

## MEMORANDUM FOR RECORD

SUBJECT: Fort Detrick Restoration Advisory Board (RAB) Meeting Summary,  
8 NOVEMBER 2017

**1. Summary Contents**

Items addressed at the meeting are listed below, with corresponding section numbers indicated in the column on the right.

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**Please note: PowerPoint presentations were utilized during the RAB meeting. A copy of the presentations is attached to these minutes and is incorporated into these minutes by this reference.**

**Text contained within brackets [] has been added for clarification purposes.**

## **2. Attendees**

### Members Present:

Dr. Gary Pauly, Community RAB Member, Co-Chair  
Mr. Joseph Gortva, Army Co-Chair, Fort Detrick, Chief, Environmental Program  
Mr. Rolan Clark, Community RAB Member  
Mr. Barry Glotfelty, Frederick County Health Department  
Dr. Elisabeth Green, Maryland Department of the Environment  
Ms. Jennifer Hahn, Community RAB Member  
Mr. Cliff Harbaugh, Community RAB Member  
Mr. Karen Harbaugh, Community RAB Member  
Mr. George Rudy, Community RAB Member

### Others Present:

Mr. John Buck, US Army Corps of Engineers  
Ms. Jennifer Adkins, Fort Detrick Environmental Restoration Program  
Ms. Samantha Hogan, Frederick News Post  
Mr. John Cherry, ARCADIS  
Mr. Brandon Fleming, USGS  
Ms. Shelly Morris, On-Site Contractor to Fort Detrick Environmental Restoration Program  
Ms. Katrina Harris, Bridge Consulting Corp.

### Members Absent:

Mr. Eli DePaula, Community RAB Member  
Dr. Henry Erbes, Community RAB Member  
Mr. Barry Kissin, Community RAB Member  
Mr. Rob Thomson, US Environmental Protection Agency

## **3. Meeting Opening / Remarks**

Mr. Joe Gortva opened the meeting, welcomed everyone, and thanked everyone for attending. Mr. Gortva reminded the RAB that Mr. Bob Craig had retired, and Mr. Gortva is now the Environmental Chief and Co-Chair of the RAB. Mr. Gortva introduced Mr. Gary Pauly, Community Co-Chair, and invited Mr. Pauly to offer any comments. Mr. Pauly stated he did not have any comments. Mr. Gortva stated this is a meeting of the RAB, with members of the community invited to observe. He said after each presentation, Board members are welcome to ask questions and offer comments. Mr. Gortva said at the end of the meeting there will be time for non-Board community members to ask questions and offer comments.

Mr. Gortva invited introductions and reminded everyone to sign-in on the sheets on the back table.

#### **4. Meeting Minutes** presented by Mr. Joseph Gortva, Fort Detrick

Mr. Gortva stated Ms. Shelly Morris had taken over many of the RAB administrative activities for him, including distributing the minutes from the last meeting. He invited comments on the minutes, and none were offered. Mr. Gortva said the minutes would be considered final and placed on the web site.

Ms. Jennifer Hahn commented that she believes previous meeting minutes indicated a soil sample collected from in front of the Montevue Building was found to have elevated levels of PCE. Mr. Gortva responded that it was likely a groundwater sample, not a soil sample, and he would check previous minutes and make any needed corrections **[note no corrections necessary as no soil samples were collected/analyzed for the Area B Groundwater Remedial Investigation field efforts]**.

#### **5. Area B Groundwater RI Update** presented by Mr. John Cherry, Arcadis

Mr. Cherry displayed an aerial photograph and reminded the RAB there are many investigative activities going on at Area B. He stated he would be talking about some of the activities, but not all. Mr. Cherry showed areas highlighted in purple that would be discussed during his presentation and noted that these are the areas where work had been completed in 2017; Mr. Cherry said he would be discussing observations and results. He advised all the data collected at Area B is being compiled into the Remedial Investigation Report which will be submitted to the Army later this year and made available to the RAB after the Army's review.

Mr. Cherry discussed work completed earlier in 2017 and noted it was done to better characterize shallow groundwater impacts in a portion of the study area. He advised the work included 10 soil gas sampling points advanced around a building on County property to identify permanent monitoring well locations; drilling eight new monitoring wells on the County property; collecting two rounds of groundwater samples from the new wells for volatile organic compounds analysis; sampling the existing network of 34 small diameter wells (piezometers) for volatile organic compounds; completing isotopic analysis of samples to try to fingerprint tetrachloroethylene (PCE), trichloroethylene (TCE), and chloroform concentrations in on-post and off-post groundwater; completing a synoptic groundwater gauging event across the entire Area B study area (187 measurement locations) to measure groundwater elevations and better understand groundwater flow.

Mr. Rolan Clark asked for an explanation of sampling "round," and Mr. Cherry explained it is a sampling event.

Mr. George Rudy asked when remediation is going to begin. Mr. Cherry stated that the Army is required to follow the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process, and currently the Remedial Investigation phase of the process is being completed which thoroughly characterizes the site. He stated while the Remedial Investigation is being completed the Army is working with EPA and MDE on pilot studies for the primary source area and Carroll Creek. Mr. Cherry explained a pilot study is not a full-scale remedial approach. Mr. Gortva added that there are different technologies that could work, and the goal

of a pilot study is to try something on a smaller scale to see if it will work at a particular site. He continued explaining that the Army would not want to spend millions of dollars on a potential remedy and find out it is not effective. He added that a pilot scale test starts smaller, and if successful, can be scaled up. Mr. Rudy asked if pump and treat is being considered as a remedial approach. Mr. Cherry stated pump and treat is a remedial technology being examined, but it is not likely to be implemented on a pilot scale basis.

Moving on, Mr. Cherry stated the additional data gap work [completed earlier in 2017] included installing four new permanent monitoring wells where previous attempts to install direct push points for monitoring shallow groundwater were not successful due to encountering shallow bedrock. He explained a rotary rig was used, and the wells were installed and sampled twice.

Mr. Rudy asked for more information on piezometers. Mr. Cherry advised they are small diameter wells, approximately one-inch in diameter, which are primarily used for gauging groundwater elevations, but also can be used to collect groundwater samples. Mr. Gortva added that piezometers are temporary, have a more simple construction, and can only be used in places where water is in soils and not bedrock.

Mr. Cherry said in 2013 two off-post direct-push grab samples had detected PCE in groundwater above the drinking water standard. He advised re-sampling of these points in 2017 found only trace levels of PCE which were “J” qualified meaning they were estimated. He said the results from the two rounds of sampling at the new permanent monitoring points found no PCE detections. He said the results found low detections of TCE with the maximum detection being 0.5 parts per billion which is less than the 5 parts per billion drinking water standard. He advised there was one detection of benzene above the drinking water standard; the likely source is a vehicle fueling station along Montevue Lane and not Army activities. Mr. Cherry reminded everyone that no one is drinking the groundwater water in this area. Mr. Cherry stated it looks like there are minimal impacts, but the data is being evaluated and incorporated into the risk assessments which are part of the Remedial Investigation Report.

Ms. Hahn asked about PCE degrading to TCE and whether that is occurring in this area. Mr. Cherry responded that PCE can degrade to TCE, but the thinking is that is not happening here. He said the TCE in the area is associated with TCE disposal related to refrigerant use at some of the buildings at Area A. Mr. Pauly asked if the samples were analyzed only for PCE or the full suite, and Mr. Cherry said the samples were analyzed for all volatile organic compounds. Mr. Pauly asked if degradation products were seen in the samples, and Mr. Cherry said degradation products were not seen in the samples.

Mr. Cherry displayed an aerial photograph showing shallow bedrock groundwater contours. He explained the contours are based on the 187 water level measurement points, and the blue arrows show the inferred groundwater flow directions. He explained the measurements are taken at a well and measuring the depth to groundwater with a tape and then converting the data to a depth above mean sea level. He pointed out the groundwater converges on either side of Carroll Creek. He mentioned in localized areas, groundwater is controlled by geologic features such as fractures. Mr. Cherry said the water level measurements are an additional line of evidence of

groundwater flow direction; other lines of evidence are the location of contaminants and the dye trace studies that have been conducted.

Ms. Hahn requested maps, such as the one showing the contours, be printed larger so they would be more easily read and referred to after the meetings.

Mr. Cherry next discussed the additional work performed at Carroll Creek to address data gaps and remaining questions. He stated Carroll Creek was re-surveyed from the point where it goes under Route 15 to the post pond. He said the objectives were to check for any seeps and streams not previously identified, to collect surface water and 20 pore water samples, and to complete isotopic analysis of samples to try to fingerprint PCE, TCE and chloroform concentrations in on-post and off-post groundwater. Mr. Cherry advised the additional work did not identify any new seeps or streams, and the prior survey results were confirmed. Mr. Cherry said pore water samples had not been collected in the past, but had been requested by EPA and Maryland Department of the Environment. He explained the samples are collected at the pore space within the sediments in the base of Carroll Creek to see if groundwater flow coming into Carroll Creek is contaminated with volatile organic compounds; if so, the samples would also be included in the forensic analysis.

Mr. Cherry displayed a figure prepared for the Remedial Investigation Report showing a compilation of sampling points along Carroll Creek.

Mr. Cherry summarized observations from the 2017 supplemental Remedial Investigation field work:

- Surface Water: Mr. Cherry advised there were 22 surface water samples collected from Carroll Creek, and analysis found some TCE detections, consistent with past sampling results, with concentrations in the 2 parts per billion to 3 parts per billion range at the primary discharge area and decreasing further downstream. He stated there were some low PCE detections at 4 locations, but they were “J” qualified estimated values up to 0.2 parts per billion. He reminded the RAB the drinking water standard is 5 parts per billion, even though Carroll Creek is not used for drinking water.
- Pore Water: Mr. Cherry advised there were a few detections of TCE in the pore water in the 3 to 4 parts per billion range, and four low estimated PCE detections up to 4 parts per billion.
- Seeps and Springs: Mr. Cherry stated groundwater directly discharges to the Creek through seeps and springs. He advised 14 seeps and springs were sampled in 2017, and the results were similar to the 2012 results. He stated the highest TCE detections were in the primary discharge area at 8.8 and 11 parts per billion. He advised there were low PCE detections in the primary discharge area of up to 0.6 parts per billion.

