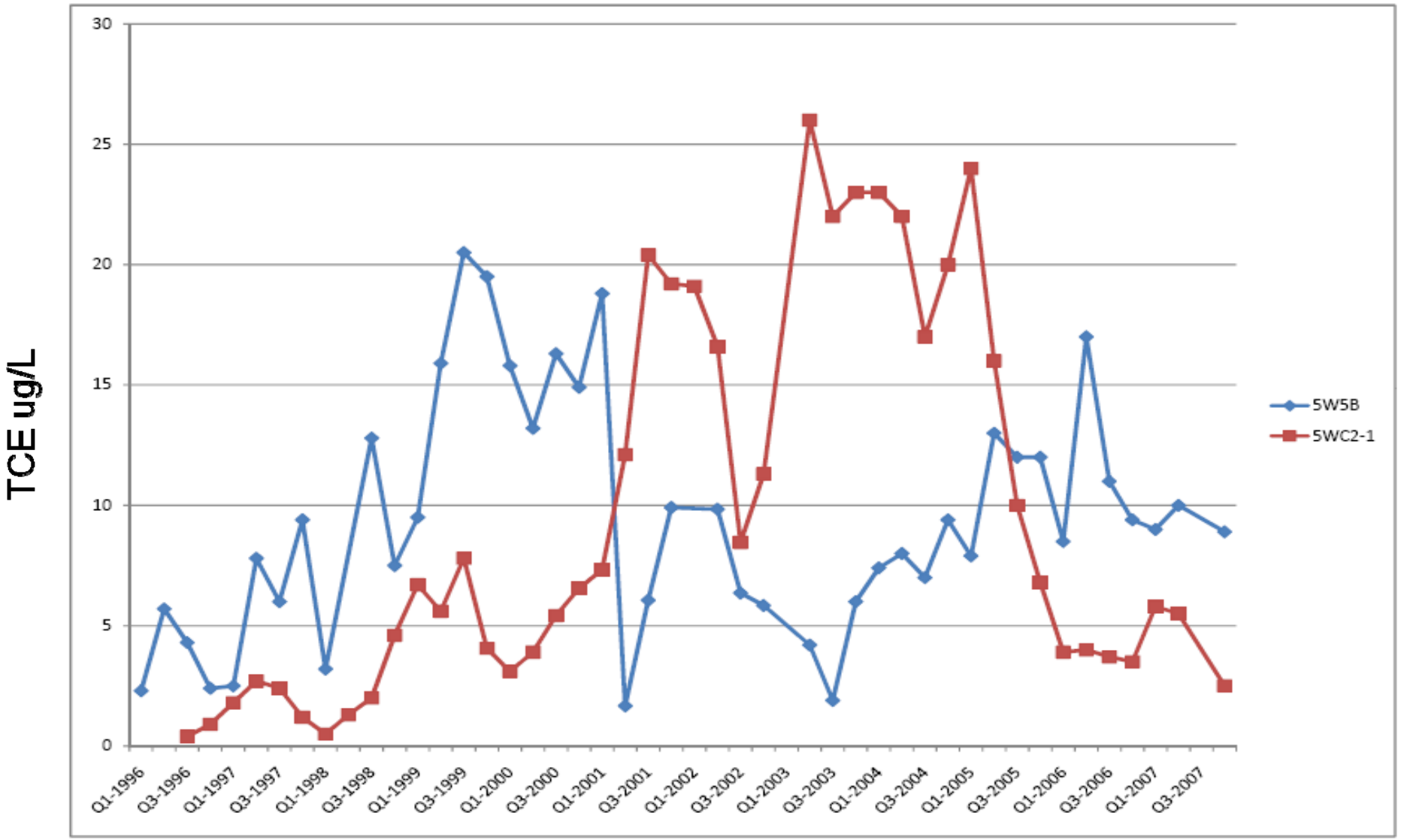


Cross Section E-E’



