IMFD–PWE

MEMORANDUM FOR RECORD

SUBJECT: Fort Detrick Restoration Advisory Board (RAB) Meeting Summary,
05 MARCH 2014

1. Summary Contents

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

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:
Mr. Robert Craig, Fort Detrick, Acting Co-Chair
Dr. Gary Pauly, Community RAB Member, Co-Chair
Mr. Rolan Clark, Community RAB Member
Mr. Eli DePaula, Community RAB Member
Mr. Joseph Gortva, Environmental Restoration Program Manager
Dr. Elisabeth Green, Maryland Department of the Environment
Ms. Jennifer Hahn, Community RAB Member

Others Present:
Mr. John Buck, US Army Corps of Engineers
Mr. Gareth Buckland, Fort Detrick Environmental Office
Mr. Nick Minecci, Fort Detrick Public Affairs Office
Mr. Gary Zolyak, Fort Detrick Office of the Staff Judge Advocate
Mr. Keith Hoddinott, US Army Public Health Command
Mr. George Rudy, Community Member
Mr. Terrence McPherson, McPherson Associates
Mr. Tom Lynch, Waverly View/Rocky Gorge Development
Dr. Barbara Brookmyer, Frederick County Health Dept.
Ms. Jessica Schmidt, CBI
Mr. Jeff Samuels, Representative Delaney's Office
Mr. Frank Anastasi, SCA Associates
Mr. John Cherry, ARCADIS
Mr. Tim Llewellyn, ARCADIS
Ms. Katrina Harris, Bridge Consulting Corp.

Members Absent:
Dr. Henry Erbes, Community RAB Member
Ms. Alicia Evangelista, Frederick County Health Department
Ms. Laurie Haines-Eklund, Army Environmental Command
Mr. Cliff Harbaugh, Community RAB Member
Ms. Karen Harbaugh, Community RAB Member
Mr. Barry Kissin, Community RAB Member
Ms. Helen Miller-Scott, Community RAB Member
Mr. James St. Angelo, Community RAB Member
Mr. Robert Thomson, U.S. Environmental Protection Agency

3. Meeting Opening / Remarks

Mr. Joe Gortva called the meeting to order. He thanked everyone for attending and welcomed everyone to the meeting. Mr. Gortva noted that the meeting had been postponed from February to March due to weather concerns and the desire to have more information to present. Mr. Gortva invited everyone present to introduce themselves.

Mr. Gortva stated that Mr. Rob Thomson from EPA advised funding was not yet available for travel, but he expects to be at the next meeting.

4. Purpose of RAB Meetings presented by Dr. Gary Pauly, Board Community Co-Chair

Dr. Gary Pauly summarized that the purpose of the Board and meetings. He noted that a Restoration Advisory Board is put together whenever a Department of Defense facility sees it has to deal with significant environmental issues. He stated that the Board acts as a conduit between the Army, its contractors, regulators like the U.S. Environmental Protection Agency and the Maryland Department of the Environment, and the public by holding meetings to exchange information among all interested parties.

Dr. Pauly reviewed the meeting ground rules, noting that discussion is limited to environmental restoration program issues. He advised that to facilitate communication, there is no video recording at the meetings. He stated that the public is certainly encouraged to participate, but he would ask their assistance in conducting the meeting in an orderly manner. Dr. Pauly noted that there would be time at the end of the presentations for discussion and questions by Board members, followed by the public's questions and comments. He noted that the meeting needed to end around 9 p.m. so he may interrupt at times to keep the meeting moving.

Dr. Pauly stated that the meetings are jointly chaired by the Army and the community, with himself being the community co-chair. Mr. Robert Craig stated that he would be the acting Army co-chair. Mr. Craig explained that there is a reorganization underway, and Col. Barthelme would probably not continue as the Army's co-chair. Mr. Craig said that a new Army co-chair will be appointed by the Garrison Commander.

5. Meeting Minutes presented by Mr. Joseph Gortva, Fort Detrick

Mr. Gortva noted that the minutes from the November 2013 minutes had been distributed to the Board members for review. He said that he had heard back from a few members who did not have any comments. He encouraged anyone who had comments to send them to him, and after making any revisions, he would have the minutes posted on the Fort Detrick web site [www.detrick.army.mil, under the Environmental tab]. Mr. Gortva noted that there would be an upcoming revamping of the web site including making it less confusing for the community and adding more updates on Area B. Mr. Gortva said that the link for the August 2013 minutes is now working, the November 2013 presentations have been added, and the November minutes will be posted as soon as they are final. Mr. Gortva said that there may be times over the next few weeks when the web site is not available as changes are being made.

Ms. Hahn and Mr. Rudy advised that they had not received the meeting minutes. Mr. Gortva said that he would talk to both of them after the meeting and check their email addresses. Ms. Hahn requested that the meeting minutes be distributed much sooner in the future so the information can be used at City/County meetings.

6. Area B Groundwater Investigation Update presented by Mr. John Cherry, ARCADIS

Mr. John Cherry reviewed the topics he would be covering including the work completed since the November 2013 meeting, an update on the groundwater tracer study, and an update on the additional on and off-post drilling.

Mr. Cherry stated that since the last Board meeting the groundwater tracer study had been completed. He noted that one new monitoring well was completed on the Waverly property, and three additional borings are in progress with some packer sampling results available. He advised that regular communication and conference calls had occurred with the U.S. Environmental Protection Agency (EPA) and Maryland Department of the Environment (MDE) during the field work, approximately every other week. He stated that Dr. Lis Green from MDE participated in the calls as did a number of people from EPA including their hydrogeologist, Kathy Davies, who had attended a Board meeting in the past.

Mr. Cherry displayed a slide showing a running list of activities that ARCADIS has been tasked with for the Area B Groundwater Investigation and their current status. He noted that all the original activities had been completed, and that the additional on and off-post drilling is underway.

Mr. Cherry stated that all the data collected had been used to produce a Conceptual Site Model which had been distributed to the Board.

Mr. Cherry displayed a graph of the Conceptual Site Model. He pointed out the location of B-11, an area which has been discussed as a source area for solvents and groundwater contamination. He reminded the Board that a removal action was conducted in 2004 to remove soil, but high level of solvents remain in the groundwater with concentrations as high as 15,000 parts per billion detected near B-11. Mr. Cherry noted that the model shows a rough approximation of the groundwater contamination, noting it leaves the Fort Detrick property and heads off in the direction of Carroll Creek, which is referred to as the primary discharge area as there are many seeps and springs where groundwater is entering, along with some low levels of contamination. Mr. Cherry pointed out the area of extensive groundwater monitoring wells, and areas (near the County property and along Carroll Creek and south of Area B) where extensive shallow direct push technology has been used to sample the groundwater. He stated that vapor intrusion work had also been completed, evaluating the potential for vapor intrusion in nearby buildings. Mr. Cherry said that the current field work involved drilling deep wells at three areas. He said that a new deep well at the center of Area B will be deeper than any current wells. He advised that a second deep well on the County property will also be deeper than any current wells in that area and will help assess whether there is any groundwater contamination beyond the primary discharge area and heading to the east or southeast. He stated that the third location for deep wells is the Waverly property which will help in the assessment of whether any contamination has crossed the fence line.

Mr. Rudy asked if the assessment of the County property on Montevue is complete. Mr. Cherry responded that the planned installation of one deep well has not yet begun. Mr. Rudy asked about the possibility of vapor intrusion in that area, and Mr. Cherry responded that the vapor intrusion work had been discussed as previous meetings, and the concentrations detected in that area were below screening criteria.

Mr. Frank Anastasi asked how deep the current deep wells extend and how deep the new wells will extend. Mr. Cherry responded that in 2011 and 2012 24 borings were drilled across Area B and 29 wells were installed, with some being nested wells. He said that nine of the borings extend to 320 feet or deeper and fairly extensive geophysical logging was performed on the borings completed in the final phase. He noted that only a few wells were constructed at the deeper depths as what was found at that depth were fractures that were not producing much water or fractures that did not have contamination in the shallow screens. Mr. Cherry said that there is a boring in the source area down to 328 feet, and a new well further downgradient will be attempted to 500 feet below ground surface. Mr. Cherry advised that off-post there is a completed well at about 175 feet deep which is the same depth where the highest levels have been found across the fence. He said that further to the south there are two borings at depths of 150 to 175 feet. Mr. Cherry said that the new off-post drillings will be installed down to 400 feet.

Dr. Barbara Brookmyer asked for confirmation that the additional off-post wells being drilled are south of Montevue Lane and Mr. Cherry said that Dr. Brookmyer was correct.

Mr. Anastasi asked what levels of chemicals were being seen in Carroll Creek and whether samples were being collected from the seeps or surface water. Mr. Cherry responded that both types of samples were collected. Mr. Cherry stated that concentrations in the seeps are in the 12 to 13 parts per billion range for TCE, and that the detections in the surface water are in the single digits. He stated that the concentrations are below the screening criteria for risk to recreational users. Mr. Anastasi stated that the concentrations detected for TCE were pretty low and asked what concentrations have been detected in the shallow groundwater. Mr. Cherry responded that the concentrations in the nearby shallow groundwater for TCE are in the range of 8 to 12 parts per billion and in the range of 20 parts per billion for PCE. Mr. Cherry added that that the primary contaminant at Area B is TCE and that it has been difficult to link the PCE to an obvious source. Mr. Gortva stated that Mr. Cherry's upcoming discussion of the tracer study would provide some additional insight on the PCE source.

Mr. Cherry explained that two tracers were introduced into the groundwater, each at a different depth and location, to help access groundwater flow velocity and direction as groundwater travels through the sub-surface. He stated that the work had begun in the spring of 2013 with a month of data collection to obtain background information before introducing the dye. He said that after the tracers were introduced, they were monitored for nine months.

Mr. Cherry displayed a map and discussed the generalized patterns of groundwater flow. He stated that the general flow is from the topographically higher areas (mountains) to the west and flowing towards the east. He said that the arrows across Area B depict the understanding of groundwater flow based on the extensive network of groundwater monitoring wells and stream gauges for surface water measurements. He explained that the monitoring well network on Area A shows the groundwater moving to the west, as indicated by the red arrows on the map. Mr. Cherry said that the existing shallow groundwater monitoring wells on the Waverly property show groundwater flow towards Fort Detrick as shown by the green areas; he noted that there would be a better understanding of the groundwater flow on the Waverly property after the

current drilling of additional, deep wells is completed. Mr. Cherry pointed out that the area referred to as the primary Area B discharge area.

He displayed an aerial photograph of the area and showed where the tracer was introduced, in monitoring wells in an area near B-11. He said that one well is approximately 140 to 155 feet below ground surface, and that the second well is approximately 325 to 328 feet below ground surface. He pointed out the more than 100 monitoring points for the tracer which included monitoring wells and surface water bodies throughout Area B and the primary discharge area, including some locations north and south of Montevue Avenue. He mentioned that the piezometer location where PCE has been detected was one of the locations monitored during the tracer study, as well as locations in Carroll Creek, Rock Creek and Baker Park. He stated that the tracer was most likely to discharge to springs and surface water in the primary discharge area based on the conceptual site model.

Mr. Rudy stated that both Area B and Area A converge into Carroll Creek. He asked if the stream water flowing into the City has been confirmed to be above or below acceptable limits for contamination. Mr. Cherry responded that Carroll Creek has been sampled and the results presented at previous meetings; he noted that no new data had been collected recently. Mr. Cherry reiterated the detection levels he had provided earlier in the meeting in response to Mr. Anastasi's questions about Carroll Creek. He repeated that the levels detected are well below the levels that would create a risk for recreational users. Mr. Rudy asked about the status of the discussion at a previous Board meeting about the possibility of posting signs at Carroll Creek. Mr. Craig responded that the Army had discussed the sampling results with Dr. Brookmyer and the County, and since the levels were below all thresholds that would trigger some concern, the decision was made not to put up signs.