Mr. Rudy commented that Carroll Creek flows into the Monocacy River which is a source of drinking water for Frederick. Mr. Gortva advised the intake for the City of Frederick’s water supply is upgradient from where Carroll Creek enters into the Monocacy River, and the concentrations are well below the drinking water standards.

Ms. Hahn asked what the recreational standard is for PCE, and Mr. Cherry said it is about 30 parts per billion (ppb) and it assumes 45 days of exposure a year. [Ambient Water Quality Criteria (AWQC) Screening Criteria (Human Health via Fish Ingestion) PCE 0.69 ppb and Recreational Use Screening Criteria for PCE 336 ppb]

The Ms. Hahn asked for confirmation that EPA establishes the recreational standard for the United States, and the recreational standard might be different in other countries. Mr. Cherry advised that EPA sets the standards and there are toxicological standards, toxicity values, and risk assessment values which are used to evaluate risk, including how to account for the concentrations and potentially exposed populations. Mr. Cherry added that the risk assessment [that is being performed as part of the Remedial Investigation Report] will also look at a variety of scenarios including fish consumption and recreational exposure.

Mr. Cherry said all the information collected will be used to develop a human health risk assessment.

Mr. Rudy asked if the reduction in the concentration is due to dilution. Mr. Cherry responded that dilution is one mechanism; other processes are biological degradation through natural attenuation and volatilization.

Ms. Hahn asked if warning signs should be posted along Carroll Creek until the risk assessment is completed. Mr. Gortva said the Army, Maryland Department of the Environment, and the County Health Department looked at the recreational standards and fish consumption numbers and did not see anything in the body of Carroll Creek that was anywhere near those levels. He said there is no reason at this time to require the posting of any signs as there is no immediate risk.

Mr. Cherry reviewed the next steps to be taken with respect to the Remedial Investigation. He stated the Remedial Investigation Report will be submitted to the Army in 2017, along with the human health risk evaluation. He stated the Remedial Investigation Report provides the basis to evaluate options through a Feasibility Study for taking remedial action down the road.

Mr. Cherry said the Army is also discussing a potential pilot study with the regulators to assess two possible groundwater remediation options in the area where there is the highest TCE concentrations to remove contaminant mass at the Area B source area and near Carroll Creek. He advised a work plan is being developed. Dr. Green stated that MDE is interested in moving forward with the pilot study in the vicinity of Carroll Creek as MDE thinks it will be very valuable to see what the immediate impacts might be.

Mr. Cherry advised the Army is working with the US Geological Survey to evaluate past groundwater tracer studies to determine an agreed upon path forward to gain regulatory acceptance of the Conceptual Site Model for Area B groundwater.

Mr. Cherry stated it is not anticipated that further Remedial Investigation work will be recommended to EPA and MDE, but that is subject to concurrence by the regulatory agencies.

Mr. Rudy and Ms. Hahn asked about potential exposure to vapors from the areas with the highest concentrations of PCE or TCE. Mr. Gortva stated the exposure would be greater to PCE from walking pass an auto repair facility as PCE is still in use at these facilities. Dr. Green said it is rare to have a vapor issue of the type Ms. Hahn was inquiring about where there would be concentrations in ambient air. Mr. Gortva added the only time there would be [significant measurable] solvents in the ambient air is when there is an active industrial process releasing solvents to the air, such as spraying paint. Ms. Hahn asked what the levels would need to be to present a potential vapor issue and referenced a newspaper article some time back where air monitors had detected elevated levels during field work. Mr. Cherry said the newspaper article referred to air monitoring that was done during the drilling of wells when the ambient air around the drilling site [at the drilling equipment] is monitored for volatile organic compounds. He said there were detections, but this is a different scenario than what Ms. Hahn is describing where there would be vapor concentrations in the ambient area where drilling was not being conducted. Mr. Gortva stated at the Area B source area, the contaminated groundwater is 100 feet or more below the ground surface, and there is nothing that is driving a large mass of solvent up to the surface which is why the contamination has remained in that space for more than 30 years as it is not moving, except for slowly diffusing into the groundwater water. Mr. Gortva said the source area also has a cap which provides another layer of protection so solvents are not going to be detected in the ambient air.

**6. Area B Landfill Cap Monitoring Network Expansion** presented by Mr. John Buck, US Army Corps of Engineers, Baltimore District

Mr. Gortva stated that while developing a monitoring plan for the landfill caps at Area B, EPA, Maryland Department of the Environment and the Army identified a number of locations where new monitoring wells were needed. He advised the work is being performed by the Baltimore District, Corps of Engineers, and Mr. John Buck will be providing an update on the progress of this project.

Mr. Buck said 16 new groundwater monitoring well locations had been identified. He noted the work also included properly abandoning and replacing five consistently dry wells. Mr. Buck said the third component of the work was to install six pairs of lysimeters at each capped landfill. Mr. Buck referenced his presentation at the last RAB meeting where he discussed the purpose of the lysimeters which is to monitor the performance of the capped areas to determine if they are inhibiting percolation of surface water through the soil into the waste.

Mr. Buck displayed a map showing the locations of new wells, noting they are focused around the disposal areas. He advised six have been installed to date with depths ranging from 45 feet to 61 feet. He stated they were all installed in limestone bedrock wherever the shallowest water was encountered. Mr. Buck showed photographs of the drill rigs and the drilling set-up. Mr. Buck said the five dry wells have been closed, and the five replacement wells have been drilled and completed. Mr. Buck said the lysimeters will begin to be installed the following week with the installation projected to be finished by mid-December. He noted the remaining work is weather and funding dependent but the plan is to have all the work done by the end of December. He advised once the wells are installed, a contractor will be conducting groundwater sampling.

Mr. Barry Glotfelty asked what method of drilling would be used to install the lysimeters, and Mr. Buck responded that auger drilling would be used.

Mr. Rudy asked if the lysimeters have not been installed yet, then there is no evidence that the caps are performing as intended. Mr. Buck responded that the lysimeters are intended to be an additional line of evidence [that the caps are functioning as designed], but there has been in place a semi-annual inspection program where the caps are physically inspected for erosion, subsidence, and animal intrusion, along with groundwater monitoring. Mr. Buck reminded the RAB the groundwater was contaminated before the disposal areas were capped, so the presence of contamination in the groundwater does not mean the caps are not functioning as intended. He said the caps are preventing exposure to the waste in the ground and minimizing the infiltration of rainwater through the waste into the groundwater. Mr. Gortva added that five-year reviews also re-evaluate the effectiveness of the capping remedy; however, any issues observed during any inspections are immediately addressed. Mr. Gortva reminded the RAB that the caps were primarily to address contact with the waste; the current Remedial Investigation will separately address the groundwater contamination and work in conjunction with the caps.

Mr. Rudy and Ms. Hahn raised concerns about the proposed City road. Mr. Gortva stated the City has contacted Fort Detrick about drilling geotechnical borings along the proposed pathway and collecting samples to be sure there are no problems with the soils to support the roadway and other design considerations. Ms. Hahn asked about the depth of the borings, and Mr. Gortva responded they would [likely] be about fifteen feet deep, and the work would be conducted only after an approved dig permit is issued by Fort Detrick.

Ms. Hahn expressed concern about the drilling being done near the disposal areas in the event there could be waste outside of the capped areas or groundwater might be encountered. Dr. Green stated the depth to groundwater is known for that area, and there is good coverage of that area with monitoring wells. Dr. Green noted that groundwater elevation data exists for the area. Mr. Cherry noted that geotechnical borings are not very deep, are temporary, and are done before construction projects to help with the design. Mr. Cherry said the purpose is not to encounter groundwater and if groundwater was encountered, safety precautions would already have been put in place including their drillers being made aware and perhaps air monitoring, but sampling of the groundwater would not be done. Mr. Cherry noted these are standard safety precautions for any drilling project, and the drilling would not be an unacceptable risk.

Dr. Green stated there have been a number of new monitoring wells installed recently, and asked Mr. Cherry and Mr. Buck if any waste was encountered when installing these wells which were drilled much deeper than the proposed City boreholes would be drilled. Both Mr. Cherry and Mr. Buck said no waste was encountered.

Mr. Gortva provided the following information:

- Waste is contained underneath the caps. Adjacent surface soil is not contaminated and soil down 10 feet is not contaminated.



- A number of studies and surveys have been done to delineate where the waste is present. Aerial photographs over the years show where there have been disturbed areas. Electromagnetic surveys have been done, and waste is not seen outside the capped areas.
- Fort Detrick has suggested the City perform another electromagnetic survey, and the City has just completed that survey. The survey found nothing that would indicate buried waste.
- The depth at which the water table is encountered in this area ranges from 30 feet below the ground surface to 47 feet or deeper and is not going to be encountered during the borehole drilling. The water table is not as deep (10 to 12 feet below ground surface) further east.
- The only purpose of the boreholes is to see if the soil will support the roadway, such as ensuring there are no sinkholes or voids; the drilling will not dig into waste or the caps.
- There is not an exposure pathway from the waste to a person on the roadway. The waste is buried under soil and is covered by a soil cap which is topped with a plastic liner and then covered with more soil and vegetation.
- The City will be required to submit its plans and schedule for drilling, including a health and safety plan that will require immediate contact with Fort Detrick if anything unusual is encountered during the drilling.

Mr. Gortva advised the City may have taken surface soil samples; he said he would check when he returned to his office. (After the meeting, Mr. Gortva advised the City's contractor did take 10 soil samples along the proposed route. The samples were properly analyzed for Volatile Organic Compounds (VOCs), Semi- Volatile Organic Compounds (SVOCs), and Herbicides using a well-known testing laboratory. All results were below EPA risk screening levels for soils. There were no detections of Chloroform, TCE or PCE in the soil.)

Mr. Gortva emphasized allowing the boreholes does not constitute approval to build the road as plans have not yet been reviewed or approved. He noted the NEPA process needs to be followed, including preparing at least an Environmental Assessment, and this process is underway; the City is responsible for preparing the required NEPA documentation.

## **7. RAB Member Open Discussion and General Community Comments**

Mr. Gortva invited open discussion from the RAB members. Mr. Rudy asked if copies of the meeting's presentations would be added to the web site, and Mr. Gortva confirmed they would be added. Ms. Morris said she would also send an electronic copy by email to Mr. Rudy.

