RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), CALVERTON
CALVERTON COMMUNITY CENTER, CALVERTON, NEW YORK
TUESDAY, APRIL 17, 2018

The Forty-eighth (48th) meeting of the Restoration Advisory Board (RAB) was held at the Riverhead Senior Center. Meeting attendees included representatives from the Navy (Joseph McCloud, Lora Fly, JC Kreidel, and Jeffrey Doepp), New York State Department of Environmental Conservation (NYSDEC) (Stephen Malsan), New York State Department of Health (NYSDOH) (Steve Karpinski), Suffolk County Department of Health Services (SCDHS) (Andrew Rapiejko), Town of Riverhead (Frank Messina), Suffolk County Legislature (Al Krupski), Suffolk County Wading River Civic Representative (Steve Shapiro), RAB Community Members (Lou Cork and Vincent Racaniello, and Adrienne Esposito), Arcadis (Robert Porsche), Resolution Consultants (Robert Forstner), Tetra Tech (David Brayack, Melissa Cushing, Kristi Francisco), Riverhead Newspaper (Geo Bartunek) and KOMAN Government Solutions (Stephane Roy). The sign-in sheet is included as Attachment 1.

WELCOME AND AGENDA REVIEW

The Navy representative, Mr. Joseph McCloud, welcomed everyone to the RAB meeting and introduced the meeting agenda. In addition, Mr. McCloud announced that Ms. Lora Fly would be taking over the Remedial Project Manager (RPM) duties. The agenda for the meeting is included as Attachment 2. The Navy presentations are included in Attachment 3.

DISTRIBUTION AND APPROVAL OF MINUTES

Mr. McCloud asked whether the RAB members received the RAB meeting minutes from the November 2018 meeting, and if there were questions or comments on the minutes. There were no comments, and the minutes for the November 2018 RAB meeting were approved.

COMMUNITY UPDATE

Mr. Vincent Racaniello (RAB co-chair) asked for an update on Pefluoroalkyl Substance (PFAS) and opened the floor to community members for topics of general discussions. Mr. McCloud responded that the presentations include updates on PFAS at Site 2 and Aircraft Paint Hangars.

TECHNICAL PROGRESS – GENERAL OVERVIEW OF INSTALLATION RESTORATION SITES

Mr. McCloud then introduced the technical portion of the meeting, which consisted of presentations on the Interim Action to address potential munitions and explosives of concern (MEC) and supplemental investigations at Site 2 for Volatile Organic Compounds (VOCs) and 1,4-dioxane, Site 2 and Aircraft Paint Hangars PFAS Site Inspections (SIs) and Preliminary Assessment (PA) at Site 2, and current activities at Operable Unit (OU)3 Sites 6A -Southern Area and Site 7.

TECHNICAL PROGRESS – SITE 2 INTERIM ACTION MEC UPDATE

Ms. Kristi Francisco (Tetra Tech) provided an overview of the interim action Record of Decision (ROD) for Site 2. The presentation is included in Attachment 3. Ms. Francisco presented the remedy and the schedule for Site 2. The remedy consists of the following components:

- consolidation of off-property material,
- regrading, surface clearance, and addition of top soil and vegetation to stabile the surface
- Land use controls (LUCs) to restrict future use of the site
- Maintenance as required for erosion control

The schedule consists of the following:

- Record of Decision (Spring 2018)
- Remedial Action Work Plan (Spring/Summer 2018)
- Construction (Summer/Fall 2018)

Ms. Adrienne Esposito inquired if the two acres owned by the town is cleared or vegetated. Ms. Francisco stated that it was cleared.

Ms. Francisco concluded the Site 2 interim action update by announcing that the interim action ROD will be issued in the Spring of 2018.

TECHNICAL PROGRESS – SITE 2 SUPPLEMENTAL VOC AND 1,4-DIOXANE INVESTIGATION

Ms. Francisco continued with a description of the supplemental investigation at Site 2 to evaluate VOCs and 1,4-dioxane. The presentation is included in Attachment 3. Ms. Francisco presented plan views showing the areal extent of the VOC plumes from Site 2, namely the western plume (consisting of trichloroethene [TCE]) and the eastern

plume (consisting of TCE and xylenes). The western plume was shown extending off-property, beneath Swan Pond towards the “TCE anomaly” area near the Peconic River Sportsman’s Club (PRSC) property, southeast of Site 2.