Mr. Cherry said that after the tracers were introduced, samples were initially collected on a weekly basis and then spaced out further as the study advanced.

Mr. Cherry stated that Tracer A was introduced at 140 to 155 feet deep. He showed an aerial photograph and noted the yellow circles show where the tracer was detected. He stated that the detections of the tracer matched very well with the locations where TCE has been detected. Mr. Cherry said that Tracer A was introduced at a shallower depth than Tracer B, and Tracer A was detected fairly quickly, with detections in the primary discharge area in eight to ten weeks. He noted that the approximate travel times were in the range of 130 to 215 feet per day for the groundwater in this area. Mr. Cherry said that the locations were monitored for nine months with the tracer not being detected during that time in some locations. He said that the locations where the tracers were detected supports the assumptions underlying the Conceptual Site Model.

Mr. Rudy asked if the tracers were radioactive or chemical. Mr. Cherry said that the tracers were fluorescein and dyes, and they were not radioactive. Mr. Cherry said that the substances are commonly used in groundwater tracer studies.

Mr. Cherry referred to his discussion of the introduction of Tracer B at the last Board meeting and that it had only been seen at monitoring locations close to where it had been introduced. He stated that Tracer B did finally arrive in the primary discharge area after 24 to 28 weeks. Mr.

Gortva added that this data also confirmed what was being seen in the conceptual site model in that there is greater flow in the shallow groundwater, and as you go deeper, the flow is much slower. Mr. Cherry agreed and said that the travel time for Tracer B was about 25 feet per day.

Mr. Cherry displayed a graphic cross-section of the study area and summarized again the results of the tracer study. In response to a question by Dr. Green, Mr. Cherry said that some of the locations on the cross-section are just water-level monitoring locations and not tracer monitoring locations.

Mr. Cherry stated that the tracer study was performed with EPA and MDE oversight with periodic conference calls. He noted that one of the calls resulted in a decision to continue the data collection for a few more months to get a broader picture. He said that the last round of sampling was completed as of January 30, 2014, and that data continues to be assessed and analyzed. He said that a report will be prepared and submitted to the regulators and the Board.

Mr. Cherry next discussed the additional on and off-post drilling activities. He showed a picture of one of the two drill rigs being used. He reminded the Board that the scope of work calls for approximately seven new borings with installation of up to 11 wells, with some being nested wells. He noted that the drilling methodology is the same used in 2011/2012 with extensive geophysical logging and packer testing to make good decisions on the well construction. He said that the drilling began in early December and will most likely continue through May or June with the collection of samples. He added that the winter weather has presented some challenges that have slowed the work slightly.

Mr. Cherry displayed a map showing the three areas where the deep drilling is occurring. He said that the first location is at B-11 to install a well deeper that any current well; he said that current work is at location 2, the Waverly property, which is a priority; and that the third location on the County property will start later this spring.

Ms. Hahn asked for clarification on number of existing wells and the number of additional wells being installed and their depths.

Mr. Cherry said that there will be potentially seven new wells on the Waverly property, shallow and deep. He said that Waverly-1 is a new shallow well across from B-11, and is 145-155 feet deep. He said that in consultation with EPA and MDE, four zones were identified for packer testing. He said that two other locations on the Waverly property are in progress with Waverly-3 to have a well constructed in the next week at 100 to 115 feet below ground surface. He noted that Waverly-2 is another shallow well, and that the recommendation to EPA and MDE made earlier that day was to construct the well at about 89 to 95 feet deep.

Mr. Rudy asked for confirmation that no data to date has shown that groundwater flows off Area B in the direction of the Waverly property.

Mr. Cherry responded that there is a network of existing monitoring wells on the Waverly property, GW-1 through GW-7, that were constructed in the early to mid-2000's by the property owner. He noted that these wells range in depth down to about 110 feet. He said that there has

been data for some time showing those wells had been sampled, and no volatile organic compounds were detected. He said that gauging those wells and water level measurements, the groundwater flow is generally back towards Area B. He said that there have been questions and data gaps so the current scope of work is to further evaluate whether or not there is some groundwater flow in the direction of the Waverly property, particularly at the deeper level. Mr. Cherry stated that there has been a detection of TCE at 15,000 parts per billion at the Fort Detrick fence line so it is likely there is some impact over the fence line which is why there is a well being installed close to the fence line. He noted that the well locations were determined after discussions with EPA and MDE, and that they include both shallow and deep wells (down to 400 feet if possible) to see if there is some flow component at depth.

Ms. Hahn said that it would be helpful to see where on the map the new homes are proposed to be built as compared to the well locations.

Mr. Cherry did a quick refresher on the karst geology present in the area. He showed a cartoon sketch of what karst geology looks like. He noted that the geology in the area is all limestone. He explained that in the shallow portion where the drilling is taking place there is overburden (soil and sediment that can be drilled through), and then the harder limestone bedrock is encountered. He continued explaining that that rain and precipitation move through the overburden and become the groundwater that moves through the fractures and large conduits. Mr. Cherry showed some imagery from the Ft. Detrick investigations and showed what a fracture looks like at about 103 feet.

Mr. Rudy asked what was done with the water and sediment removed during the drilling. Mr. Cherry responded that the water is treated and then discharged through the treatment system at the landfill.

Mr. Cherry showed a graphic depicting what happens if there is a spill in karst geology. He stated that the contamination would work its way through the overburden, following fractures and pooling in some areas. He said that TCE can dissolve, not disappear, in groundwater which leads to a plume which moves with the groundwater. Mr. Cherry said that these are the kinds of things that are looked for during the drilling process and which can be seen through the geophysical logging equipment. He said that a fracture might be encountered, checked to see if could be water bearing, sampled at different depths, and based on laboratory analysis, determine where to put a permanent well.

Mr. Cherry discussed the packer sampling and showed a picture of the packer assembly. He explained that the data is considered usable to determine which fractures to target for permanent monitoring wells.

Mr. Cherry discussed the difference between packer sampling and permanent monitoring well sampling. He stated that packer sampling occurs during drilling and is a snapshot to see what is happening in the subsurface specifically for the purpose of targeting the location of permanent monitoring wells. He explained that once a monitoring well is constructed there is a waiting period before the well is sampled in order to obtain good reliable and reproducible data. He stated that packer sampling may or may not match data obtained from a permanent monitoring

well as it sometimes shows higher levels of contaminants and sometimes lower. Mr. Gortva added that a large amount of water can be produced during the drilling and a lot of water can be moved around and temporarily change flow paths; he said that this is one of the reasons why there is a waiting period [to return to steady state] before the monitoring wells is sampled.

Mr. Cherry reviewed the preliminary data obtained during the packer sampling. He advised that in Waverly-1, installed just over the fence line, TCE has been detected at concentrations above the drinking water standard. He noted that the well is about 100 to 125 feet from the fence line. He said that the levels detected are far lower (10's to low 100's parts per billion) than what is being detected on Fort Detrick at the fence line (15,000 parts per billion). Mr. Cherry said that at Waverly-2 TCE was not detected. He noted that at Waverly-3 the TCE detections were very low and were "j" qualified, estimated detections of TCE; he said that it is unclear whether they were actual detections. Mr. Cherry reiterated that the results were all from preliminary packer sampling, and that the monitoring well sampling will occur when all the wells are completed--May or June timeframe.

Mr. Rudy asked if seasonable rainfall conditions are taken into account. Mr. Cherry and Mr. Gortva stated that seasonable measurements, high/low water conditions, are taken into account during the sampling program.

Ms. Hahn asked if the stream had been tested. Mr. Cherry stated that it had been sampled and there were no TCE detections. He said that it also had been included in the dye tracer study, and the tracer did not show up in that location.

Mr. Rudy asked if off-gassing was being seen at the B-11 area. Mr. Gortva said that it is important to distinguish between what is in the groundwater versus what can get into the air. He said during drilling operations, air monitoring is conducted, and the meters did not show any levels of concern. In response to a question about vapor intrusion, Mr. Gortva said that EPA guidance is being followed which states that if a building is within 100 feet of a detection above five parts per billion, the building is sampled for the potential of vapor intrusion.

A representative for the Waverly property said that an access agreement has been given to the Army for drilling the monitoring wells so no homes will be developed near the wells at this time. He said that until the deep wells are sampled and data is obtained, there cannot be a decision about the need for the wells to stay in place. Mr. Cherry reminded everyone that Maryland Department of the Environment put land use restrictions in place which prevent the use of the groundwater on the Waverly property for drinking water purposes.

Mr. Craig commented that there is still additional work to be done leading to a remedial investigation report with human health and ecological risk assessments.

Mr. Cherry added that there are a number of techniques that can be used when development takes place above groundwater contamination. He stated that vapor barriers can be installed, similar to a radon situation, and such pathways need to be evaluated in the risk assessment process. Mr. Craig gave an example of a similar situation in Silver Springs where a new building was being constructed 200 yards away from groundwater contamination; part of the

construction approach was a sub-slab, passive vapor system in case it would be needed in the future.

Mr. Cherry displayed an aerial photograph showing TCE detections from the comprehensive 2012 sampling event and the recent interim packer test results. He noted that the preliminary data seems to indicate the groundwater does not appear to be migrating in the direction of the Waverly property.

Mr. Rudy asked whether there would be some type of active treatment system put in place near B-11. Mr. Craig responded that he had discussed the possibility with EPA about a year ago of taking an interim action, and EPA's hydrogeologist was not willing to allow the Army to take action until more data was obtained, particularly regarding the hydrogeology at the Waverly property. He said that there may be sufficient data soon to move toward some type of interim action. Dr. Green said that the assumption is that there will be an active remedy taken at Area B. She reminded the Board that there will be a Feasibility Study which will review possible alternatives. She said that the Army is required to evaluate taking no action and then all other alternatives are compared against taking no action. She stated that there are nine criteria under the Comprehensive Environmental Restoration, Compensation and Liability Act (CERCLA) that alternatives must be compared against, one of which is community acceptance, which is taken very seriously. Mr. Gortva confirmed that the Feasibility Study will be made available to the Board and to the public, followed by the Army's Proposed Plan which has a CERCLA mandated public comment period.

Mr. Rudy asked if any other major source other than B-11 had been identified on Area B. Mr. Cherry responded that the monitoring networks points towards B-11 as the primary source area. He said that there are other small landfills that the Army has investigated in the past and has capped. Mr. Cherry said that there is no indication there are other major source areas.

Mr. Rudy questioned the effectiveness of capping. Mr. Gary Zolyak asked Mr. Gortva for confirmation that capping is EPA's presumptive remedy for landfills, and Mr. Gortva agreed. Mr. Gortva added that landfill caps have a monitoring requirement and formal reviews every five years. Dr. Green added that the formal reviews continue as long as there waste left in place. Mr. Gortva said that the landfills are monitored on an annual basis to ensure there is no subsidence impacting the cap, and that the monitoring wells around the caps would provide data if there would be a new release. Mr. Gortva advised that another component of the five-year reviews is checking current regulations to see if any other actions might be required.

Mr. Gortva stated that there was a recent announcement in the newspaper that the Army is starting a five-year review of the landfill caps. He said that the review process includes interviews with the regulators and on-post staff.

Ms. Hahn asked for confirmation that contamination had not been found in the seven shallow wells installed on the Waverly property, but contamination has now been found in the recently installed deeper well. Mr. Gortva stated that large quantities of water were moved right along the fence line during the initial drilling, and that the results are very preliminary and from the packer testing, not from the finished monitoring well. He said that sampling of the completed

monitoring well may show the levels decreasing, increasing, or staying the same. He stated that the Conceptual Site Model indicates slight flow onto the Waverly property and then flowing to the east back onto Fort Detrick. He noted that the other wells on the Waverly property did not show any detections during the packer testing which also aligns with the Conceptual Site Model.