Mr. Gortva invited comments for the community members in the audience; none were offered.

## **8. Future Meeting Dates**

Mr. Gortva said proposed future meeting dates are March 7, 2018, July 11, 2018, and November 7, 2018. Mr. Gortva said all the dates are tentative until the room is booked.

Mr. Gortva invited Board members to let him know about topics of interest for future meetings.

The meeting adjourned at approximately 8:32 p.m.

Reviewed by:

Approved/Disapproved

Enclosures:

Area B Groundwater Remedial Investigation Status

Area B Groundwater Monitoring Well Network

Meeting Sign-In Sheet

DISTRIBUTION:

Each RAB Member (w/o enclosure)

Each Meeting Attendee (w/o enclosure)



# ENVIRONMENTAL RESTORATION SERVICES FORT DETRICK, FREDERICK MD

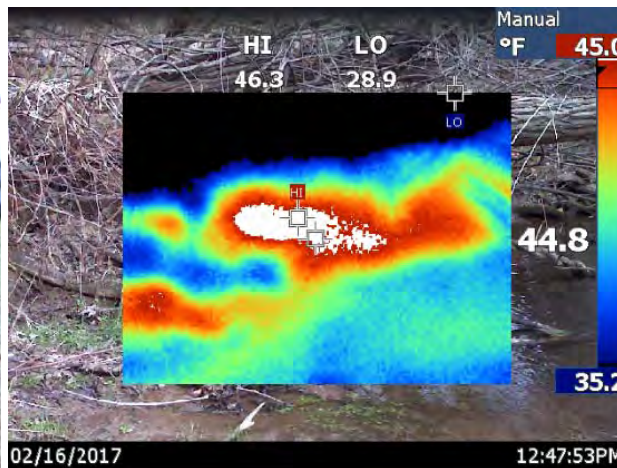
## Progress Report for the RAB

November 08, 2017

John Cherry  
Arcadis

# Overview of Topics

## □ Area B Groundwater Remedial Investigation (RI) Status














# Fort Detrick Area B Study Areas

ID	Study Area
A	B-11 disposal pit
B	Off-Post Property Nearest Source (Waverley)
C	Groundwater contaminant plume from B-11
D	Vapor Intrusion Study area
E	Shallow groundwater Contamination Area (PCE)
F	Carroll Creek (including seeps, springs, tributaries)
G	Off-Post Properties (Downgradient)
H	Off-Post Properties (Upgradient)
I	Active Landfill

There are multiple on-going and overlapping investigation efforts in and around Area B. This figure provides a generalized representation of the current on- and off-post Area B study areas. Phased investigation activities are being conducted with EPA and MDE oversight and in accordance with approved work plans following the CERCLA process within these areas. For RAB meetings this figure is included in the slides to indicate which areas are the focal points of the meeting, recognizing that all areas cannot be discussed during each quarterly meeting. Note that shaded boundaries for each study area are approximate and provided only for general representation.



# Supplemental Off-Post RI Investigations Underway

ID	Study Area
	B-11 disposal pit
	Off-Post Property Nearest Source (Waverley)
	Groundwater contaminant plume from B-11
	Vapor Intrusion Study area
	Shallow groundwater Contamination Area (PCE)
	Carroll Creek (including seeps, springs, tributaries)
	Off-Post Properties (Downgradient)
	Off-Post Properties (Upgradient)
	Active Landfill










**Off-post remedial investigation activities completed in 2017 in purple Study Areas**



# 2014-2015 Additional Data Gap Work

## Shallow PCE Groundwater Contamination Area on County Property

- ✓ Completed 10 soil gas sampling points around existing buildings.
- ✓ Drilled 8 new permanent monitoring points.
- ✓ Collected 2 rounds of VOC groundwater samples from new monitoring points.
- ✓ Sampled all 34 existing piezometers for VOCs, including the location on County property with the PCE MCL exceedance.
- ✓ Completed isotopic analysis of samples to try to “fingerprint” PCE, TCE, and chloroform concentrations in on- and off-post groundwater.
- ✓ Completed synoptic groundwater gauging event across entire Area B study area (187 measurement locations) including new points on County property.

ID	Study Area
	B-11 disposal pit
	Off-Post Property Nearest Source (Waverley)
	Groundwater contaminant plume from B-11
	Vapor Intrusion Study area
	Shallow groundwater Contamination Area (PCE)
	Carroll Creek (including seeps, springs, tributaries)
	Off-Post Properties (Downgradient)
	Off-Post Properties (Upgradient)
	Active Landfill



# 2014-2015 Additional Data Gap Work

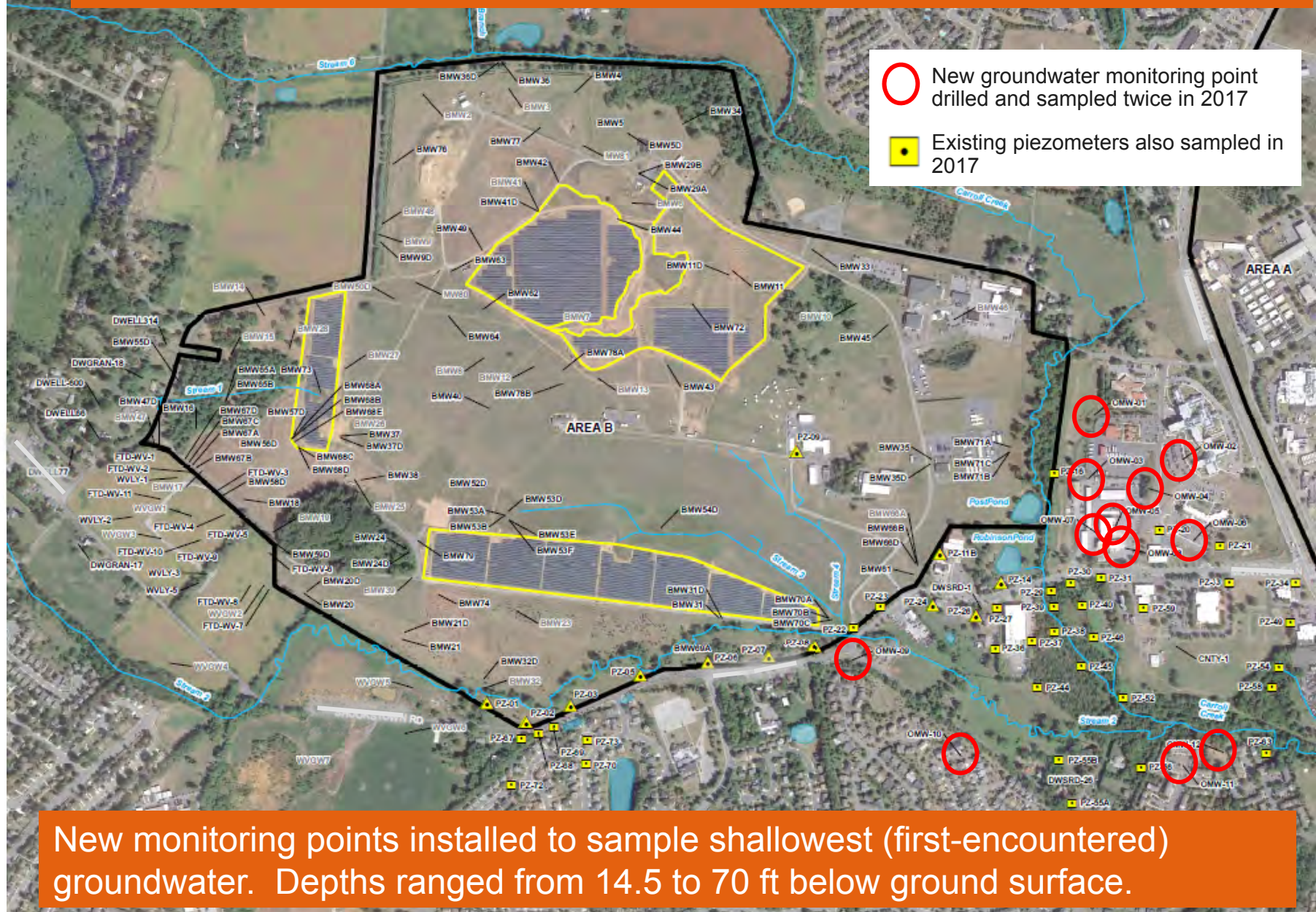
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8	Off-Post Properties (Upgradient)
9	Active Landfill

## Off-Post Properties

- ✓ Installed 4 new permanent monitoring points.
- ✓ Collected 2 rounds of VOC groundwater samples from the new monitoring points and one round of VOC groundwater samples from the existing piezometers in this area.