ARCADIS

TCE Data Trends



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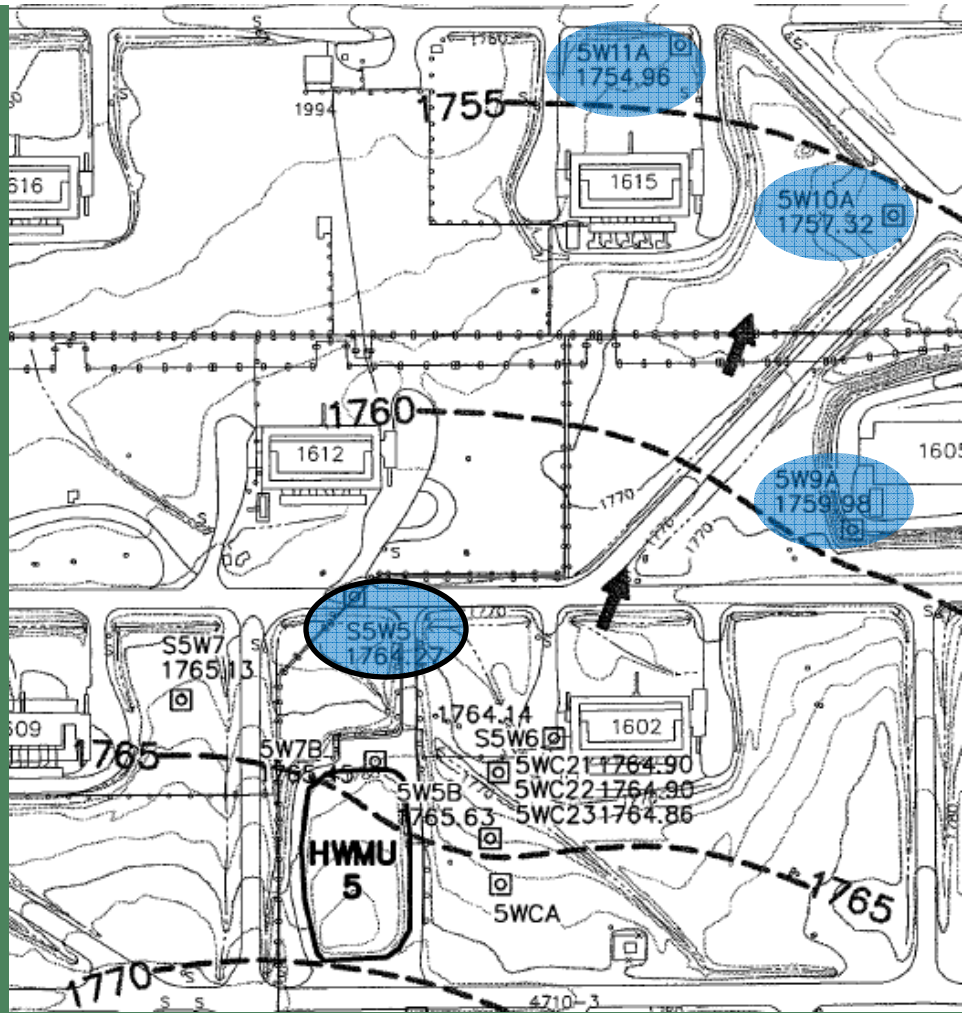
Phase 2 Investigation Summary

- TCE not identified in groundwater or soils in the vicinity of Buildings 1034, 1041, 1549 at concentrations above:
  - EPA promulgated drinking water standards (MCL)
  - Industrial Regional Screening Levels (RSLs) ORNL/EPA 2008
- One TCE detection in soil gas above RSLs for industrial indoor air east of Building 1041--but no further contamination detected above standards
- Small plume of TCE (160 ft) delineated east of HWMU-5
- Current maximum TCE in GW in vicinity of HWMU is 11 ppb
- Only 3 samples exceed drinking water standard of 5 ppb at HWMU 5