Ms. Hahn asked if the data may change once the deep water well is installed on the County property. Mr. Gortva said that the monitoring well information may be different from the initial packer testing; however, vapor intrusion will not be an issue as the shallow groundwater has already been sampled and that the new well is a deep groundwater well. Mr. Gortva stated that the primary purpose of the new deep well on the County property is to determine if there is any deep groundwater flow under Carroll Creek.

Mr. Cherry summarized the current work and the next steps by stating a report is being prepared on the dye trace study and drilling at the three locations mentioned earlier will continue. He said that sampling of the permanent monitoring wells is anticipated in the May/June timeframe.

7. Watermark ECC Projects Updated presented by John Buck of Army Corps of Engineers

Mr. Buck reminded the Board that Watermark ECC was conducting work on Areas A, B and C, including conducting vapor intrusion sampling.

Mr. Buck advised at Area A, the main post area, Watermark ECC is conducting vapor intrusion sampling primarily related to the spill near Building 568. He noted that they had conducted a site visit to all the buildings earlier that day where vapor intrusion studies will be conducted to outline where the borings will be done to collect the samples. Mr. Buck said that an appendix to the work plan then will be prepared for each building showing the location of each sample. He estimated that the work plan will be completed by the end of March, and the initial round of sampling conducted in April. Mr. Buck stated that there may be several rounds of sampling at these buildings.

Mr. Gortva advised that EPA is in the process of revising their vapor intrusion guidance. He said that a report on the vapor intrusion already conducted at Area B is being held until there are further discussions with EPA and MDE.

Mr. Rudy asked for confirmation that no off-post properties have been cleared of a vapor intrusion issue. Mr. Gortva said that the results were presented two meetings ago of the sub-slab sampling, and that the concentrations at the former Montevue home showed the concentrations were below screening levels so there would not be a vapor intrusion problem.

Ms. Hahn asked at what level of contamination is vapor intrusion a concern. Mr. Gortva responded that EPA's guidance calls for an investigation when a building is within 100 feet of contamination exceeding five parts per billion [for TCE and PCE] in shallow groundwater. He said that the guidance calls for an investigation at this level, but it does not mean there is an issue. He said that every situation is different, but experts have said that there typically is not a vapor intrusion issue until the contamination is much higher.

Ms. Hahn asked if the relatively low detection of PCE in the off-post parking lot would trigger EPA or MDE to say it needed to be cleaned up and who would be responsible. Mr. Gortva said that the location was included in the tracer study, and that the tracer did not show up in that location which seems to indicate it is from a different, unknown source. Dr. Green stated that if it is determined to not be Army-related, the information would be turned over to MDE's Hazardous Substance Division. She stated that with detections that low and no one on well water in the immediate vicinity, it is possible not much more investigation would be done. Mr. Gortva added that the possibilities are a source from Area A or an off-post localized source. He said Fort Detrick is investigating the possibility of a source from Area A and should have an answer later this summer.

Mr. Buck said that the vapor intrusion study is underway at Area B, and there may be some seasonal variation collections.

Mr. Buck advised that at Area C, Fort Detrick's wastewater treatment plant, Watermark ECC hopes to begin the delineation of the extent of ash in the sub-surface at the end of the month. He stated that this work is a result of a five-year review which indicated more work was needed to delineate the extent of the ash and possibly extend the land use controls.

8. RAB Member Open Discussion and General Community Comments

Ms. Hahn asked how often Fort Detrick communicated with elected officials. She stated that there did not seem to be adequate communication on environmental issues between Fort Detrick and elected officials and suggested more needed to be done beyond RAB briefings and posting information on the web site. Mr. Nick said that elected officials would be coming to a meeting at Fort Detrick soon. Mr. Gortva said that there would be a brief overview of Area B given but follow-on meetings for more in-depth presentations could be requested and would be scheduled. Mr. Craig said that periodic meetings between the Commander and the Mayor often involve the environmental staff giving presentations on environmental issues.

Mr. Rolan Clark thanked the representative from Congressman's Delaney's office for attending the meeting.

9. Membership

Mr. Craig stated that Fort Detrick was continuously seeking new community Board members and invited anyone present who was interested to take an application from the back table. He noted that an application had been received from Mr. George Rudy which he would distribute to the Board and Fort Detrick's Colonel who needs to approve the community members' recommendation on the application.

10. Next Meeting

Mr. Gortva noted that the next meeting was tentatively scheduled for May 7 and all agreed to this date. He proposed future meeting dates of August 6, November 5, and February 4, 2015 as meeting dates for 2014/2015.

The meeting adjourned at approximately 9:01 p.m.

Reviewed by:

Approved/Disapproved

Enclosures:
Fort Detrick Installation Restoration Program Area B Groundwater Investigation Update
Fort Detrick Watermark ECC Project Update
Meeting Sign-In Sheet

DISTRIBUTION:
Each RAB Member (w/o enclosure)
Each Meeting Attendee (w/o enclosure)

Fort Detrick
Restoration Advisory Board Meeting
March 5, 2014

Our mission is to synchronize, integrate and deliver installation services and sustain facilities in support of Senior Commanders in order to enable a ready and resilient Army

We are the Army's Home

Fort Detrick Restoration Advisory Board
Meeting Ground Rules

- The Restoration Advisory Board (RAB) is limited by its Charter to discuss business relevant to the Installation Restoration Program (IRP) at Fort Detrick. Matters that are not associated with the IRP are not appropriate for this forum.
- In order to foster communication and open discussion, video recording devices will be prohibited from the meeting room.
- All questions and comments are to be limited to the agenda item at hand and time allotted. Once all RAB members have had an opportunity to voice their questions on the topic, the general public will then have an opportunity to voice their comments on the topic.
- Once the business items on the agenda have been completed, there will be an opportunity for the general public to comment on areas that are relevant to the IRP.
- The meeting will adjourn as noted in the meeting agenda at 9 p.m.

Characteristics of a RAB

A RAB is…

- Jointly chaired by the designated installation and community member
- Made up of representatives from the community, installation, and regulatory agencies
- Not a decision making body
- Provides advice to the installation's decision makers

RAB Purpose

1. An opportunity for stakeholder involvement in the environmental restoration process at Department of Defense (DoD) installations.

   (Stakeholders are those parties that may be affected by environmental restoration activities at the installation.)

RAB Purpose (continued)

2. A forum for the early discussion and continued exchange of environmental restoration program information between DoD installations, regulatory agencies, and the community.

RAB Purpose (continued)

3. An opportunity for RAB members to review progress, participate in a dialogue with, and provide comments and advice to the installation's decision makers concerning environmental restoration matters.

RAB Purpose (continued)

4. A meeting, open to the public, for addressing issues associated with environmental restoration activities governed by the Defense Environmental Restoration Program (DERP).

Area B Groundwater Investigation Fort Detrick

Progress Report to the RAB

March 5, 2014

John Cherry

ARCADIS

ARCADIS

Overview of Topics

- Groundwater Tracer Study Update
- Update on Additional On- and Off-Post Drilling

Work Completed Since the Last RAB

- Completed the nine month groundwater tracer study.
- One new monitoring well completed on adjacent off-post property.
- Three additional borings in progress on off-post property.
- Interim packer sample data collected from three of the boreholes for well construction decision-making purposes.
- Four decision-making discussion calls with EPA/MDE since January ‘14

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Status of Original RI Work Plan Activities

✓ Existing well assessment and repair	Feb 2011 to Apr 2011
✓ New well installation (onsite)	April 2011 to Mar 2012
✓ Direct Push Investigation	March 2012
✓ Spring and Seep Surveys	March 2012
✓ Groundwater/Surface Water Sampling	April 2012 /Sept 2012
✓ Vapor Intrusion Sampling (2 rounds)	Jan/Aug 2013
✓ Groundwater tracer study	Spring 2013 to Fall 2013
Additional On- and Off-Post Drilling	Through **May/June 2014**

Grey = completed

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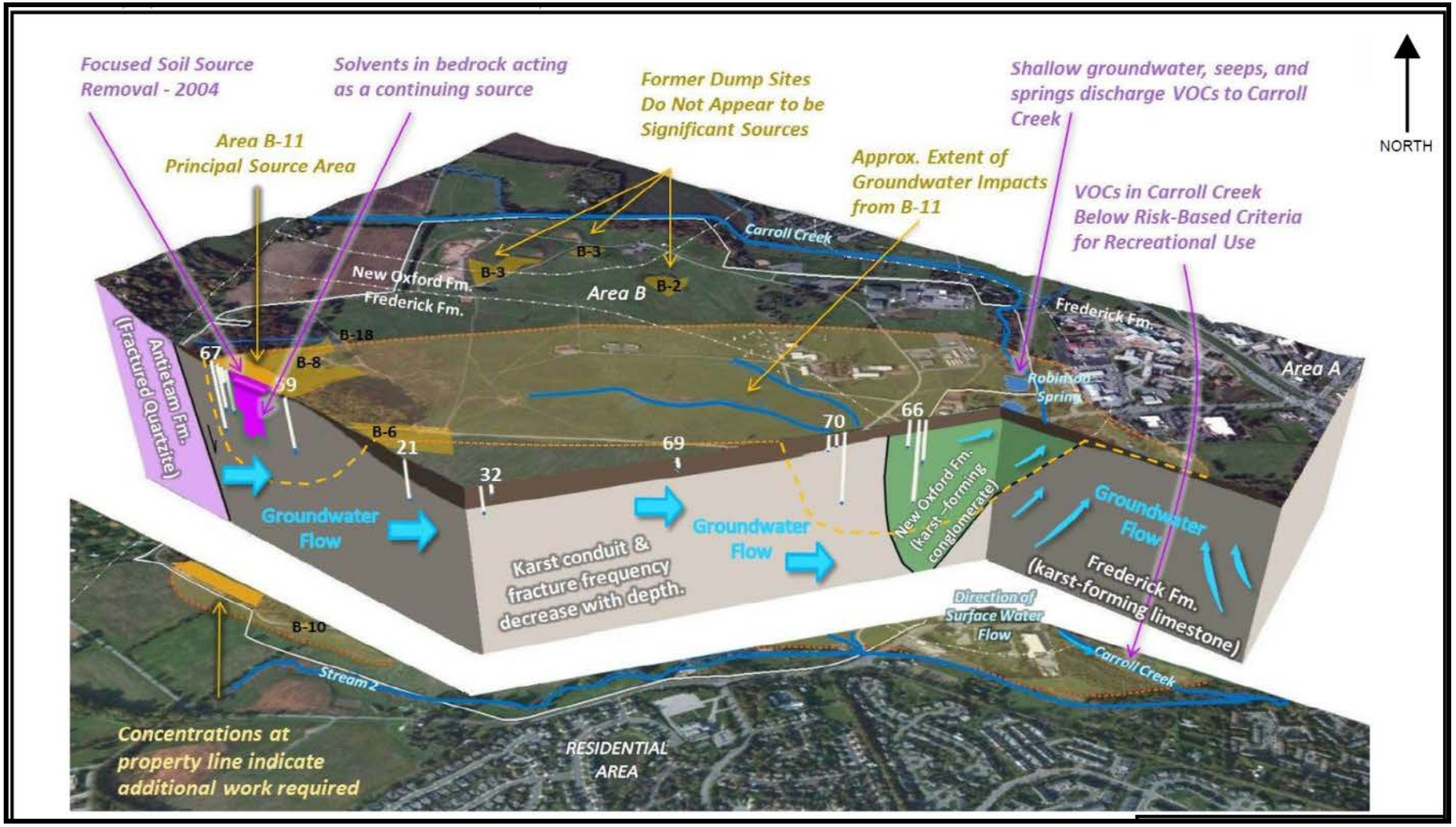
Area B Conceptual Site Model Review



Legend

- Streams
- Spring
- B-11 Boundary
- Trichloroethene in Groundwater
- Groundwater Flow Direction
- Geologic Contact

Aerial Source: ArcGIS Online Bing Imagery accessed 6/13/2012 via ArcGIS 10.