# Groundwater Monitoring Points Across the Area B Study Area



# - 2017 Supplemental RI Field Work – Observations

## New Permanent Monitoring Points (*sampled twice in 2017*)

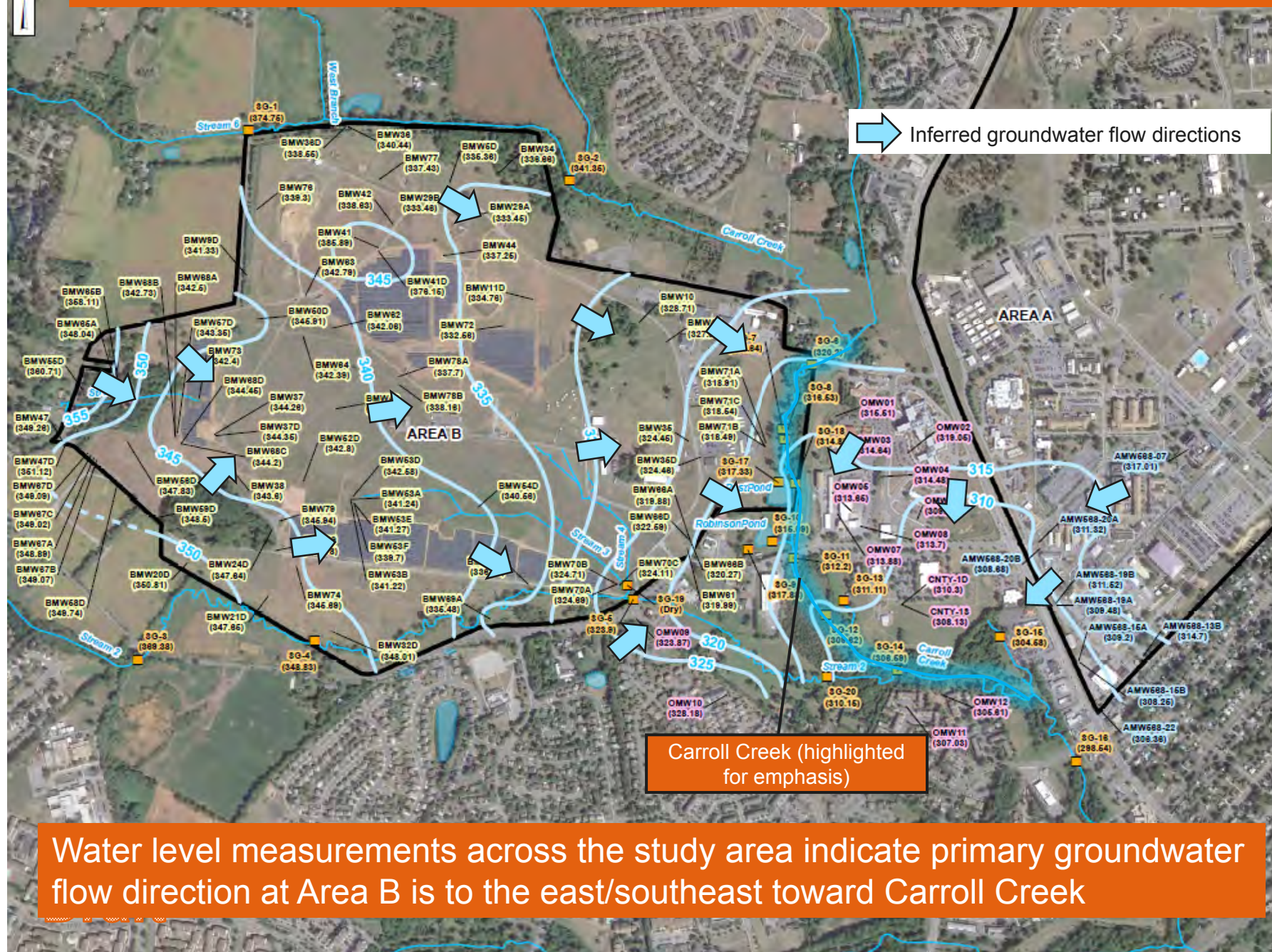
- No PCE was detected in any of the 12 new off-post monitoring points during the two sampling rounds in 2017.
- TCE was detected in three of the twelve new points at low concentrations below the drinking water standard (MCL). The maximum concentration was 0.5 µg/L (MCL = 5 µg/L)
- The only MCL exceedance was benzene in a new shallow point located adjacent to a vehicle fueling station along Montevue Lane. The maximum concentration was 17 µg/L (MCL = 5 µg/L). *This detection is not related to Army activities.*

## Existing Shallow Piezometers (*resampled in 2017*)

- Trace, estimated PCE concentrations were reported in 2017 at the two points on County property where PCE was detected above the MCL in 2012. Concentrations were 0.1 J and 0.3 J µg/L in 2017 (down from 26 µg/L and 9.1 µg/L in 2012, respectively).












# Shallow Bedrock Groundwater Contours (2017)





# 2014-2015 Additional Data Gap Work

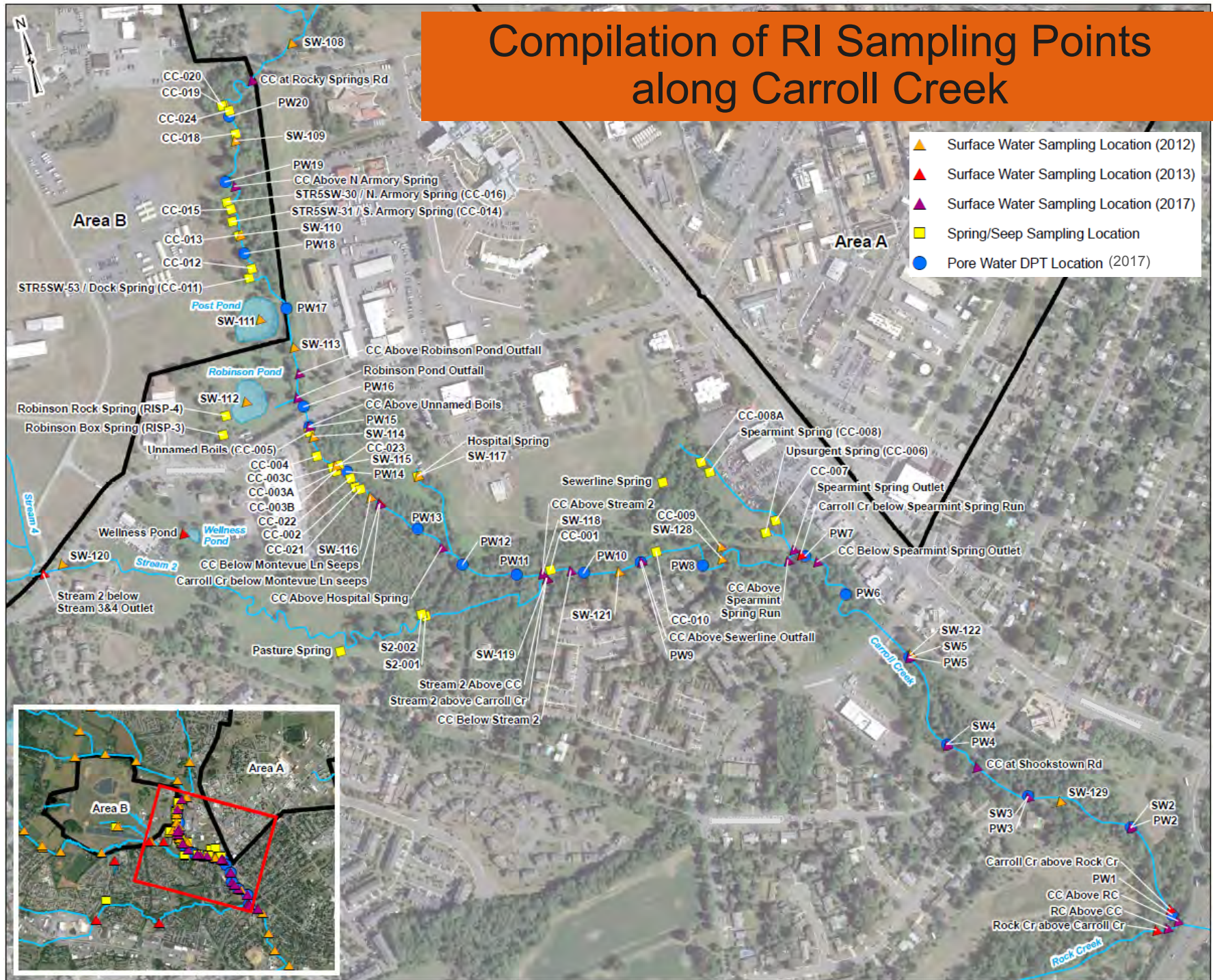
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	Off-Post Properties (Upgradient)
	Active Landfill

## Carroll Creek Follow-On Evaluation

- ✓ Resurveyed Carroll Creek to check for seeps and springs with visual and infrared survey.
- ✓ Collected surface water and 20 pore water samples in Carroll Creek
- ✓ Completed isotopic analysis of samples to try to “fingerprint” PCE, TCE, and chloroform concentrations in on- and off-post groundwater.



# Compilation of RI Sampling Points along Carroll Creek



# - 2017 Supplemental RI Field Work – Observations

## Surface Water (Carroll Creek)

- 22 surface water samples collected in 2017.
- Highest TCE detections were in the primary discharge area at 2.2 and 3.4  $\mu\text{g/L}$ . Concentrations decrease further downstream.
- Low estimated PCE detections at 4 locations (up to 0.2  $\mu\text{g/L}$ ).

## Pore Water (Carroll Creek)

- 20 water samples collected in 2017.
- TCE was detected in pore water at up to 4.9  $\mu\text{g/L}$  in the primary discharge area (near Montevue Lane).
- Low estimated PCE detections at 4 locations (up to 0.4  $\mu\text{g/L}$ ).

## - 2017 Supplemental RI Field Work – Observations

### Seeps and Springs

- 14 seep and spring samples collected in 2017.
- Concentrations and locations with detections in 2017 were very similar to 2012 results.
- Highest TCE detections were in the primary discharge area at 8.8 and 11 µg/L.
- Low PCE detections in the primary discharge area (up to 0.6 µg/L).



## Next RI Steps:

- A draft comprehensive CERCLA Remedial Investigation (RI) report detailing all Area B investigation activities and analytical results collected to date will be submitted to the Army in 2017.
- RI report will include human health risk evaluation.
- RI report will support evaluation of potential remedial alternatives in a future Feasibility Study document.
- Army is also in discussions with EPA and MDE about a potential pilot study to assess remedial options and developing a Work Plan with proposed pilot study options.
- The Army is currently working with the US Geological Survey to evaluate the past groundwater tracer studies. The intent is to determine an agreed-upon path forward to regulatory acceptance of the Conceptual Site Model for Area B Groundwater.
- It is not anticipated that further RI work will be recommended to EPA and MDE, but this is subject to concurrence by the regulatory agencies.