Historical TCE data downgradient of HWMU 5

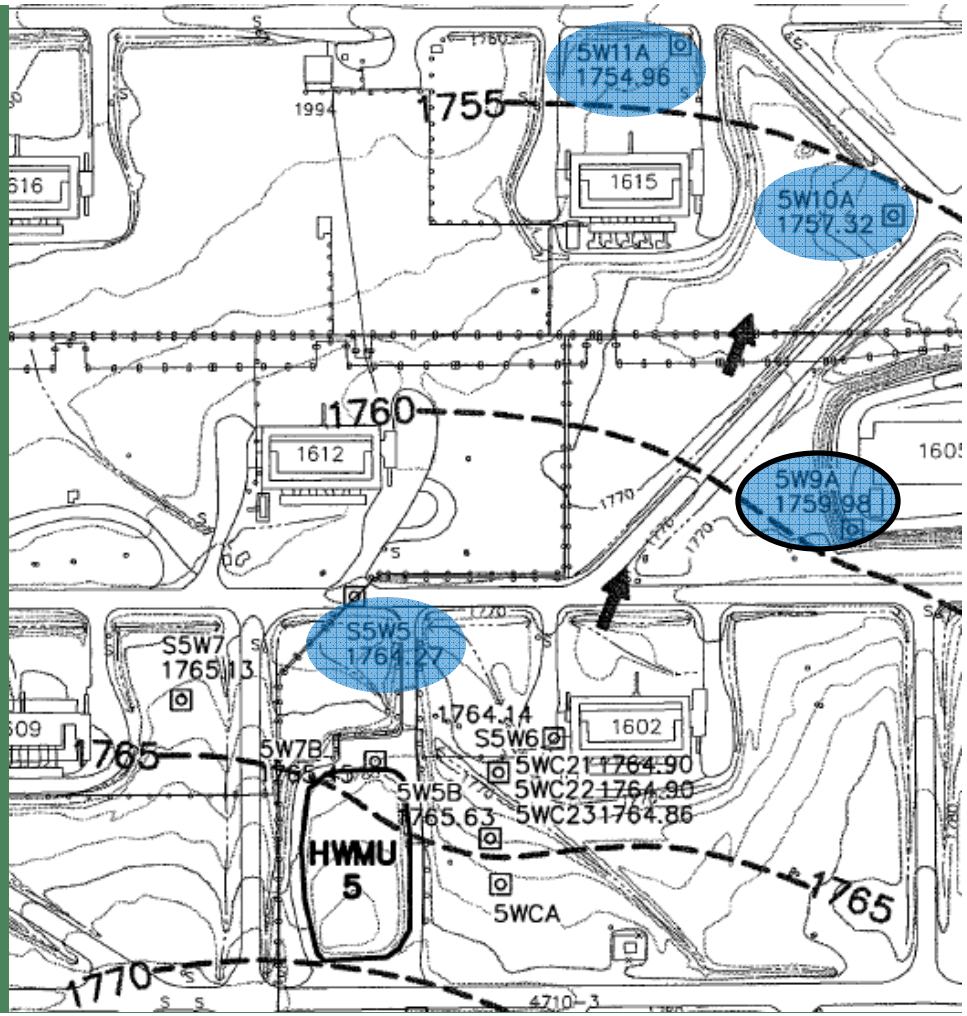
- Well S5W5 150 feet from HWMU
  - TCE non detect in samples since 1999,
  - ‘97-’98 - 4 detections of concentrations less than 0.5 ppb.
  - 25 ft total depth
  - 10 ft screen.



ARCADIS

Historical TCE data downgradient of HWMU 5

- Well 5W9A 500 feet from HWMU
  - TCE non detect in samples since the 3rd quarter of 1999,
  - '96-'98 low level detections less than 1 ppb.
  - 49 foot total depth
  - 20 ft screen