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Groundwater Tracer Study Update

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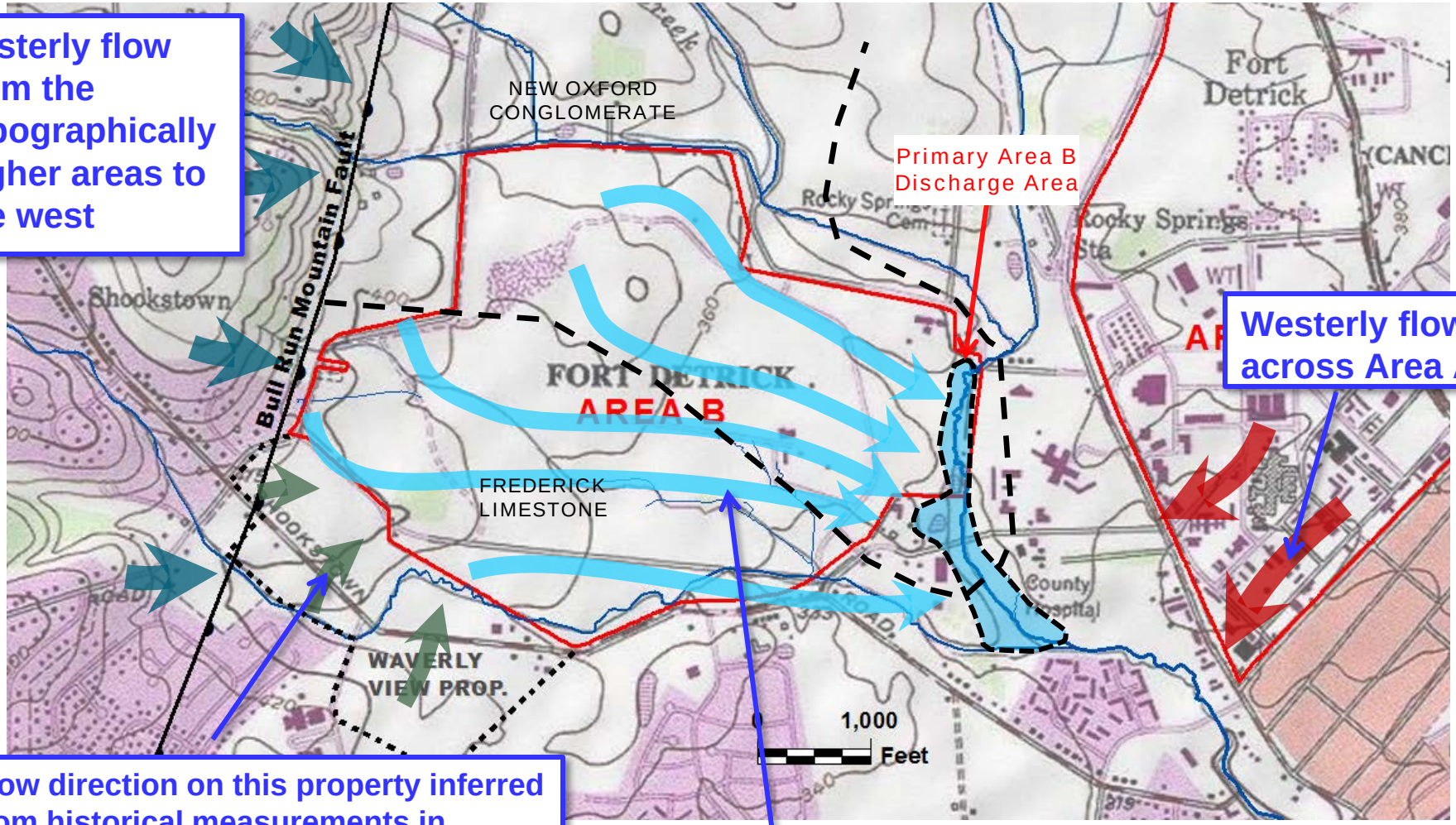
Groundwater Tracer Study

- What is a groundwater tracer study?

- A tracer is introduced to the groundwater and monitored over time to see where and when the tracer appears at other monitoring points in the study area (e.g. wells, springs, surface water bodies).

- Useful for evaluating the groundwater flow velocity and direction of groundwater movement.

Generalized Patterns of Groundwater Flow



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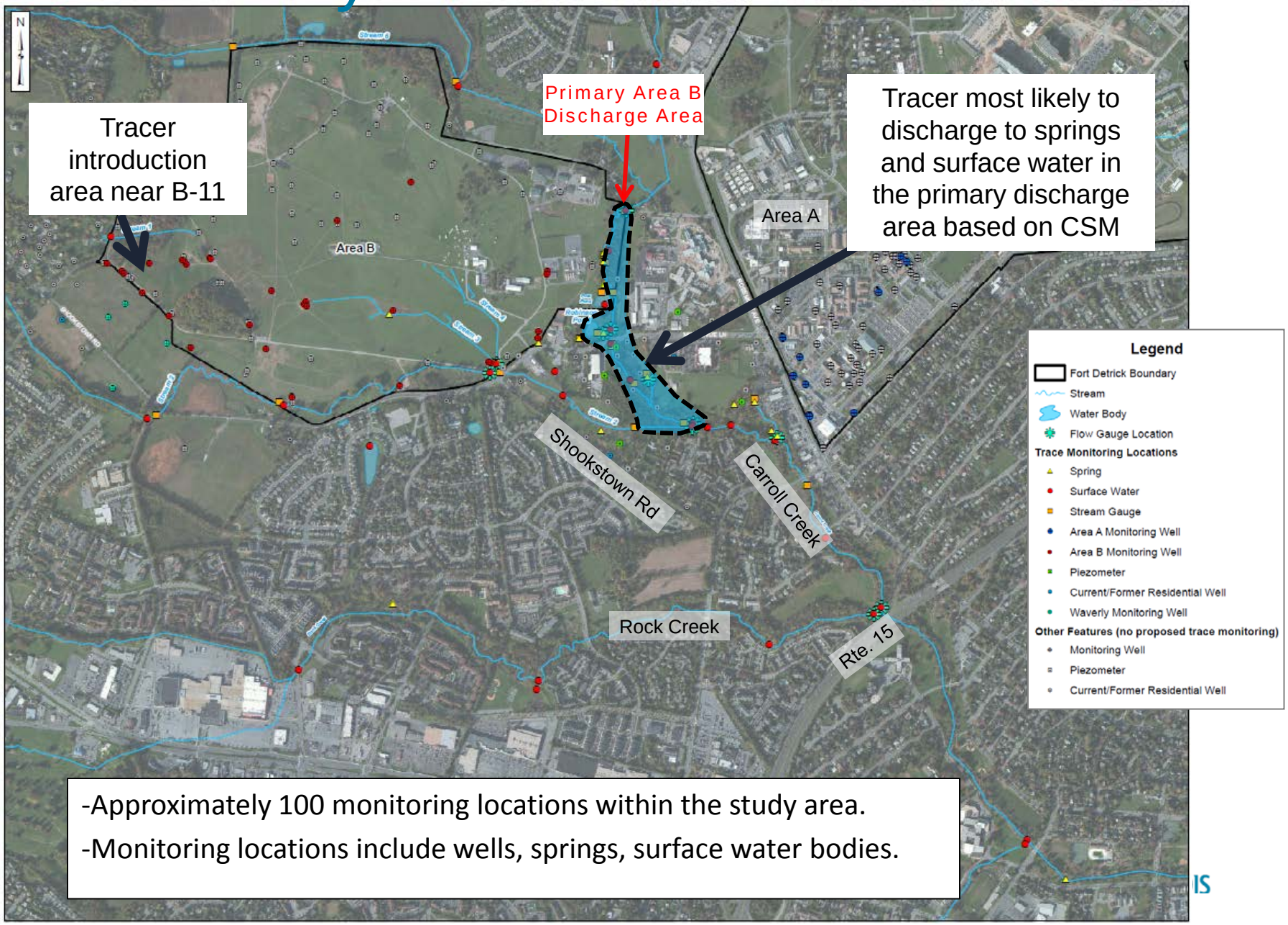
Tracer Study Area



-Approximately 100 monitoring locations within the study area.

-Monitoring locations include wells, springs, surface water bodies.

Groundwater Tracer Study Updates

- Two tracers introduced in deep wells in May ’13 at these depths:
  - Tracer A: 140-155 feet deep
  - Tracer B: 313-328 feet deep

- Tracer A:
  - In 2-3 weeks Tracer A was detected in springs in the center of Area B.
  - In 5-7 weeks, Tracer A detected in on-post monitoring wells east/southeast of the introduction area.
  - After 8-10 weeks Tracer A was detected in springs in the primary discharge area.
  - Detections are consistent with the conceptual site model for Area B groundwater and contaminant migration east/south east across Area B.

  - Data evaluation and reporting is on-going and these are preliminary observations.

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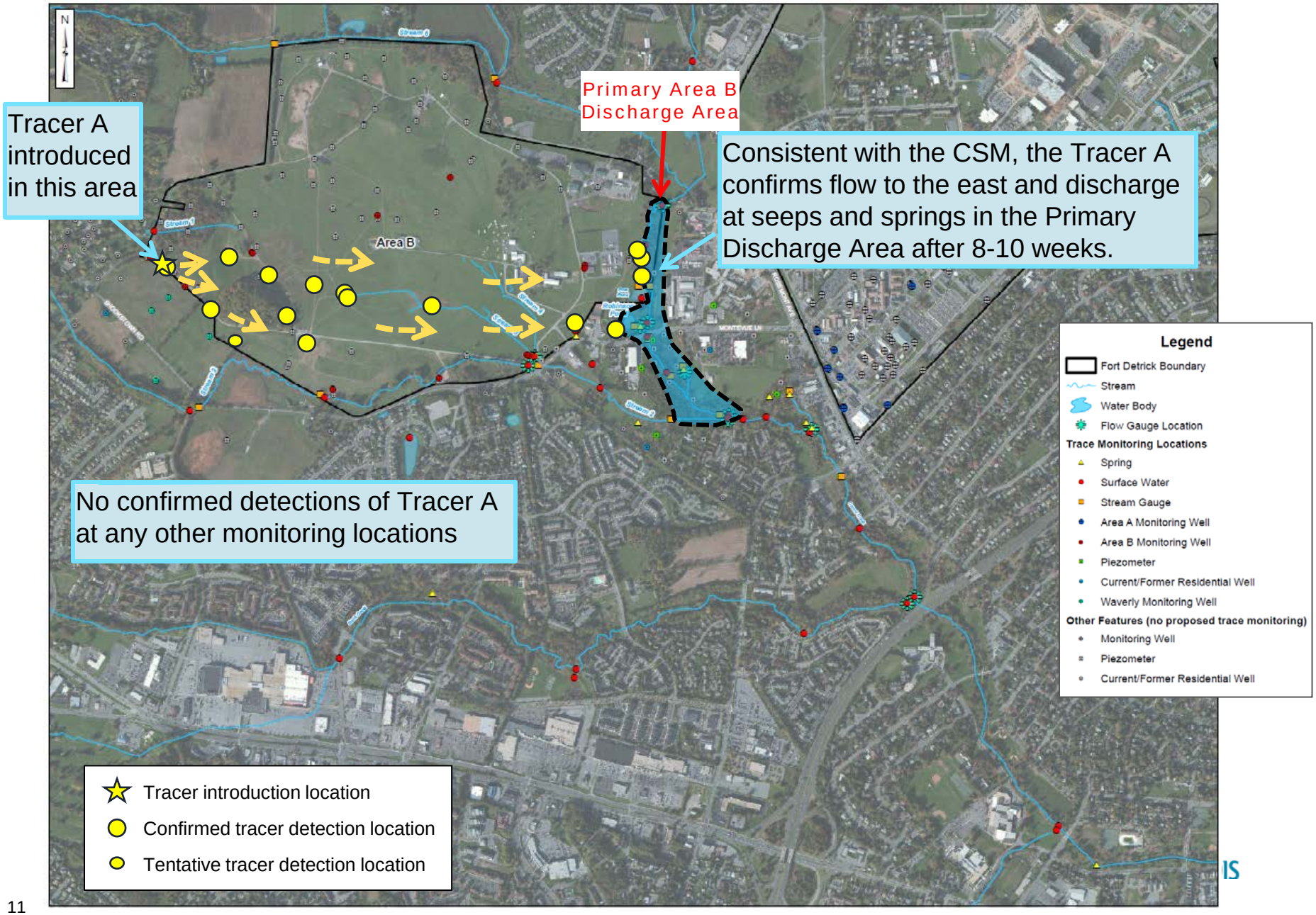
Preliminary Study Observations for Tracer A