# **Fort Detrick Area B Status Update Landfill Cap Monitoring Network Expansion**

U.S. Army Corps of Engineers  
November 8, 2017



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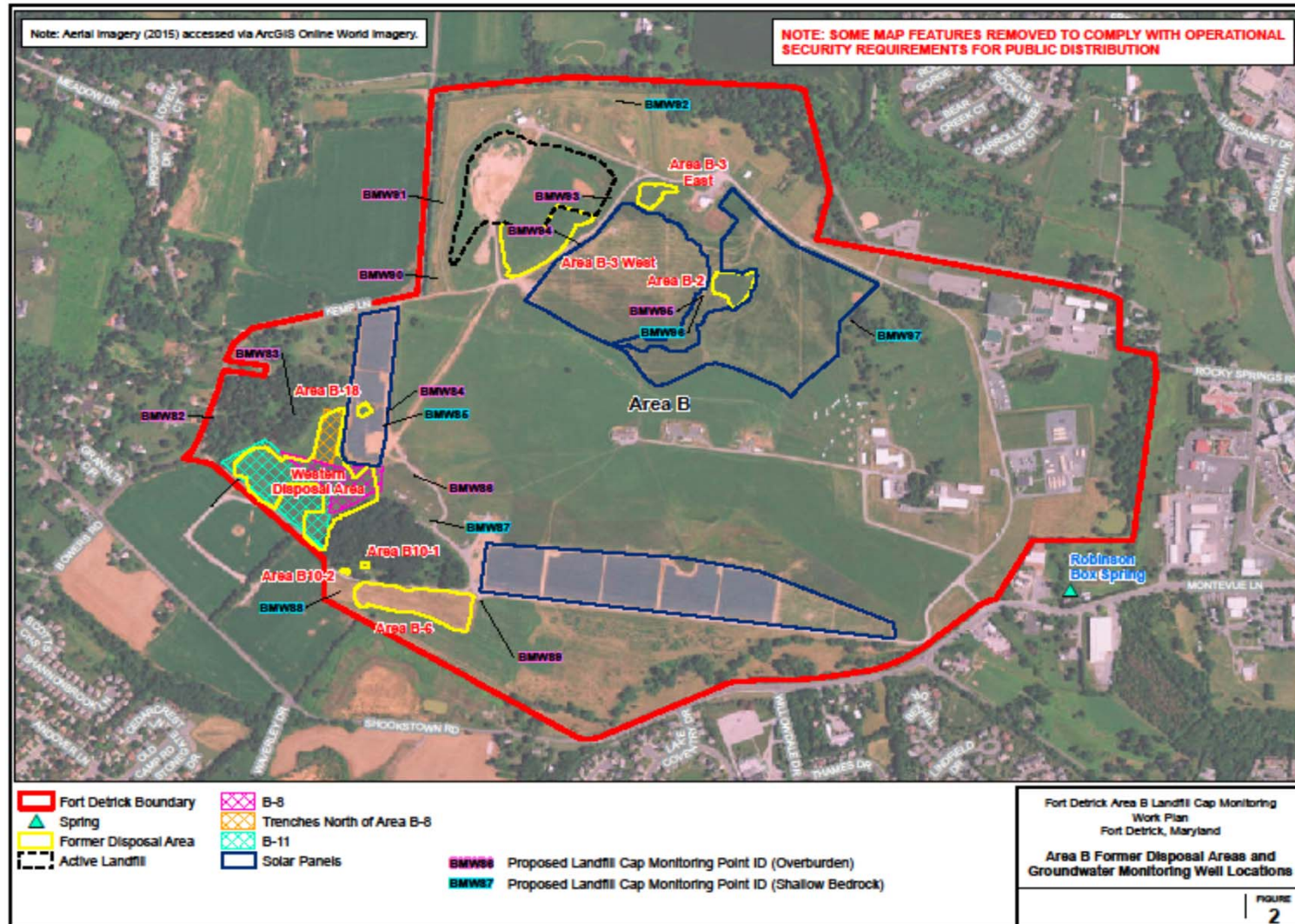
**BUILDING STRONG®**

# Scope of Work

- Install 16 new monitoring wells to expand the existing monitoring network surrounding the capped landfills.
- Properly abandon and replace 5 consistently dry monitoring wells.
- Install a pair of lysimeters at each capped landfill (6 pair total).



# New Well Locations



# Status of 16 New Wells

- Six of the 16 wells have been completed to date. Completed wells include BMW84, BMW85, BMW87, BMW88, BMW92 and BMW97.
- Well depths ranged from 45 feet (ft) to 61 ft. All wells were completed in limestone bedrock with 15 ft of screen.
- Numerous voids were encountered in each borehole. Voids ranged from a 1 ft to 6 ft cavities.

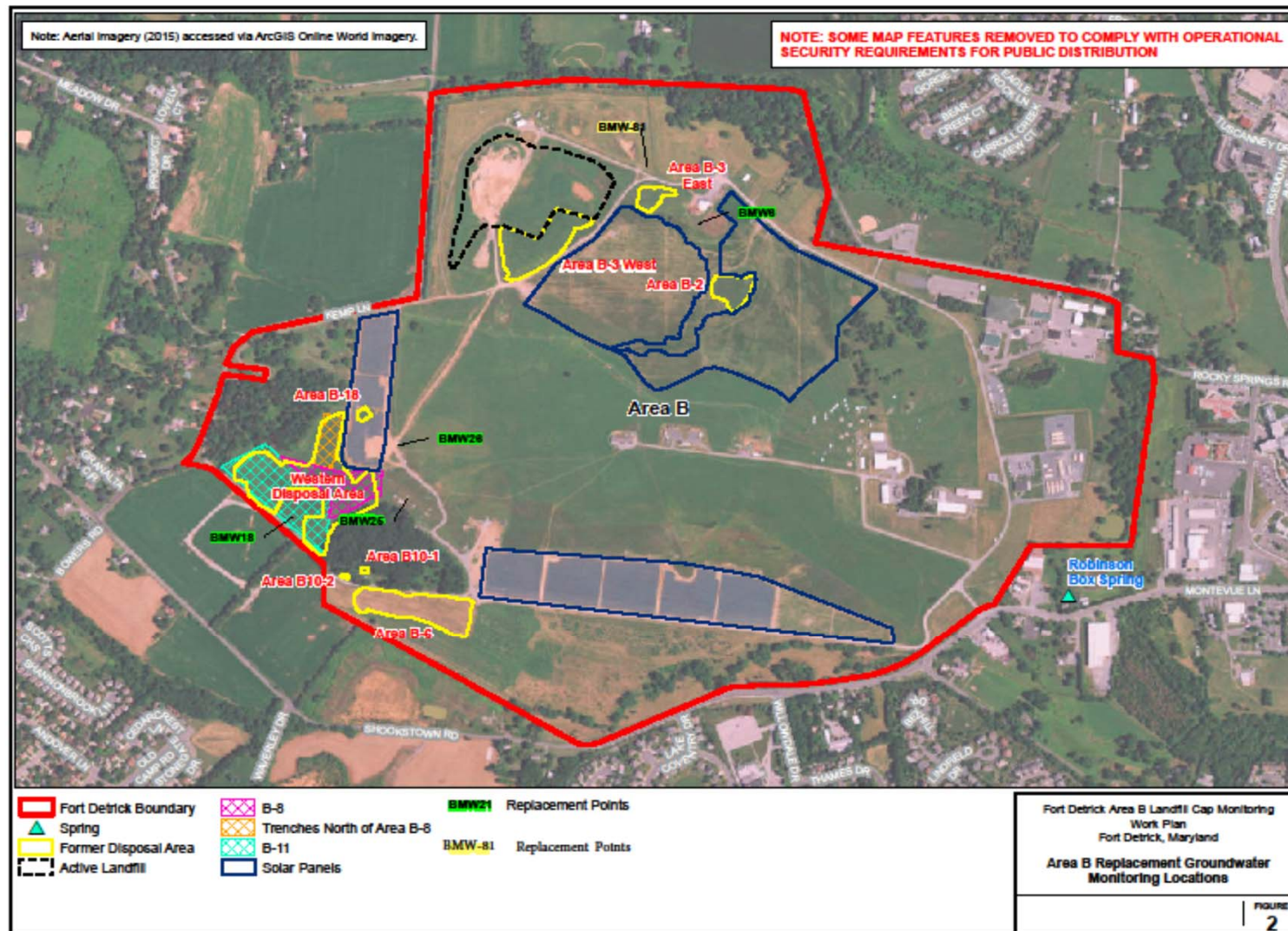


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# Replacement Well Locations