A summary of 1,4-dioxane, an emerging contaminant which has a variety of uses in consumer and industrial products, was also given. Relevant to Site 2, 1,4-dioxane was used as a stabilizer for chlorinated solvents – including 1,1,1-trichloroethane (TCA), which is known to have been used at NWIRP Calverton. 1,4-dioxane is of concern because it moves rapidly through soil and then into groundwater where it further disperses; long-term exposure may cause kidney and liver damage. The NYSDOH does not specifically regulate 1,4-dioxane at the current time, and as such the maximum contaminant level (MCL) for unspecified contaminants of 50 micrograms per liter (µg/L) applies; the United States Environmental Protection Agency (EPA) regional screening level (RSL) is 0.46 µg/L. A screening program for 1,4-dioxane was implemented as part of the 2016 basewide sampling event and it was not detected at Site 2.

In order to further evaluate VOCs and 1,4-dioxane in Site 2 groundwater, a supplemental sampling program was implemented in 2017 that included water level measurement at all Site 2 monitoring wells (to establish groundwater flow patterns), VOC testing at 11 monitoring wells, and 1,4-dioxane testing at 31 monitoring wells to evaluate whether 1,4-dioxane is associated with the Site 2 VOC plumes. The results from the 2017 program confirmed groundwater flow at NWIRP Calverton straddles a regional groundwater divide. Groundwater beneath the northern half of the facility flows to the northeast, and the Long Island Sound is the probable discharge point for groundwater in the shallow aquifer zones. Groundwater beneath the southern half of the facility flows to the southeast, and the Peconic River basin is the likely discharge point. Groundwater on the divide, which can fluctuate, flows to the east. Groundwater elevations range from 30 to 38 feet above mean sea level. VOCs were detected in seven of the 11 samples and exceeded MCLs at four locations. Trend analysis graphs were presented for select monitoring wells located within the VOC plumes (FT-MW03S, FT-MW09I, FT-PZ460I, and FT-PZ461I), which showed a downward trend. 1,4-Dioxane was detected in four of the 31 groundwater samples all at concentrations less than the NYSDOH MCL, but at concentrations that exceeded the lower range of the EPA Tapwater Regional Screening Level (RSL) at three locations. The path forward includes monitoring for VOCs and 1,4-dioxane in the Fall of 2018.

Ms. Adrienne Esposito inquired about the status of developing an MCL for 1,4-dioxane. Mr. Karpinski replied that the MCL will take a while to get promulgated.

Mr. Andrew Rapiejko noted that SCDHS split groundwater samples with the Navy in 2017 but used EPA Method 522 rather than Method 8270 SIM to analyze for 1,4-dioxane. The SCDHS results were approximately three times higher than Navy results.

In response, Ms. Fly indicated that in 2018, 1,4-dioxane will be analyzed by with Method 522 and Method 8270 SIM to resolve whether there is a method, quality control or recovery deviation.

TECHNICAL PROGRESS – SITES 2 & AIRCRAFT PAINT HANGAR PFAS INVESTIGATION

Ms. Francisco continued with a description of the Site Inspection (SI) and facility-wide Preliminary Assessment (PA), which are used to evaluate the presence of PFAS in relation to Sites 2 and Aircraft Paint Hangars. The presentation is included in Attachment 3. Site 2 was used as an active fire training area and aqueous film forming foam (AFFF) was used to extinguish fires. PFAS were used to manufacture AFFF from the 1960s through 2001. New York has identified Perfluorooctane Sulfonate (PFOS) and Perfluorooctane Acid (PFOA) as hazardous substances. The current EPA drinking water health advisory recommends PFOS and PFOA should each be less than 70 nanograms per liter (ng/L), and that when both are present their combined concentration should also be less than 70 ng/L. For reference, a nanogram is one-thousandth of a part per billion (or 1 µg/L), so 1 mg/L is equivalent to 1,000 µg/L or 1,000,000 ng/L.

In 2016, five on-property and two off-property groundwater wells were sampled for PFOS and PFOA as part of a screening program. PFOS and/or PFOA were detected at each location, with the EPA health advisory exceeded at four of these locations.