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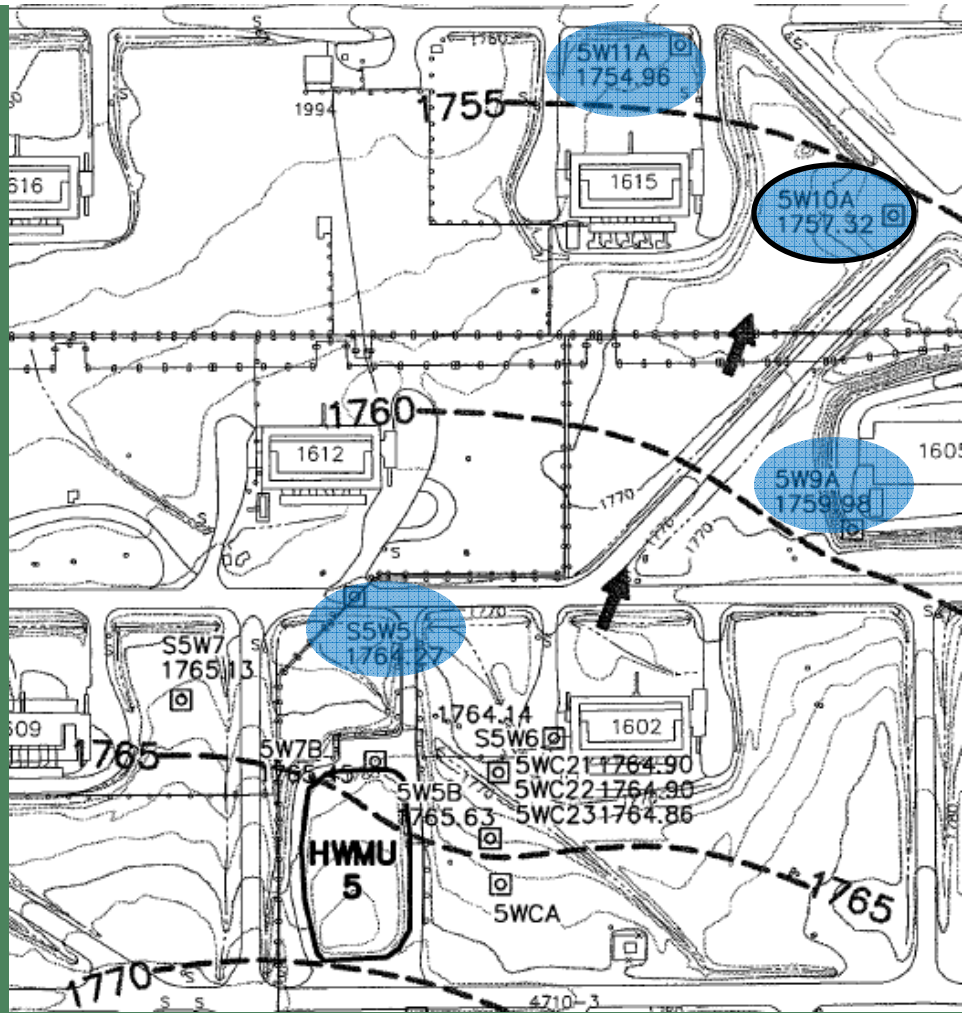
Historical TCE data downgradient of HWMU 5

- Well 5W10A 700 feet from HWMU
  - TCE detected once at 7.4 ppb 9 years ago and never repeated
  - 45 foot total depth
  - 20 ft screen