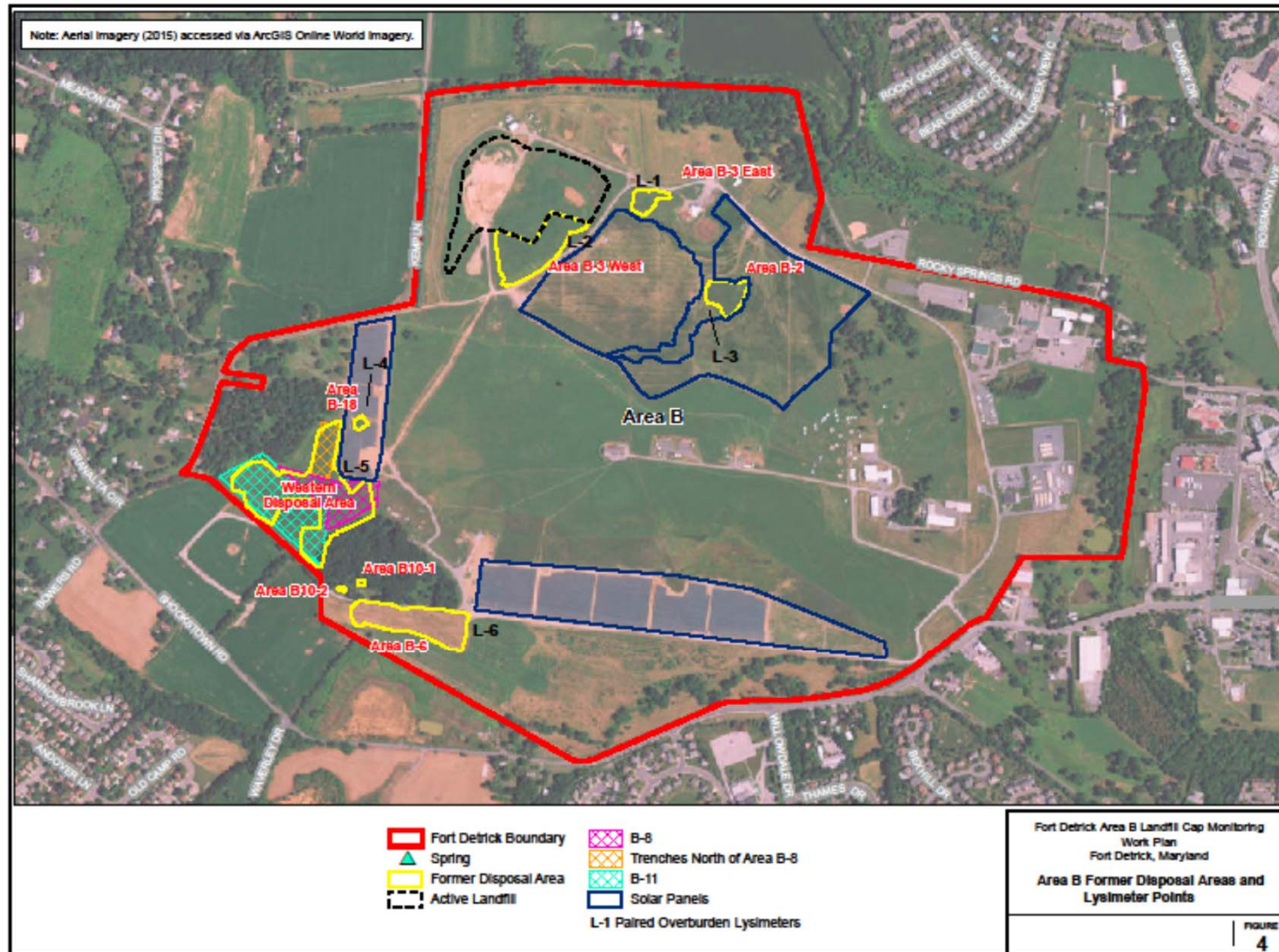
# Status of Replacement Wells

- Five, consistently dry, wells have been properly abandoned (grouted and sealed).
- Installation of the 5 replacement wells is complete (BMW6R, BMW18R, BMW25R, BMW26R and BMW81R).
- Wells ranged from 45 ft to 90 ft in depth. All wells were completed in limestone bedrock with 15ft of screen, except for BMW18R (10ft screen).
- Numerous voids were encountered in each borehole. Voids ranged from a 1 ft to 16 ft cavities.





# Lysimeter Locations



# Status of Lysimeters

- The installation of 6 pair of lysimeters is scheduled to begin this week.



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# USACE Drilling Setup



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# USACE Drilling New Well



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# USACE Drilling New Well



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# Schedule

- The remaining 10 well installations are projected to be complete by 22 December 2017.
- A 2<sup>nd</sup> USACE drill crew was mobilized this week (6 Nov) to the start the Installation of Lysimeter Wells. Lysimeter installation is projected to be complete by 15 December 2017.





# ENVIRONMENTAL RESTORATION SERVICES FORT DETRICK, FREDERICK MD

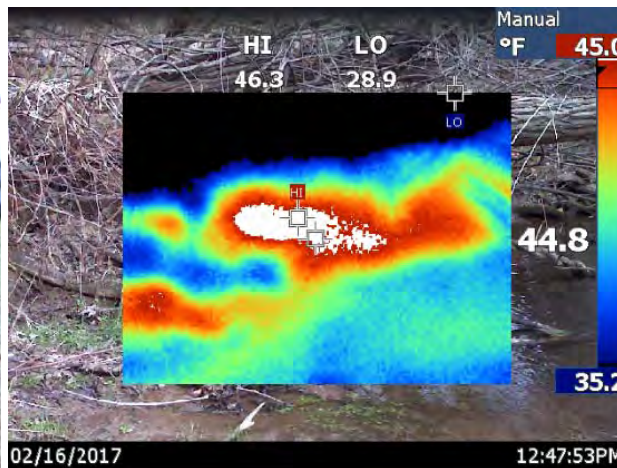
## Progress Report for the RAB

November 08, 2017

John Cherry  
Arcadis

# Overview of Topics

## □ Area B Groundwater Remedial Investigation (RI) Status














# Fort Detrick Area B Study Areas

ID	Study Area
A	B-11 disposal pit
B	Off-Post Property Nearest Source (Waverley)
C	Groundwater contaminant plume from B-11
D	Vapor Intrusion Study area
E	Shallow groundwater Contamination Area (PCE)
F	Carroll Creek (including seeps, springs, tributaries)
G	Off-Post Properties (Downgradient)
H	Off-Post Properties (Upgradient)
I	Active Landfill

There are multiple on-going and overlapping investigation efforts in and around Area B. This figure provides a generalized representation of the current on- and off-post Area B study areas. Phased investigation activities are being conducted with EPA and MDE oversight and in accordance with approved work plans following the CERCLA process within these areas. For RAB meetings this figure is included in the slides to indicate which areas are the focal points of the meeting, recognizing that all areas cannot be discussed during each quarterly meeting. Note that shaded boundaries for each study area are approximate and provided only for general representation.



# Supplemental Off-Post RI Investigations Underway

ID	Study Area
 A	B-11 disposal pit
 B	Off-Post Property Nearest Source (Waverley)
 C	Groundwater contaminant plume from B-11
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 I	Active Landfill










**Off-post remedial investigation activities completed in 2017 in purple Study Areas**



# 2014-2015 Additional Data Gap Work

## Shallow PCE Groundwater Contamination Area on County Property

- ✓ Completed 10 soil gas sampling points around existing buildings.
- ✓ Drilled 8 new permanent monitoring points.
- ✓ Collected 2 rounds of VOC groundwater samples from new monitoring points.
- ✓ Sampled all 34 existing piezometers for VOCs, including the location on County property with the PCE MCL exceedance.
- ✓ Completed isotopic analysis of samples to try to “fingerprint” PCE, TCE, and chloroform concentrations in on- and off-post groundwater.
- ✓ Completed synoptic groundwater gauging event across entire Area B study area (187 measurement locations) including new points on County property.

ID	Study Area
	B-11 disposal pit
	Off-Post Property Nearest Source (Waverley)
	Groundwater contaminant plume from B-11
	Vapor Intrusion Study area
	Shallow groundwater Contamination Area (PCE)
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	Off-Post Properties (Downgradient)
	Off-Post Properties (Upgradient)
	Active Landfill



# 2014-2015 Additional Data Gap Work

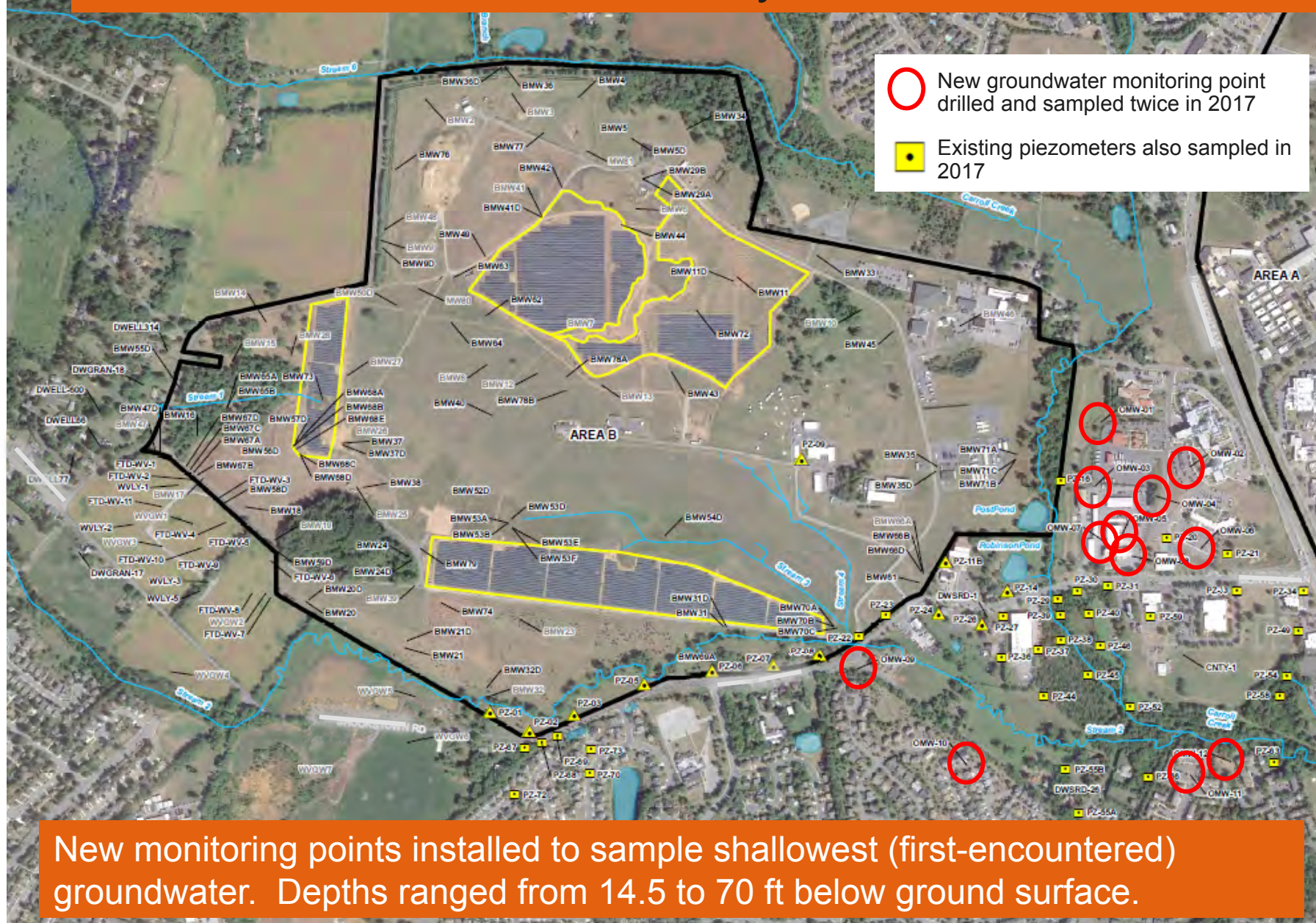
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2	Off-Post Property Nearest Source (Waverley)
3	Groundwater contaminant plume from B-11
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5	Shallow groundwater Contamination Area (PCE)
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7	Off-Post Properties (Downgradient)
8	Off-Post Properties (Upgradient)
9	Active Landfill

## Off-Post Properties

- ✓ Installed 4 new permanent monitoring points.
- ✓ Collected 2 rounds of VOC groundwater samples from the new monitoring points and one round of VOC groundwater samples from the existing piezometers in this area.