(Results through 1/30/14 spanning 8 months after the tracer introduction)



Groundwater Tracer Study Updates

- Two tracers introduced in deep wells in May ’13 at these depths:
  - Tracer A: 140-155 feet deep
  - Tracer B: 313-328 feet deep

- Tracer B:
  - In 2-3 weeks Tracer B was detected in shallow monitoring wells very close to the introduction area.
  - After 18-20 weeks, Tracer B was detected in downgradient wells on Area B.
  - New After 28 weeks, Tracer B was detected in the primary discharge area.
  - Detections are consistent with the conceptual site model for Area B groundwater and contaminant migration east/south east across Area B.

  - Data evaluation and reporting is on-going and these are preliminary observations.

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Preliminary Study Observations for Tracer B

(Results through 1/30/14 spanning 8 months after the tracer introduction)

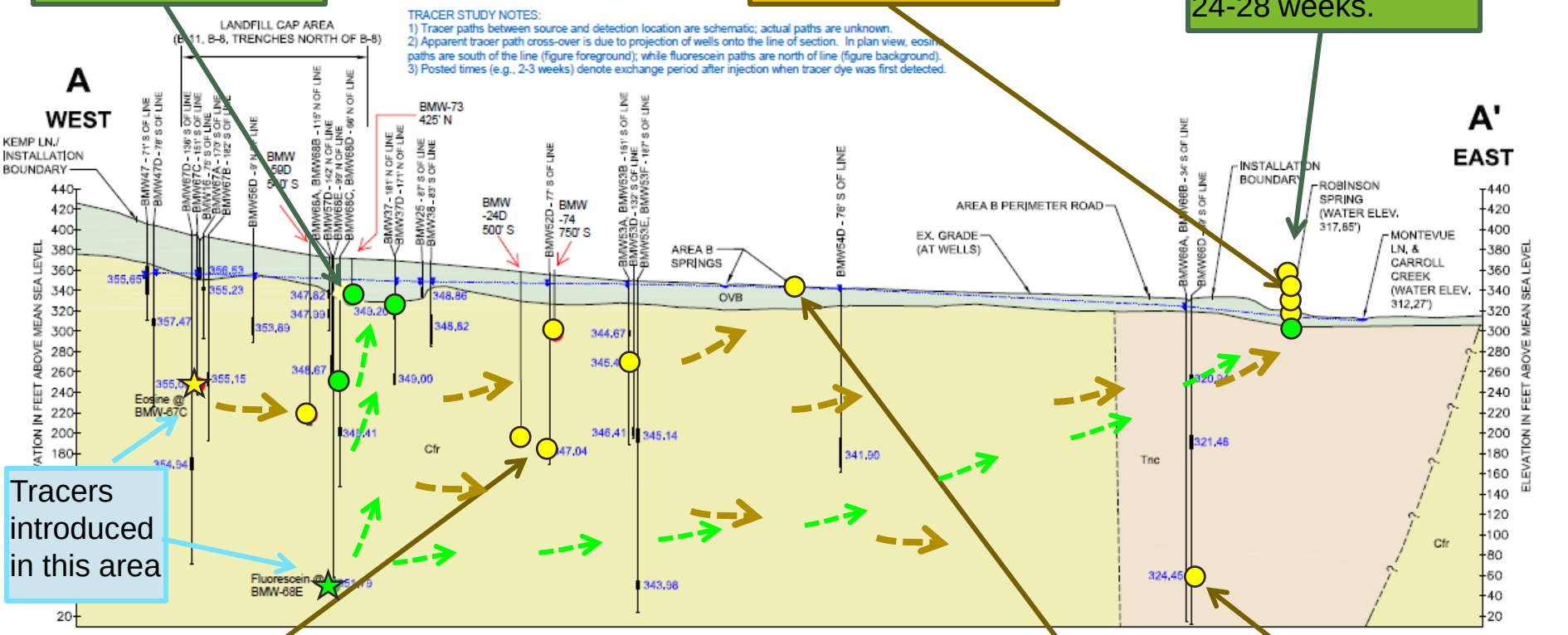
Preliminary Study Observations for Tracer B

(Results through 1/30/14 spanning 8 months since the tracer introduction)

Tracer B only detected early in shallow wells near introduction location

8-10 Weeks: Tracer A detected in primary discharge area.

Tracer B only detected in primary discharge area after 24-28 weeks.



CROSS SECTION A-A'

HORIZONTAL GRAPHIC SCALE: 0 500' 1000'

VERTICAL GRAPHIC SCALE: 0 50' 100'

Tracers introduced in this area

5-7 Weeks: Tracer A detected in multiple monitoring wells across Area B.

2-3 Weeks: Tracer A detected at the ground surface in a spring on Area B.

20 Weeks: Tracer A detected at property boundary.

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Groundwater Tracer Study Schedule

- EPA and MDE oversight:
  - Status discussions with EPA and MDE to review laboratory results and observations to date.:
    - August 7, 2013
    - September 30, 2013
    - January 15, 2014
- All tracer sampling rounds completed as of January 30, 2014
- Final data analysis and preparation of the tracer study report is underway. Report will be submitted to EPA, MDE, and the RAB.
- Preliminary conclusion is that the dye trace study supports the overall CSM.

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Update on Additional On- and Off-Post Drilling

Additional Deep On-Post & Off-Post Drilling

- Scope calls for approximately 7 new borings with installation of up to 11 wells.
- Drilling methodology is following the same techniques employed during the 2011/2012 drilling program (including geophysical logging and packer testing).
- Maximum drilling depths anticipated to be ~400-500 feet below ground surface at some new locations.
- Drilling commenced December 6, 2013 and is projected to continue through May 2014.
- Work has continued through particularly challenging weather conditions this winter.

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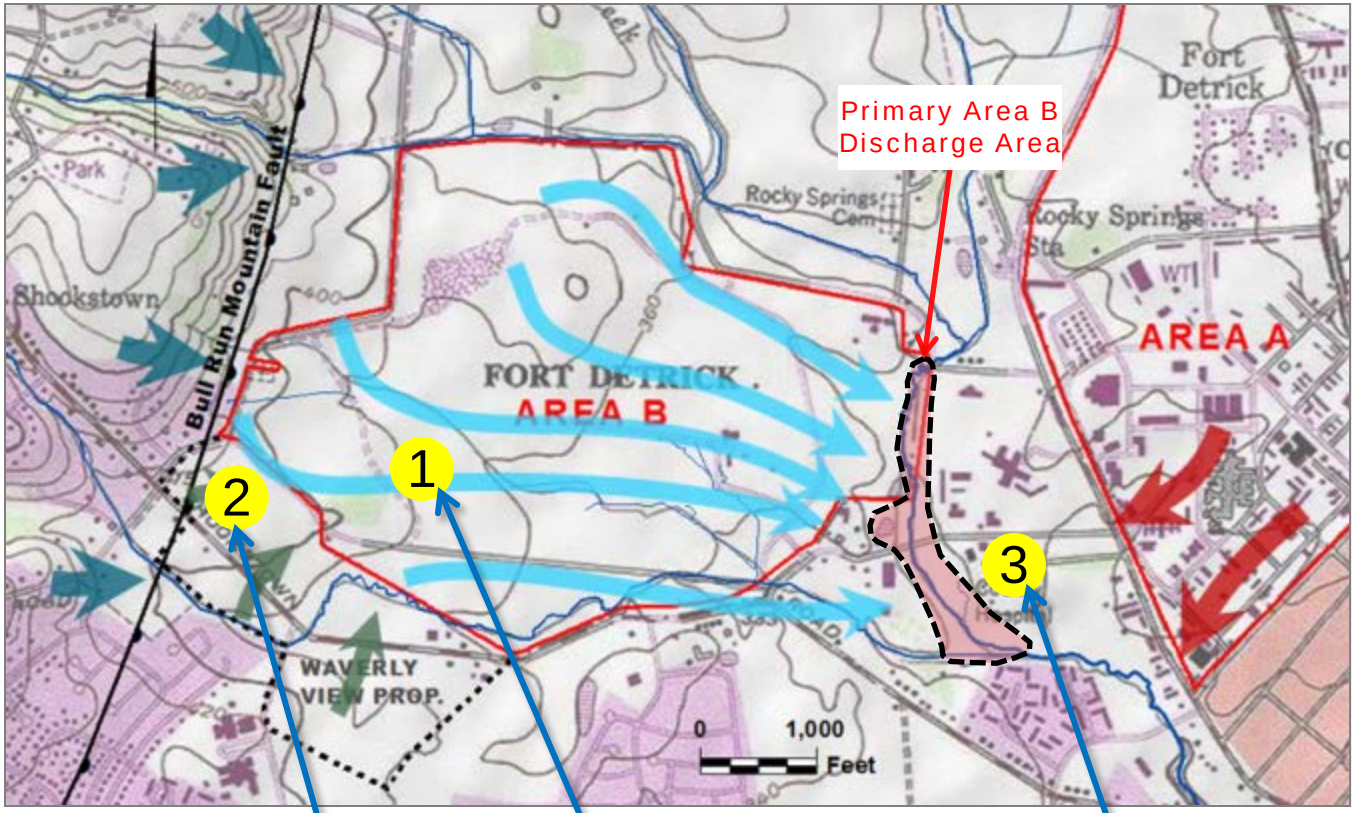
Supplemental Deep Drilling Locations

1. Vertical delineation downgradient of B-11 to depths greater than 325 ft. (~ 2 nested wells)
2. Delineation south of B-11 area (Waverley Property) (~7 shallow/deep wells)
3. Horizontal delineation east of Carroll Creek (underflow) (~ 2 nested wells)



Arrows = Generalized patterns of groundwater flow

Drilling on-going (current priority)