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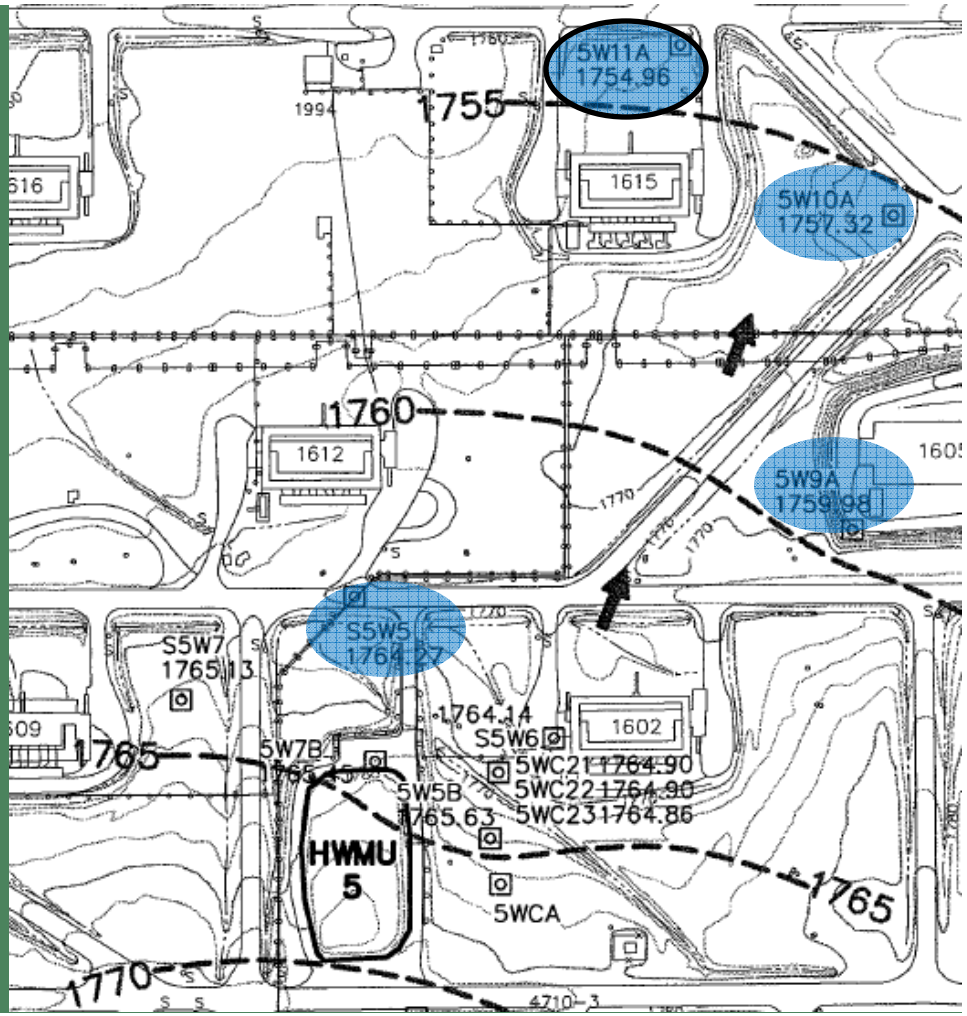
Historical TCE data downgradient of HWMU 5

- Well 5W11A 750 feet from HWMU
  - TCE not detected in 10+ years of data.
  - Unconsolidated
  - 48 foot total depth
  - 20 ft screen



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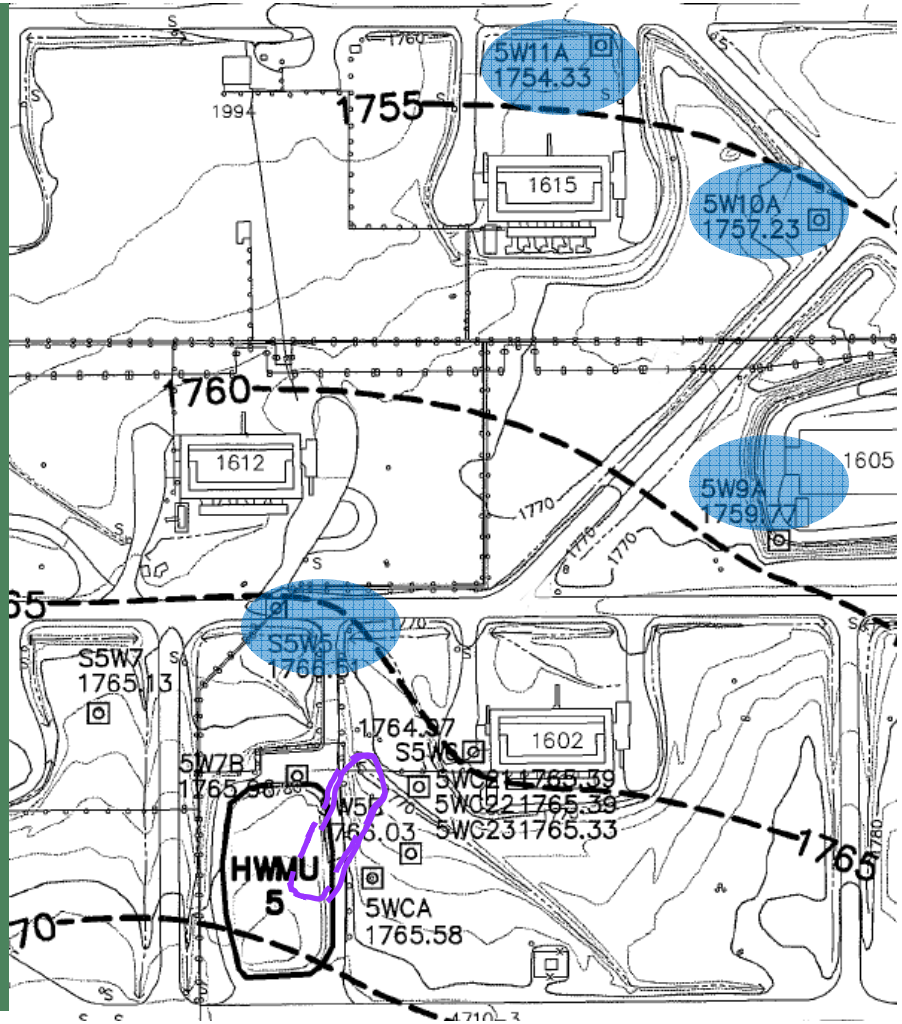
Historical TCE data downgradient of HWMU 5