# Groundwater Monitoring Points Across the Area B Study Area



# - 2017 Supplemental RI Field Work – Observations

## New Permanent Monitoring Points (*sampled twice in 2017*)

- No PCE was detected in any of the 12 new off-post monitoring points during the two sampling rounds in 2017.
- TCE was detected in three of the twelve new points at low concentrations below the drinking water standard (MCL). The maximum concentration was 0.5 µg/L (MCL = 5 µg/L)
- The only MCL exceedance was benzene in a new shallow point located adjacent to a vehicle fueling station along Montevue Lane. The maximum concentration was 17 µg/L (MCL = 5 µg/L). *This detection is not related to Army activities.*

## Existing Shallow Piezometers (*resampled in 2017*)

- Trace, estimated PCE concentrations were reported in 2017 at the two points on County property where PCE was detected above the MCL in 2012. Concentrations were 0.1 J and 0.3 J µg/L in 2017 (down from 26 µg/L and 9.1 µg/L in 2012, respectively).



**Shallow Bedrock Groundwater Contours (2017)**

The map displays inferred groundwater flow directions (indicated by blue arrows) and water level measurements (elevation in feet) across the study area. The area is divided into two main regions: AREA A (north) and AREA B (south). The map shows various monitoring wells (BMW, OMW, CNTY) and their elevations. Key features include Carroll Creek (highlighted for emphasis), Stream 1, Stream 2, Stream 3, Stream 4, and Robinson Pond. The map also shows the location of the study area relative to the surrounding landscape.

**Water level measurements across the study area indicate primary groundwater flow direction at Area B is to the east/southeast toward Carroll Creek**










► Inferred groundwater flow directions

Carroll Creek (highlighted for emphasis)

Water level measurements across the study area indicate primary groundwater flow direction at Area B is to the east/southeast toward Carroll Creek



# 2014-2015 Additional Data Gap Work

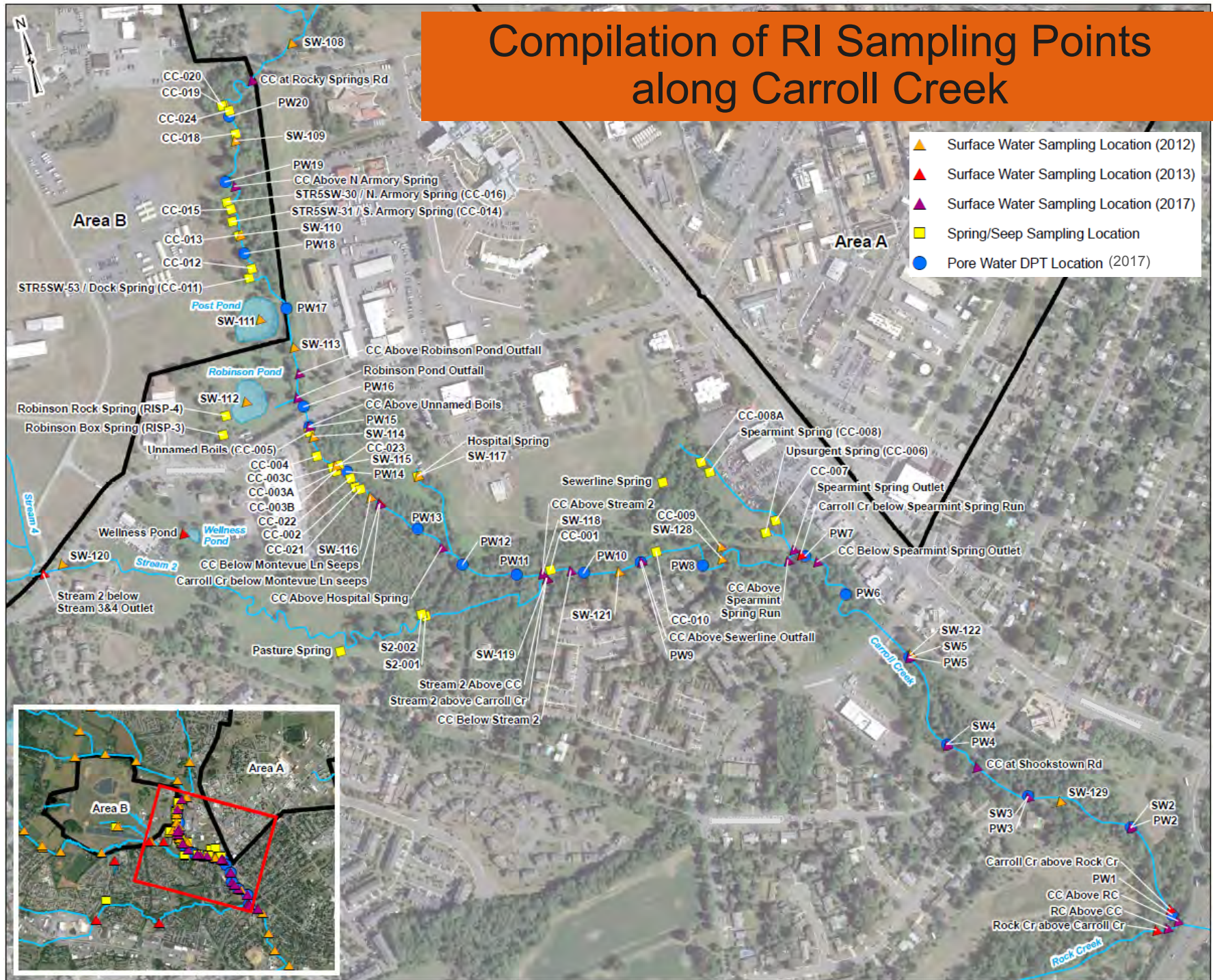
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	Off-Post Properties (Upgradient)
	Active Landfill

## Carroll Creek Follow-On Evaluation

- ✓ Resurveyed Carroll Creek to check for seeps and springs with visual and infrared survey.
- ✓ Collected surface water and 20 pore water samples in Carroll Creek
- ✓ Completed isotopic analysis of samples to try to “fingerprint” PCE, TCE, and chloroform concentrations in on- and off-post groundwater.



# Compilation of RI Sampling Points along Carroll Creek





# - 2017 Supplemental RI Field Work – Observations

## Surface Water (Carroll Creek)

- 22 surface water samples collected in 2017.
- Highest TCE detections were in the primary discharge area at 2.2 and 3.4  $\mu\text{g/L}$ . Concentrations decrease further downstream.
- Low estimated PCE detections at 4 locations (up to 0.2  $\mu\text{g/L}$ ).

## Pore Water (Carroll Creek)

- 20 water samples collected in 2017.
- TCE was detected in pore water at up to 4.9  $\mu\text{g/L}$  in the primary discharge area (near Montevue Lane).
- Low estimated PCE detections at 4 locations (up to 0.4  $\mu\text{g/L}$ ).

## - 2017 Supplemental RI Field Work – Observations

### Seeps and Springs

- 14 seep and spring samples collected in 2017.
- Concentrations and locations with detections in 2017 were very similar to 2012 results.
- Highest TCE detections were in the primary discharge area at 8.8 and 11 µg/L.
- Low PCE detections in the primary discharge area (up to 0.6 µg/L).

## Next RI Steps:

- A draft comprehensive CERCLA Remedial Investigation (RI) report detailing all Area B investigation activities and analytical results collected to date will be submitted to the Army in 2017.
- RI report will include human health risk evaluation.
- RI report will support evaluation of potential remedial alternatives in a future Feasibility Study document.
- Army is also in discussions with EPA and MDE about a potential pilot study to assess remedial options and developing a Work Plan with proposed pilot study options.
- The Army is currently working with the US Geological Survey to evaluate the past groundwater tracer studies. The intent is to determine an agreed-upon path forward to regulatory acceptance of the Conceptual Site Model for Area B Groundwater.
- It is not anticipated that further RI work will be recommended to EPA and MDE, but this is subject to concurrence by the regulatory agencies.



# **Fort Detrick Area B Status Update Landfill Cap Monitoring Network Expansion**

U.S. Army Corps of Engineers  
November 8, 2017



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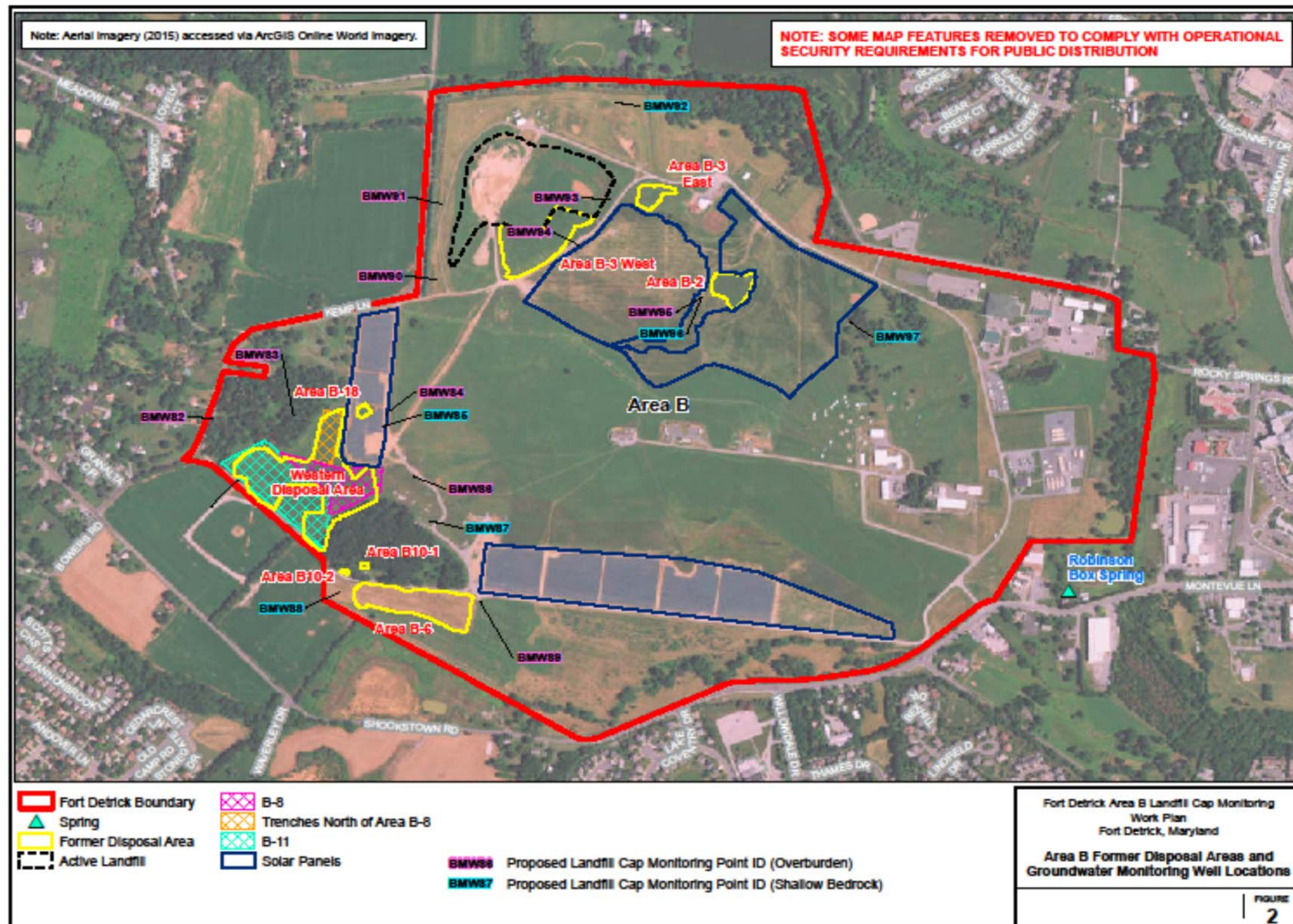
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# Scope of Work