Drilling started but on-hold currently

Drilling scheduled for later this Spring

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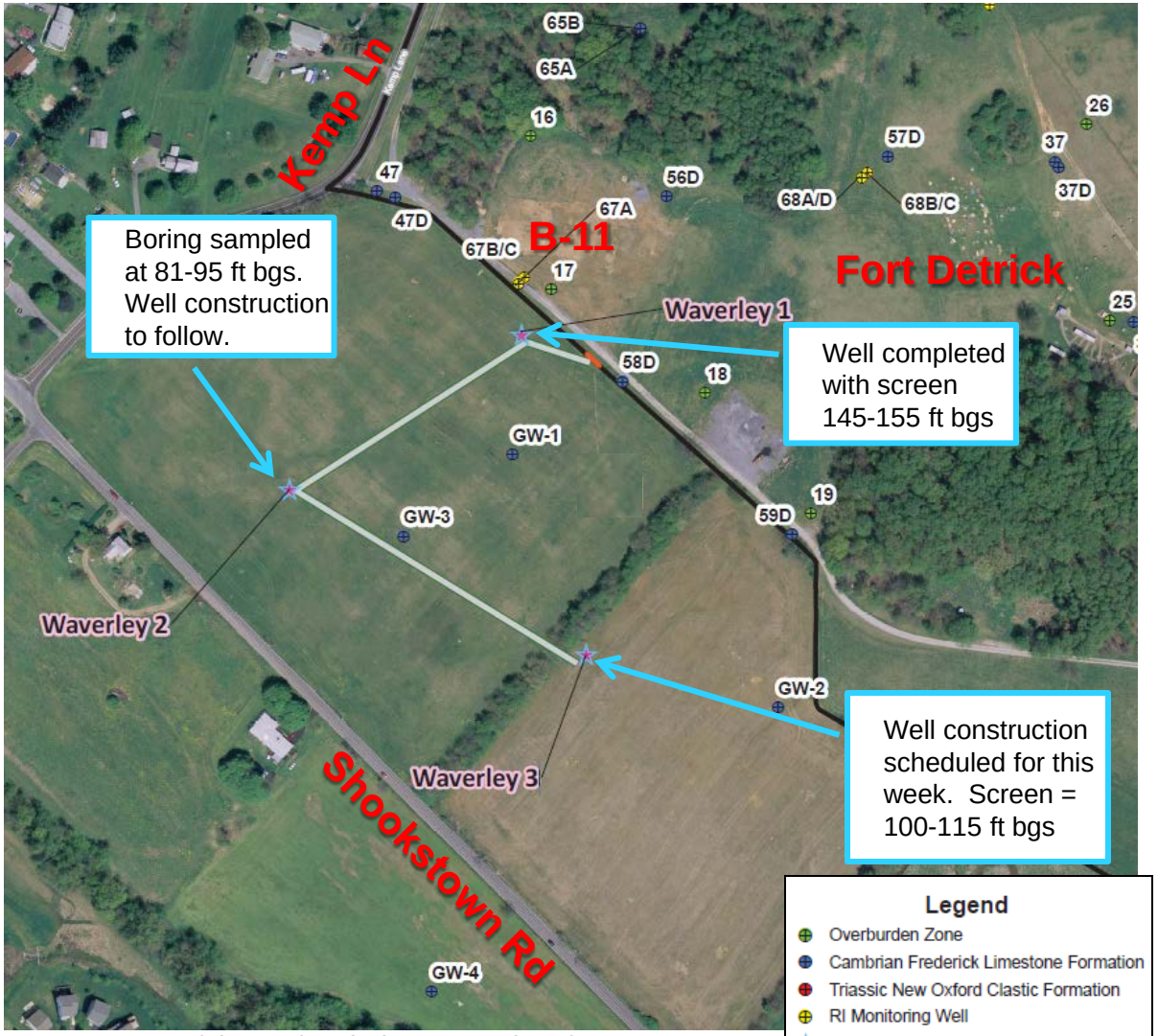
Drilling Status (through 3/5/14)

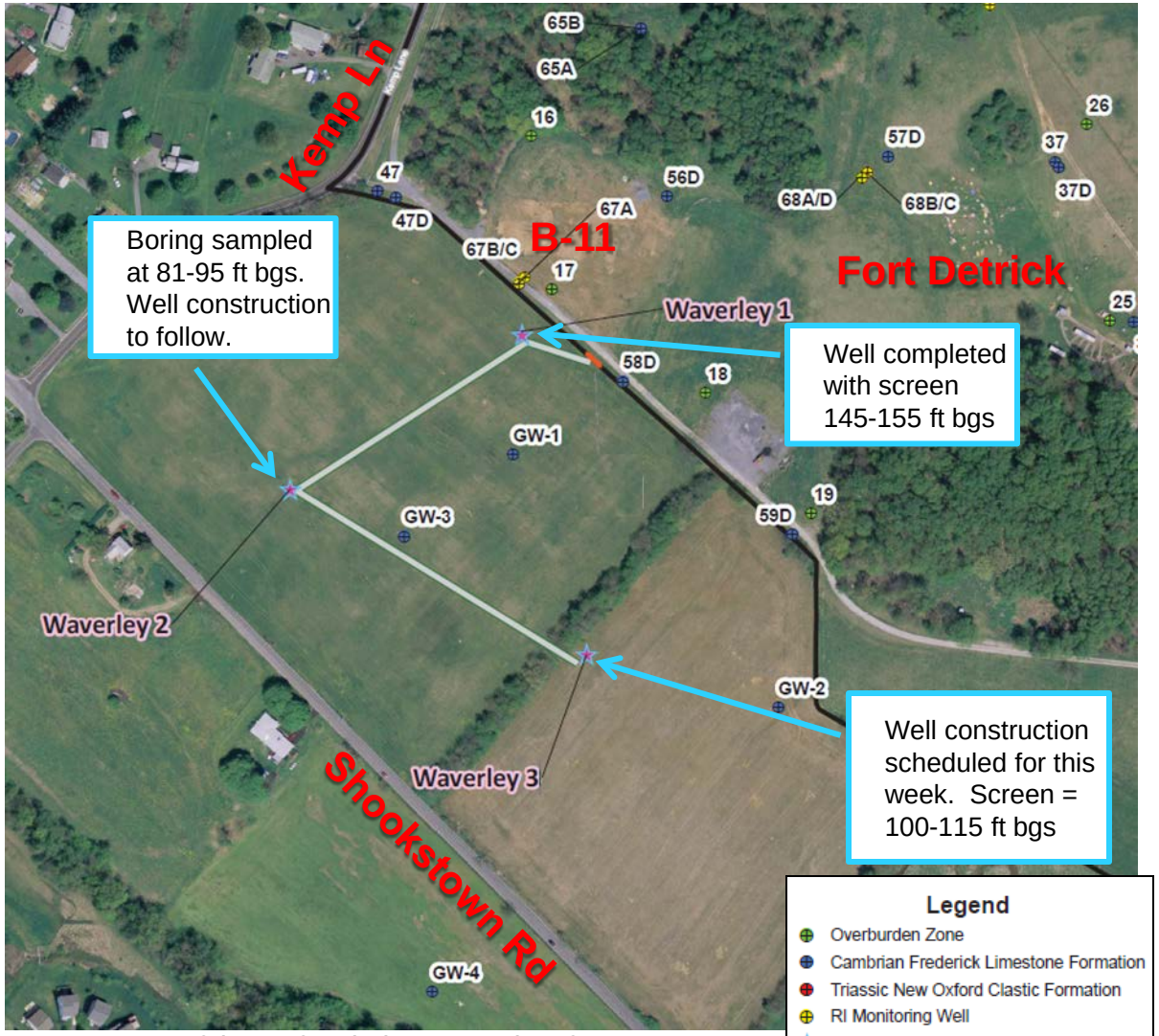
- Three shallow borings completed on the Waverley property:
  - Waverley-1: New shallow monitoring well completed near Area B fence line.
  - Waverley-2: Sampling completed and well construction expected this week.
  - Waverley-3: Geophysical logging and packer sampling completed. Well construction this week.



ft bgs = feet below ground surface

Drilling Observations (through 3/5/14)

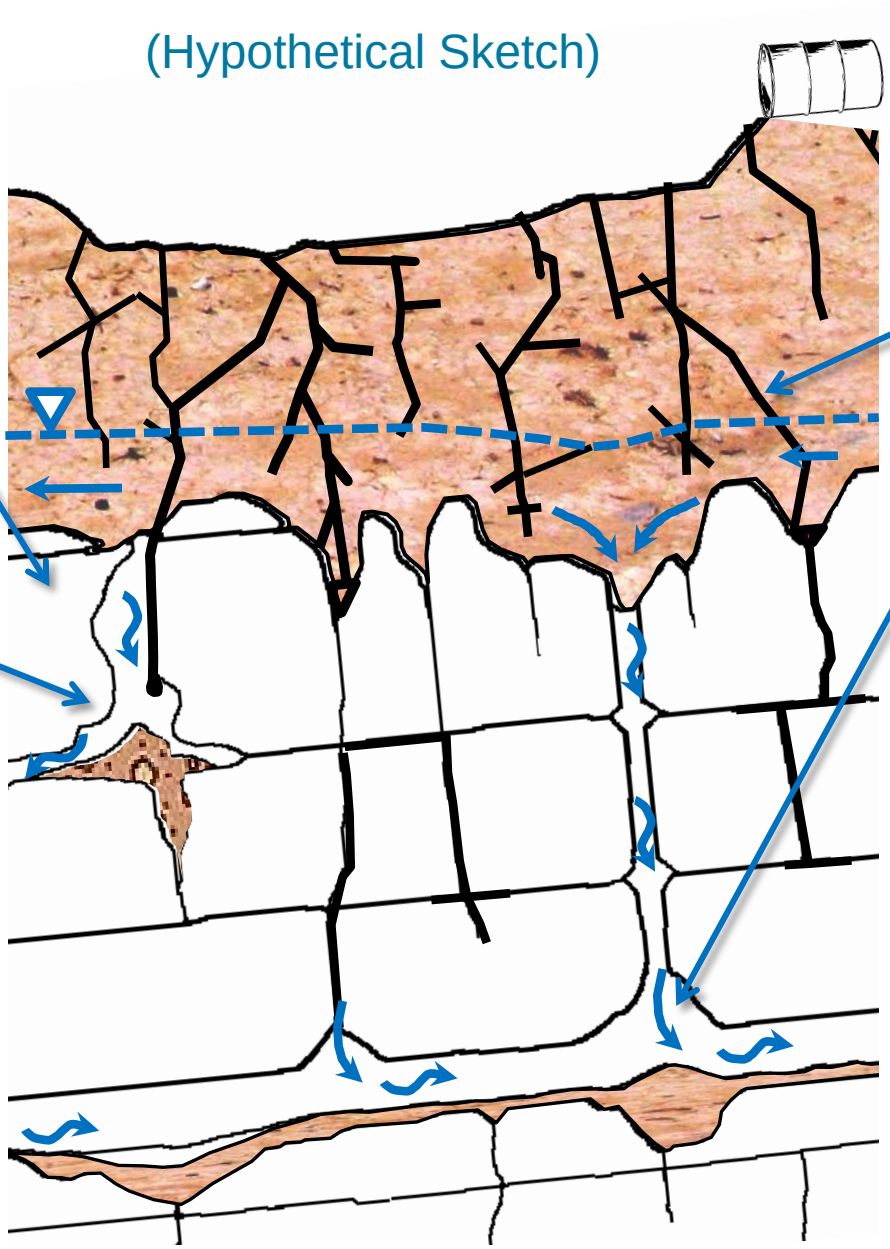
- Slower than anticipated drilling so far through the karst geology.
- Drillers have encountered difficulties with volumes of water and sediment generation associated with large fracture/void zones.
- Deeper drilling efforts are underway this week on Waverley property (targeting depths to 400 ft) at two locations.



ft bgs = feet below ground surface

Karst Geology – A Quick Refresher

(Hypothetical Sketch)



Limestone geology

Dissolution along fractures and bedding planes can lead to small and large conduits

Water infiltrates from the surface and drains through the system.