- Current conditions
  - Continued Non-detects for TCE



ARCADIS

HWMU 5 and RAAP 47 Groundwater Investigations--Summer 2008

- Objectives of the Study
- Background of Sites
- Overview of the Work
- Results and Path Forward

Proposed Path Forward

- The Army will be preparing a Corrective Action Plan (CAP) for the TCE plume under the HWMU RCRA post closure permit
- CAP will propose a remedy for the TCE
- Public will be afforded the opportunity to comment on this plan (scheduled for 2009)

SWMU 51
Interim Action Work Plan

SWMU 51

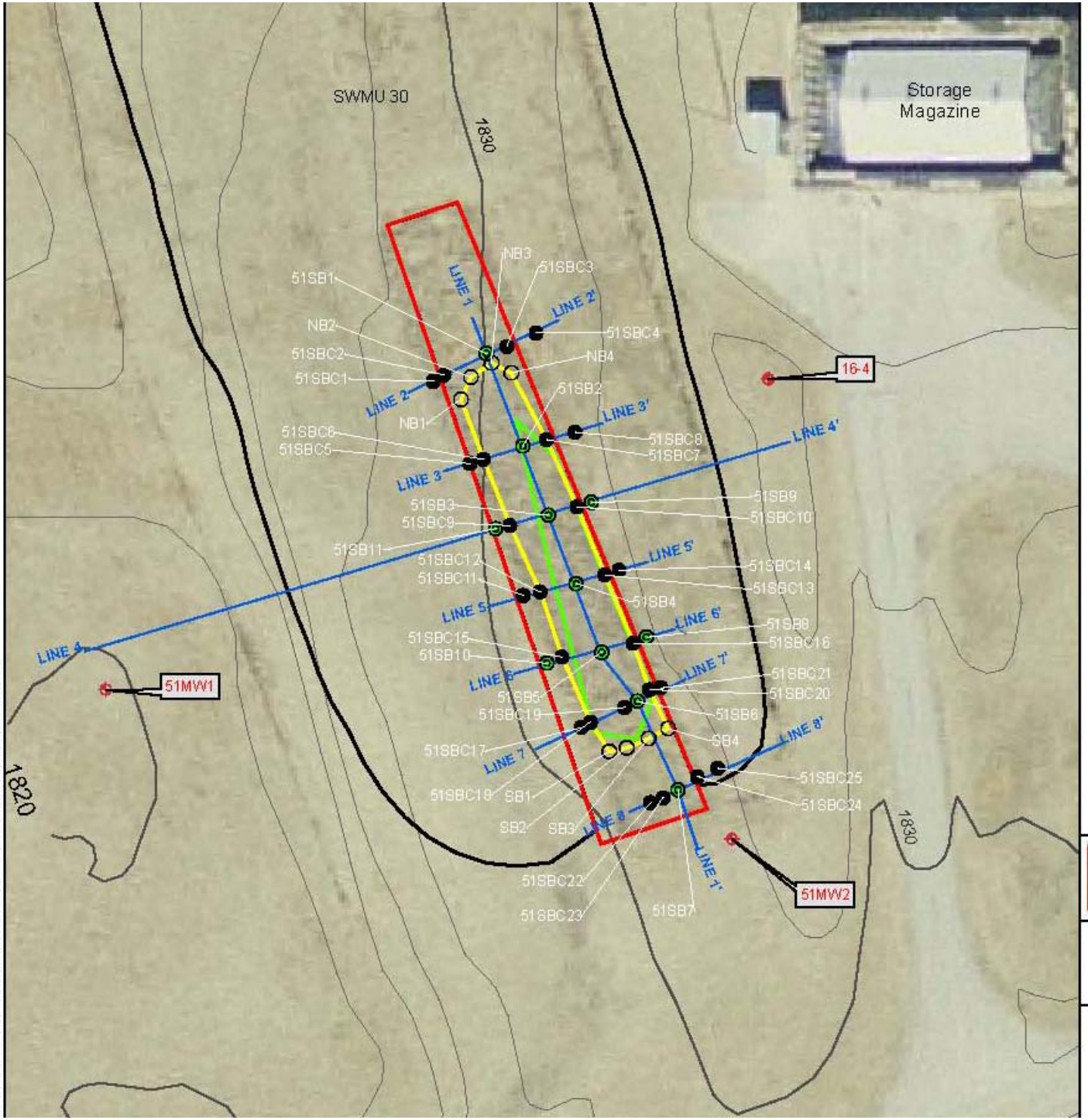
- TNT Waste Acid Neutralization Pit
- Final *RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) Report* submitted in July 2008
  - EPA/VDEQ approval is expected in September 2008