- Install 16 new monitoring wells to expand the existing monitoring network surrounding the capped landfills.
- Properly abandon and replace 5 consistently dry monitoring wells.
- Install a pair of lysimeters at each capped landfill (6 pair total).



# New Well Locations



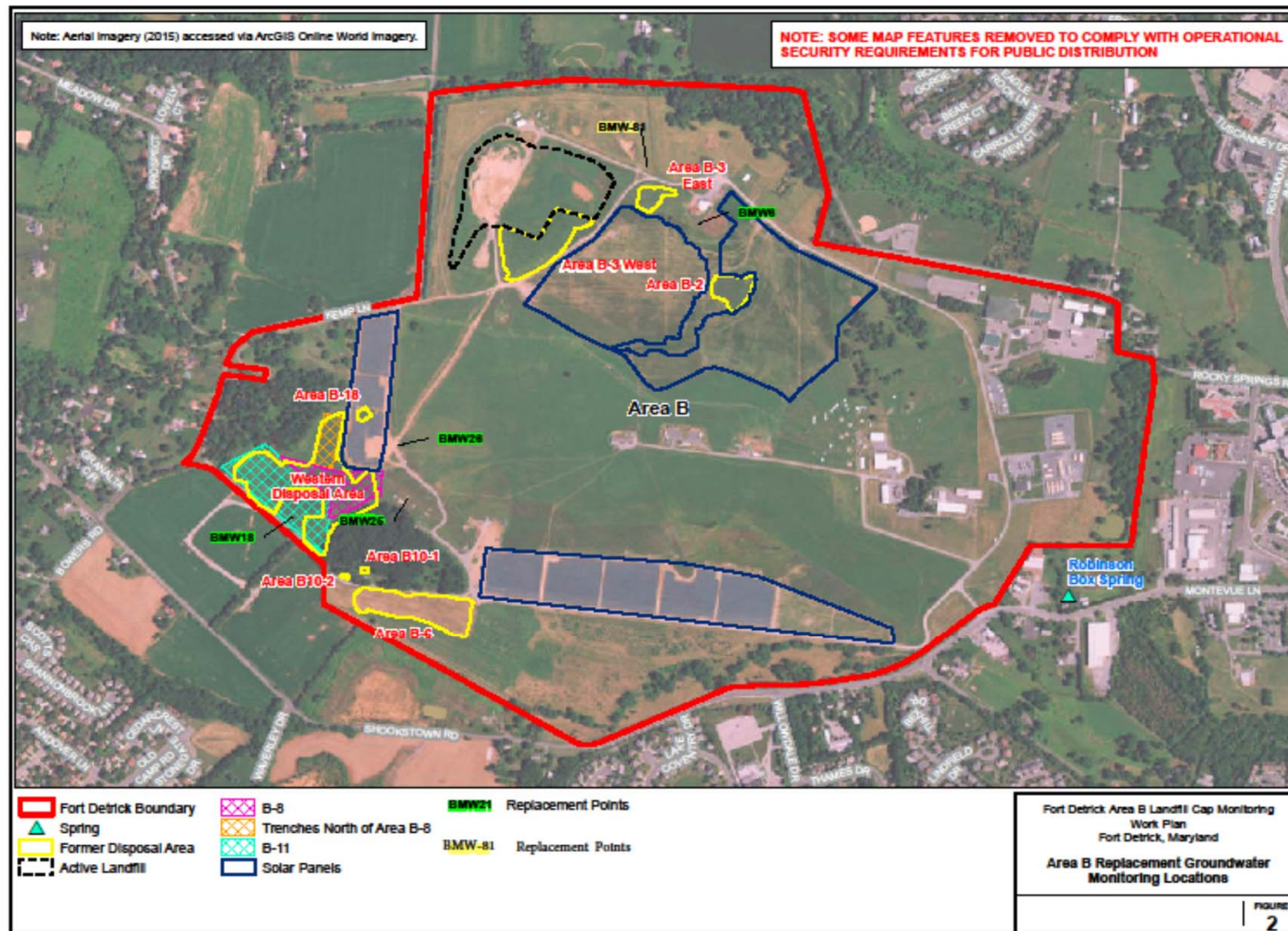


# Status of 16 New Wells

- Six of the 16 wells have been completed to date. Completed wells include BMW84, BMW85, BMW87, BMW88, BMW92 and BMW97.
- Well depths ranged from 45 feet (ft) to 61 ft. All wells were completed in limestone bedrock with 15 ft of screen.
- Numerous voids were encountered in each borehole. Voids ranged from a 1 ft to 6 ft cavities.



# Replacement Well Locations



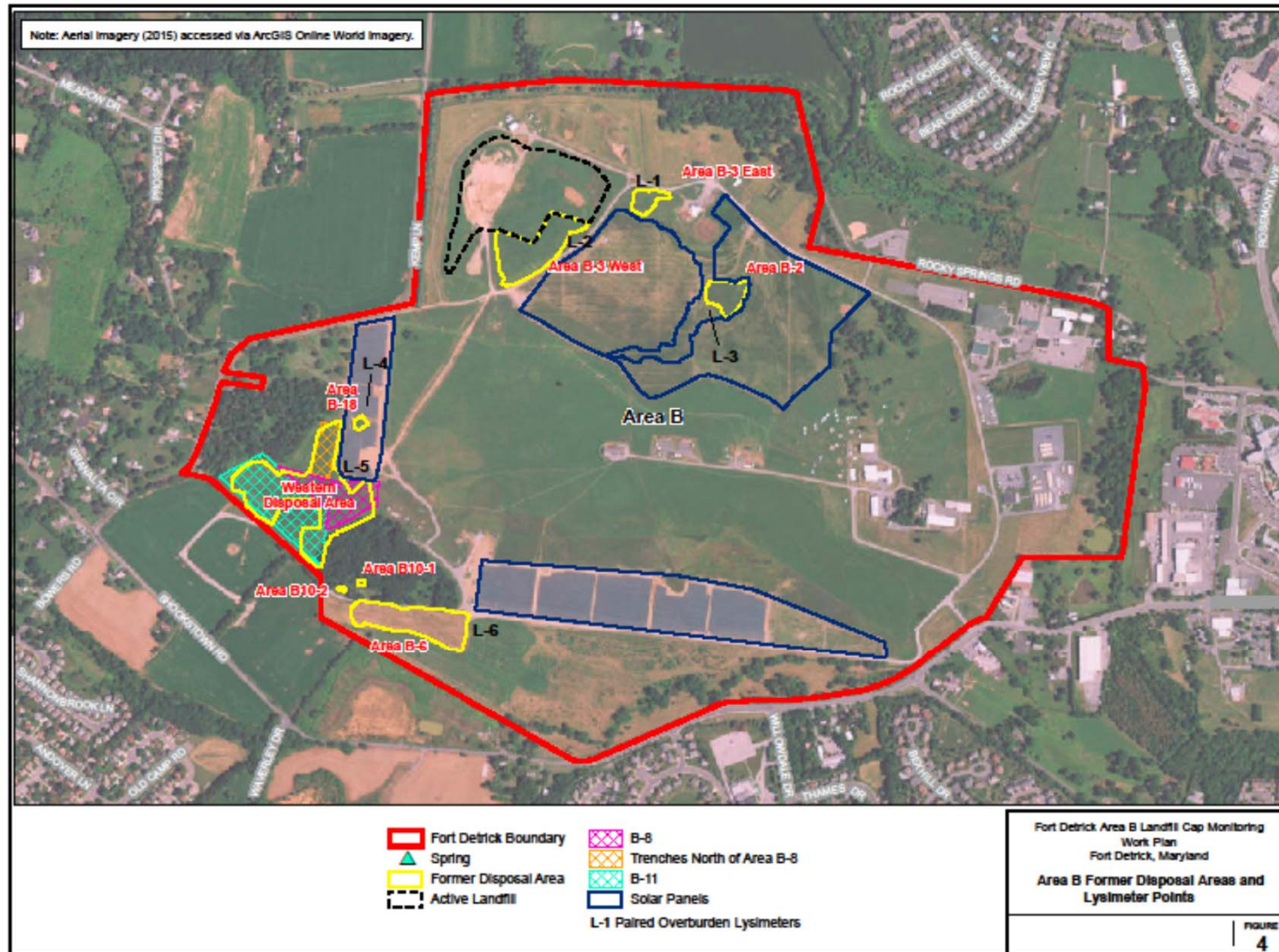
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# Lysimeter Locations



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# USACE Drilling New Well



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