Water flows through interconnected fractures and conduits

EXPLANATION

= WATER TABLE

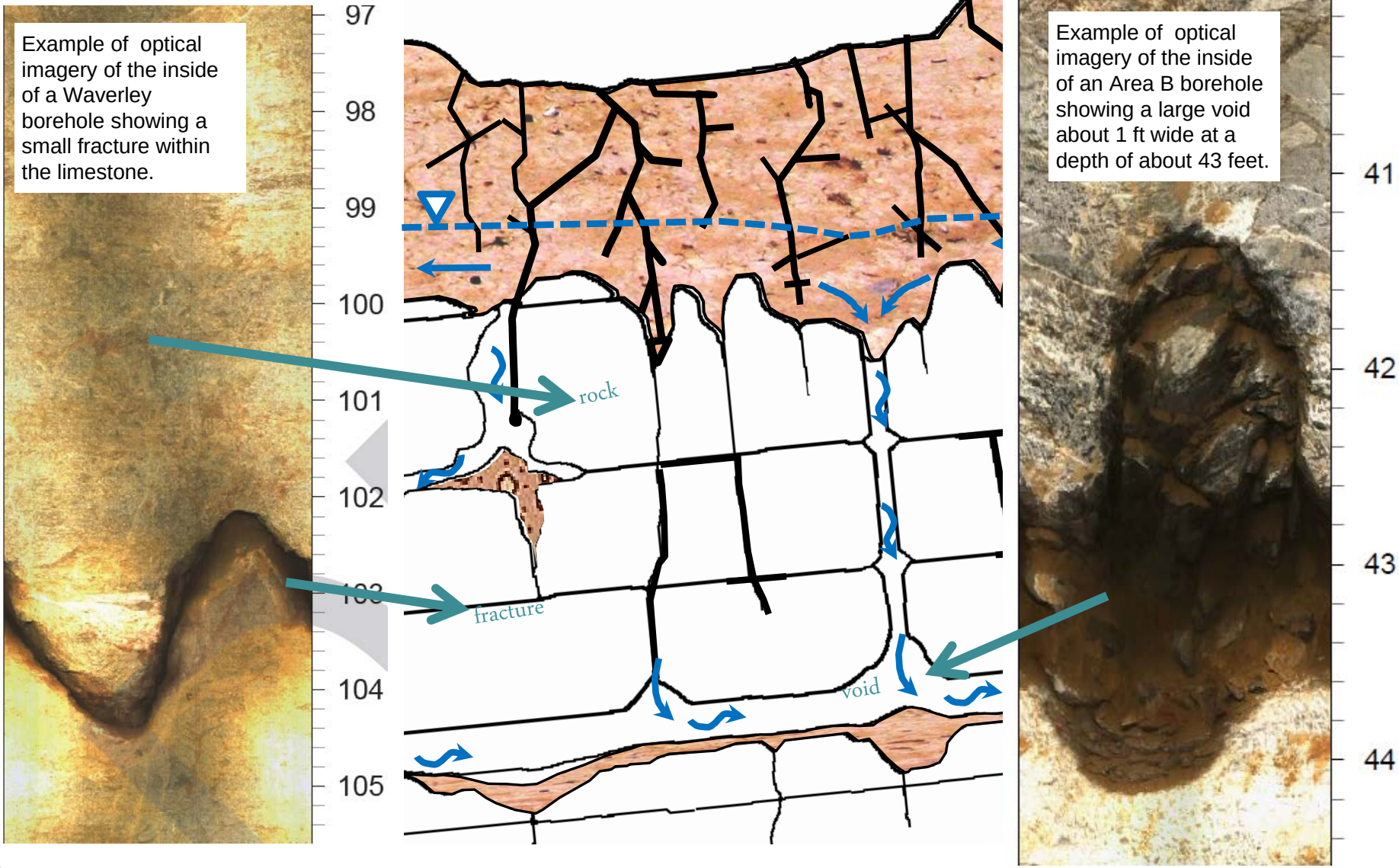
= GROUNDWATER MOVEMENT

= MACROPORES

= SOIL OR SEDIMENT

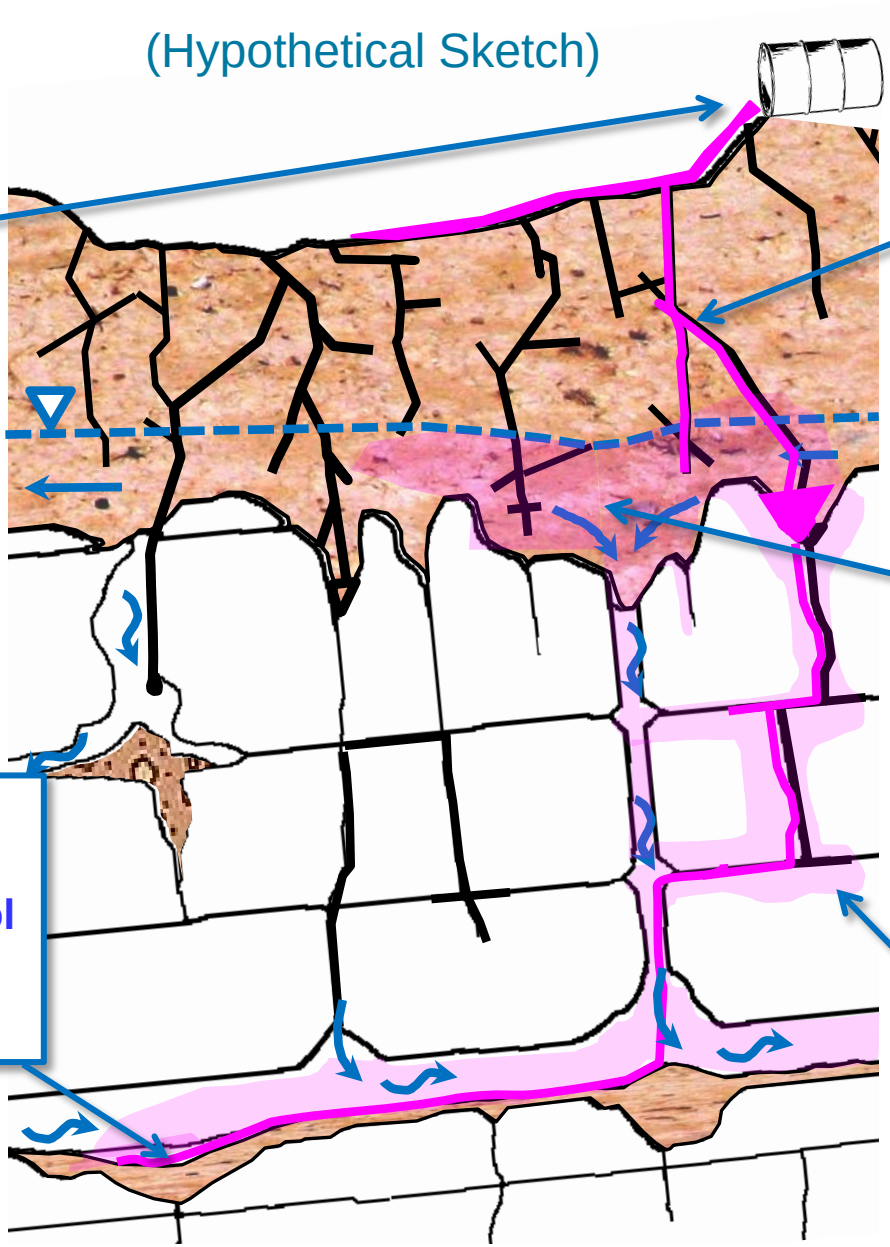
Understanding Karst Geology

(Hypothetical Sketch)



Understanding How Contamination Behaves in Karst

(Hypothetical Sketch)



Assume a hypothetical DNAPL release

DNAPL release migrates downward into the subsurface

Dissolves into groundwater creating a dissolved contaminant plume that migrates with groundwater flow

DNALP migrates downward through fractures and can pool in depressions in the rock surface

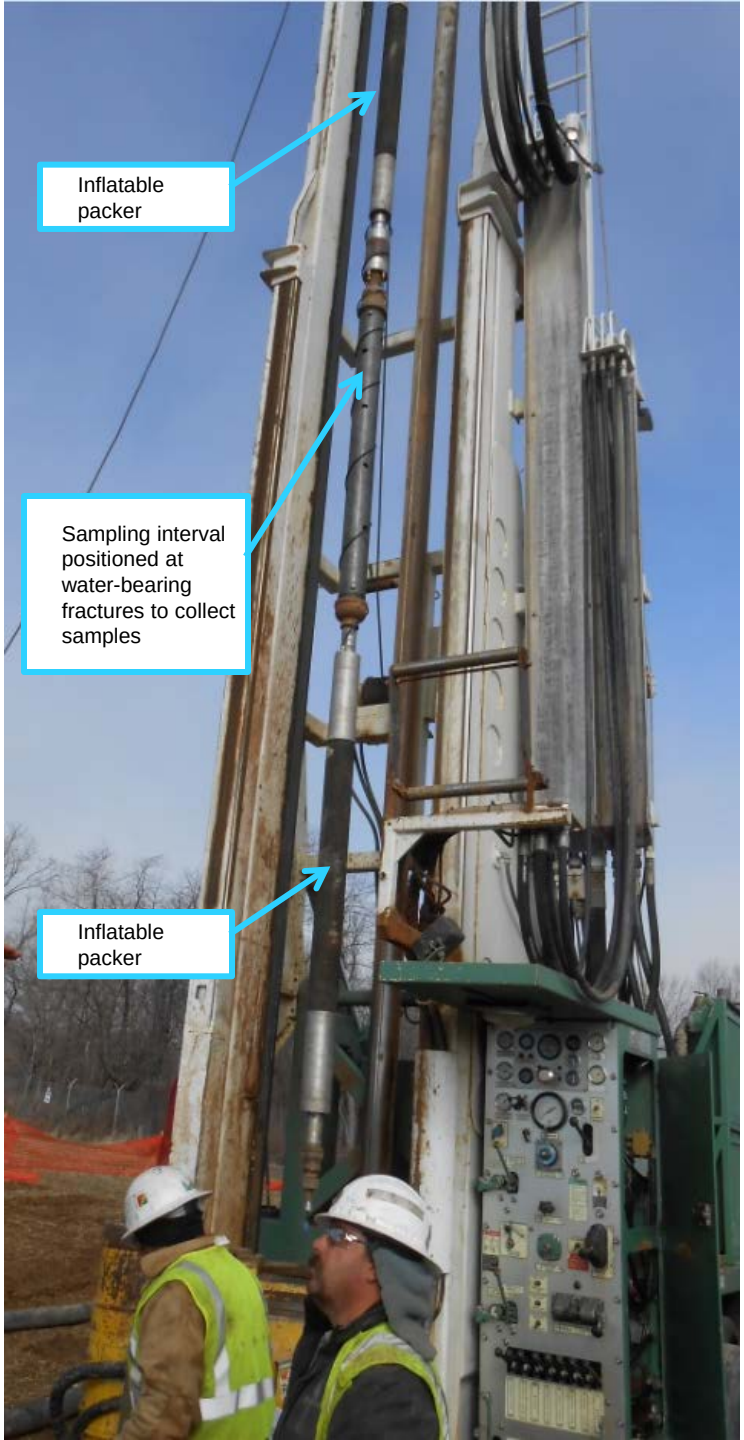
DNAPL diffuses into the soil/rock matrix

DNAPL = dense non-aqueous phase liquid (e.g., TCE)

Packer Sampling During Drilling & Interim Borehole Results

Note: Sampling of the new wells will not be conducted until after all the new wells are completed and properly developed (likely in May/June).

- In the interim, we have screening-level packer sample data that is collected during drilling operations.
- Laboratory results from packer samples are reviewed with EPA and MDE to reach concurrence on well construction decisions for each borehole.
- Since early January, we've had 4 biweekly calls with EPA and MDE to review drilling progress, geophysical logs, and interim packer sample data for collaborative decision-making purposes.