Site Description & History

- Unlined trench 140 ft by 23 ft in the eastern Horseshoe Area.

- Used for disposal of TNT neutralization sludge and red water ash in the 1960s/1970s. Clean soil was placed on top of the trench after its operational use.

- Thickness of the trench sludge averages 3-4 ft and depth to the top of the sludge ranges from ½ ft at the edges to 14 ft in the center.



LEGEND

- Qualitative Soil Boring
- Monitoring Well
- Stratigraphic Characterization Soil Boring
- Chemical Sample Soil Boring
- 10 ft Contour Line
- Trench Boundary As Defined by Chemical and Stratigraphic Characterization Borings
- Area Of SWMU 51 Trench As Interpreted From 2D-ERI Profiling (ANL, 2003)
- SWMU 51 Boundary
- Other SWMU/HWMU Boundary

Notes:
1) Aerial photo, dated 2005, was obtained from Montgomery County, VA Planning & GIS Services.

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Scale:

0 25 50 100 Feet

U.S. Army Corps of Engineer

Shaw Shaw Environmental, Inc.

FIGURE 2-3

SWMU 51 Soil Boring Locations

Radford Army Ammunition Plant,
Radford, VA

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RFI/CMS

- Elevated levels of metals, dioxins and TNT, DNT and related compounds were found in the sludge and in soil immediately below the sludge.

- Groundwater was investigated and has not been affected by site operations.

- Selected Remedial Alternative is:

  “Excavation of Sludge and Grossly Contaminated Soil with Off-site Disposal.”

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Interim Measures Remedial Action

- Dig up the trench sludge and grossly contaminated soil.
- Direct Load into dump trailers using plastic/lumber loading area.
- Disposal offsite in an appropriate landfill with pre-treatment, if required.
- Trucks will use Gate 10 to avoid bridge over New River. 8-10 trucks per day expected.

Interim Measures Steps

Delineation Sampling & Set-up

- Collect samples to mark the extent of soil to be removed. Set up erosion controls and loading area.

- Excavation and Load Out.
  - Direct Load into dump trailers using plastic/lumber loading area.
- Confirmation Sampling
  - After Excavation, samples collected to make sure RGs have been met
- Site Restoration
  - Backfill with clean soil, reseed with native grass, maintain erosion control until re-vegetated, remove equipment.