Packer Sampling versus Monitoring Well Sampling

Packer sampling

- Conducted during drilling activities using inflatable packers to isolate fractures, purge test intervals, and collect groundwater samples for laboratory analysis.
- Results are considered “screening level” suitable for deciding well construction specifications, but not as reliable as data from a completed monitoring well.

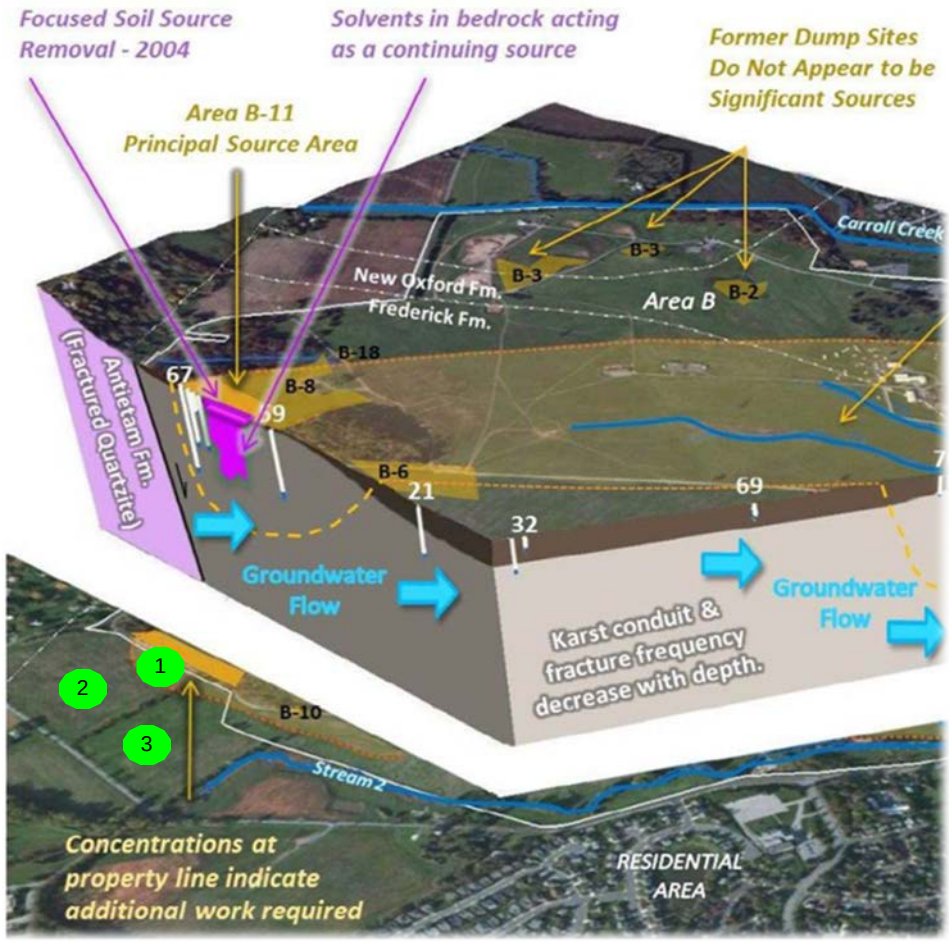
Monitoring well sampling

- Once a well is built and the grout is allowed to set, the well is pumped and surged to “develop” the well. This removes silt and fine-grained material from the vicinity of the well screen to establish a reliable monitoring point.
- The well is allowed to settle for a week before sampling to allow the groundwater to return to steady-state conditions.
- Wells provide reliable and reproducible data that can be validated and used to characterize nature and extent of contamination and evaluate risks.

Packer sample and monitoring well results can vary significantly (sometimes higher and sometimes lower) so we default to presenting data from monitoring wells and discuss packer sample data in general terms.

Packer Sampling - Interim Borehole Results (pre-monitoring well construction)

1. Waverley-1
   - Located approximately 100 feet from the Detrick property boundary.
   - TCE detected above the MCL but significantly below levels detected in the B-11 monitoring wells.
2. Waverley-2
   - TCE non-detect.
3. Waverley-3
   - Trace TCE detections reported at low estimated concentrations well below the MCL.



Initial observations are consistent with original conceptual site model:

- Groundwater impacts south of the Detrick fence do not extend far beyond the property line and concentrations drop off quickly in this direction by orders of magnitude.

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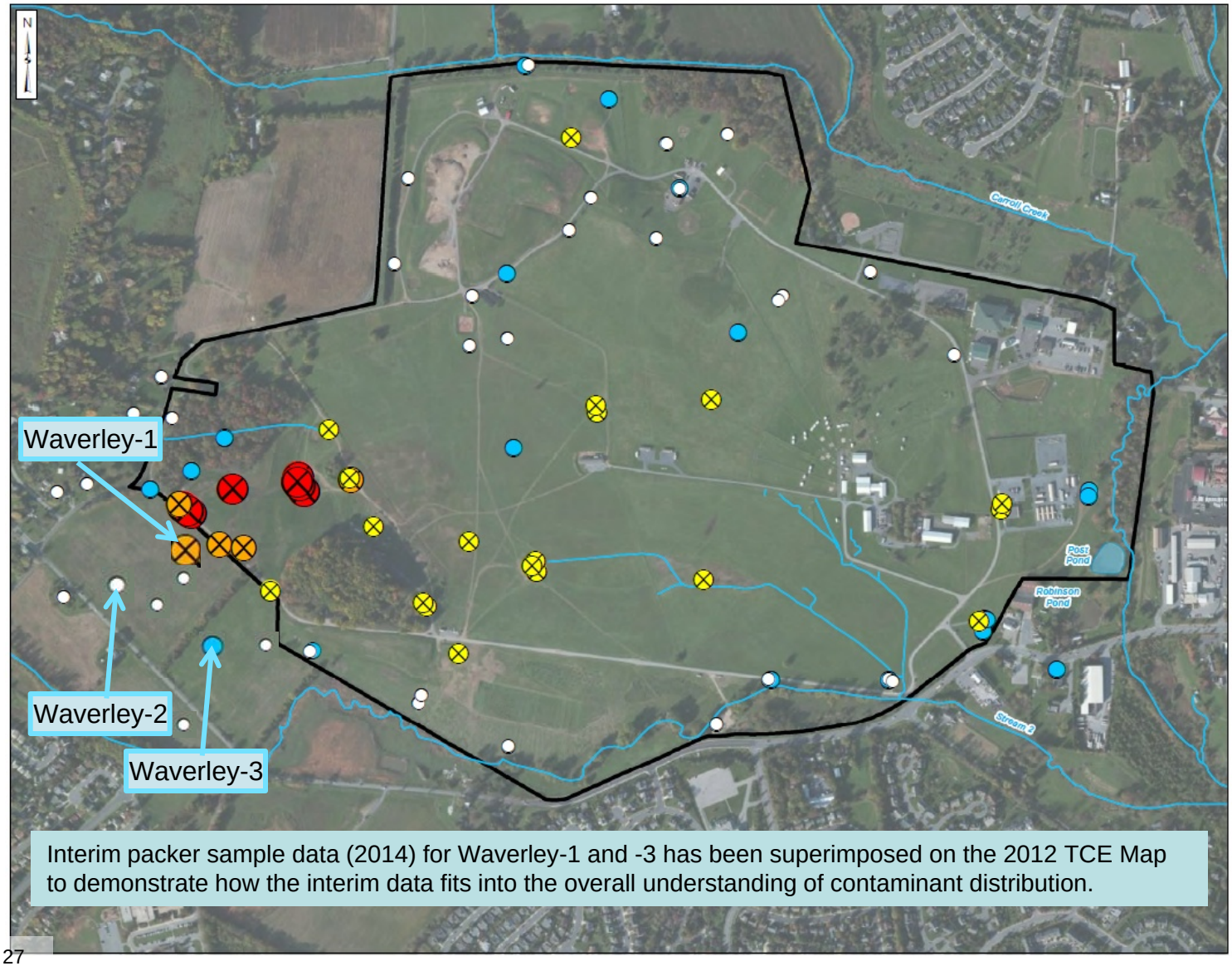
TCE in Groundwater

Recent interim packer test results shown with TCE data from comprehensive 2012 sampling event



Legend

- Fort Detrick Boundary
- Stream
- Non-Detect
- 5 ug/L or less
- >5 to 80 ug/L
- >80 to 1,000 ug/L
- >1,000 ug/L

X = Exceeds drinking water standard

Notes:
1) Aerial imagery accessed through BING Maps Aerial via ArcGIS Online Layer Packages by ESRI (12/1/2010) (c) 2010 Microsoft Corporation and its data suppliers accessed on 05/29/2012 through ArcGIS 9.3.1.
2) ug/L = micrograms per liter
3) TCE = Trichloroethene
4) Drinking water standard for TCE = 5 ug/L

0 500 1,000
Feet

REFERENCE/PROJECTION: Maryland State Plane, NAD 83, Feet

ARCADIS MALCOLM PIRNIE

Groundwater Sampling
TCE Concentrations
March/April 2012

Fort Detrick
Frederick, MD

Interim packer sample data (2014) for Waverley-1 and -3 has been superimposed on the 2012 TCE Map to demonstrate how the interim data fits into the overall understanding of contaminant distribution.

Next Steps

Next Steps

- Complete data evaluation and report for the dye trace study and submit for regulatory review.

- Continue with on-going drilling activities at Waverley property and then move to the two remaining locations (one on Area B and one on the County Montevue Campus).

- Complete drilling and sample new wells (May/June 2014)

Regular updates to be provided during community RAB meetings.

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Questions and Discussion

Agenda – March 2014

- Status and Schedule Updates under Watermark ECC LLC Performance-Based Acquisition (PBA):
  - Area A Update – Vapor Intrusion Assessment Program
  - Area B Update – Bedrock Drilling Program and Vapor Intrusion Assessment
  - Area C Update – Soil Sampling and Land Use Control Evaluation

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AREA A – Vapor Intrusion

- Near-term Projected Schedule:
  - Week of 3 March 2014: Begin site reconnaissance activities at 10 pre-selected locations (i.e., building inspections to identify potential sampling locations, assess schedule and physical/operational constraints, etc.)
  - End of March 2014: Issue Addendum to Work Plan to cover proposed activities at 10 pre-selected locations at Area A
  - April 2014: Begin vapor intrusion assessment activities

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Area B – Bedrock Drilling Program and Vapor Intrusion

- Near-term Projected Bedrock Drilling Schedule (and update since last meeting):
  - December 2013: Site preparation and general equipment/materials mobilization completed; initiated drilling program.
  - January 2014 through Present: Continue drilling program. See Area B update provided by Army/ARCADIS for additional details.
  - June 2014: Estimated completion of the Area B drilling program.
- Vapor Intrusion Assessment Update:
  - 1699 Shookstown Road: Initial sampling activities completed on 5 October 2013; subsequent activities likely to be completed in Spring 2014
  - Other Area B Locations: Confirmatory/seasonal sampling activities to occur in Spring 2014; final locations still to be determined.

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Area C – Soil Sampling and Land Use Control Evaluation

- Near-term Projected Schedule:
  - February 2014: Work Plan finalized. Activities will be completed using a two-phase Incremental Sampling Methodology (ISM) approach.
    - Phase I: Visual Inspection to establish future sampling requirements (i.e., determine decision units; 2 units anticipated)
    - Phase II: Collect up to 30 samples per decision unit for compositing and laboratory analysis (dioxins and metals)
  - Week of 17 March 2014 (weather-permitting): Phase I investigation (1 day duration)
  - Week of 24 or 31 March 2014 (weather-permitting): Complete phase II investigation (2- to 3-day duration)

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