SWMU 39
Interim Action Work Plan

SWMU 39

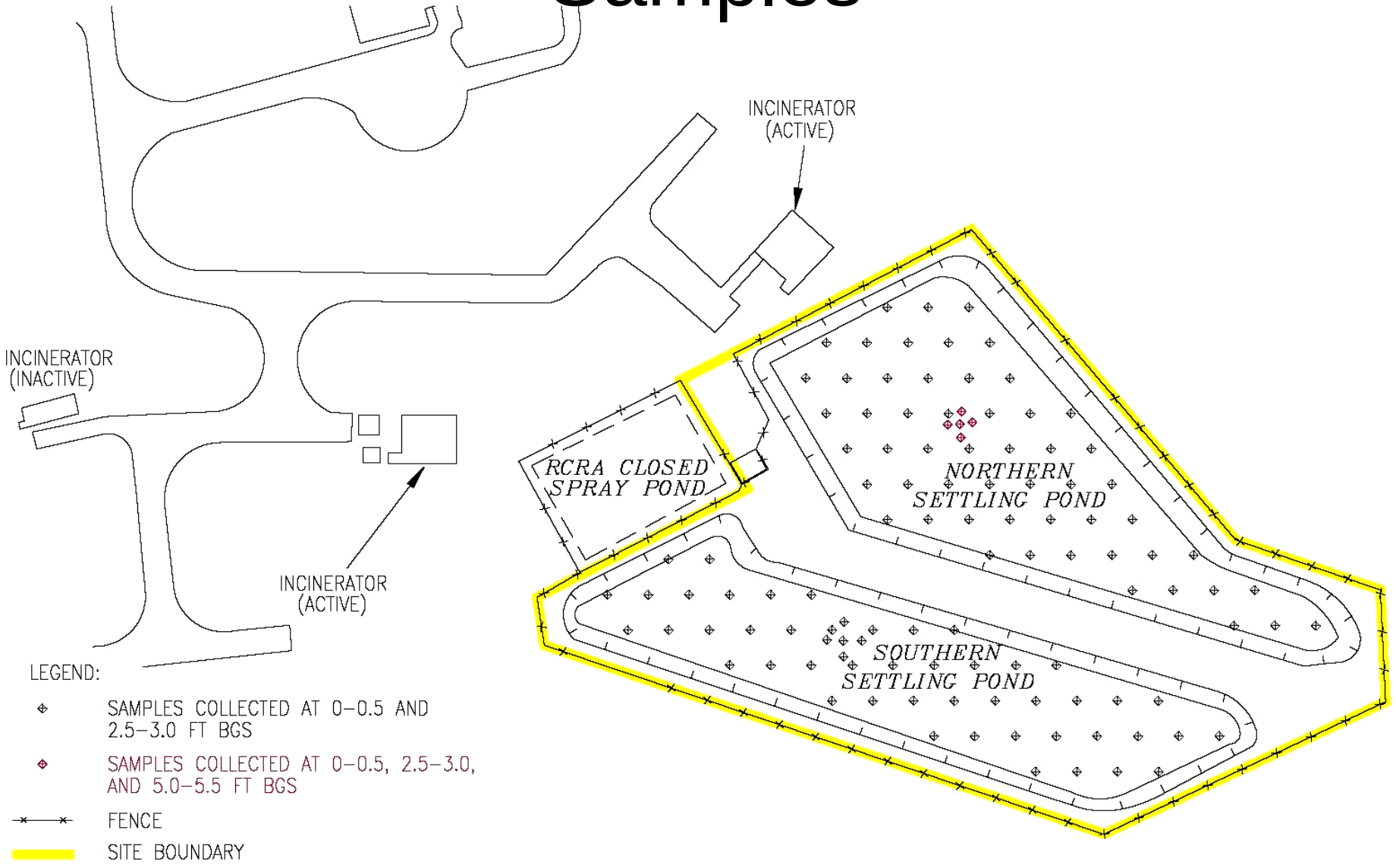
- Wastewater Ponds from the Propellant Incinerators.

- Final RFI/CMS was approved by EPA and VDEQ
  - VDEQ approval – Dec 2004
  - EPA approval – Jun 2005

RFI/CMS

- Investigations found elevated levels of metals (lead, arsenic & vanadium) and dioxins/furans in pond sediment.
- Groundwater was investigated and has not been affected by site operations.
- Selected remedial alternative is excavation to residential clean-up levels and off site disposal.

SWMU 39 Site Map & Delineation Samples



Interim Measures Action

- Work is similar to SWMU 51 and will proceed in the same manner.

- Additional backfill will be brought in to bring the ponds up to the level of the surrounding grade.

Schedule

- Excavation at SWMU 51 will start in October and is expected to take 2 months for excavation and backfilling.

- SWMU 39 field work will start after load-out on SWMU 51 is finished.