As a result, a further investigation was planned and was conducted in November and December 2017 and January 2018. This program included five surface soil, 12 subsurface soil, four temporary wells, 27 monitoring well, and three surface water samples. PFOS and/or PFOA were detected in several samples in each medium. Results from several groundwater samples from monitoring wells On-Property exceeded the EPA Health Advisories. Results from the groundwater samples from monitoring wells Off-Property did not exceed the EPA Health Advisories.

Planning for a summer 2018 sampling event is in progress and will include further investigation of groundwater and surface water. An SI report will be prepared in Fall 2018.

There was a question regarding soil criteria and Mr. McCloud noted that the number (Residential and Industrial USEPA RSL) is for Perfluorobutane Sulfonic Acid (PFBS). Naval Station Newport has developed soil criteria and Department of Defense (DoD) is coming out with residential soil criteria but a schedule is not in place.

In addition to Site 2, the Aircraft Paint Hangars had an AFFF fire suppression system, and this system was tested in the 1980’s. The hangars were equipped with trough

drains that would have routed impacted water to an industrial waste treatment plant, and AFFF could have also flowed via drainage swales or the drainage system to McKay Lake. Screening at four wells in 2016 found PFOS and/or PFOA in the four wells, with concentrations exceeding the EPA health advisory at three of these locations.

The 2017 field program for the Aircraft Paint Hangars included well redevelopment, collection of groundwater samples from 12 monitoring wells in the Site 6A area, five monitoring wells along the property line and seven monitoring wells off-property. In addition, a sample from the Fence Line Treatment System (FLTS), two pore water samples, and five surface water samples were collected for PFAS analysis. Exceedances of the EPA Health Advisories were detected in one groundwater and one pore-water sample off-property.

An additional investigation is planned for 2018.

Mr. Andrew Rapiejko inquired as to the difference in screen depths for the wells. Ms. Francisco responded that the shallow screens are generally at the water table about 20 feet and the intermediate well screens are generally about 50 feet.

As part of the PA process, background research including literature searches, interviews of site personnel and site reconnaissance are underway to evaluate potential PFAS release points. Release points may include runways and flight lines, fire training areas, hangars and crash sites, among others. Regarding crashes, the project team is aware of several crashes over the years.

Mr. Andrew Rapiejko inquired whether other compounds were analyzed besides PFOS, PFOA and PFBS and stated that the Health Department samples and analyzes 14 compounds. Mr. McCloud responded that 14 compounds were analyzed, but only the three that have criteria will be evaluated in the SI. The results for the remaining PFAS compounds will be included in the appendix of the report. Mr. Rapiejko noted the New York State defaults to an MCL of 50 micrograms per liter for unspecified compounds and therefore, the remaining PFAS compounds do have criteria. Mr. McCloud noted that decisions would be based on the EPA Health Advisory. Mr. McCloud added that surface water results are below the calculated surface water screening level.

Mr. Rapiejko asked about the path forward after the summer 2018 sampling event. Ms. Francisco replied that the Navy will have a recommendation in the SI.

Mr. Shapiro asked if there were any plans for remediation. Ms. Fly responded that there are no plans for remediation at the time. Ms. Fly added that the Navy is reviewing all the data and collaborating with the state on how to move forward since RSLs and criteria do not exist at this time and remediation may not address the contaminants at this point. The Navy will be in contact with the state. Ms. Fly explained that with PFAS coming out

as a new emerging contaminant, there is not much guidance from the EPA and the Navy is waiting for the science to catch up regarding guidance and regulations, then decisions can be made.

Mr. Rapiejko stated there is literature that PFAS do bioaccumulate and people are eating fish in the Peconic river which is a concern with these plumes that are probably discharging at some level. Ms. Fly stated that is why the Navy is looking at surface water and screening levels and what is being developed. Mr. Rapiejko added that some states have put out fish advisories. Mr. Karpinski added that the health department has looked at fish data and are reviewing the information very closely. Ms. Fly added that a comparative analysis of groundwater and fish studies could be performed.

One community member asked if there were any plans to sample further down the Peconic River. Ms. Fly responded that they will evaluate the data to determine if there is a need.

Mr. Rapiejko asked if there were other potential sources from aircraft crashes. Ms. Francisco replied that a PA is in process and the facility as a whole is being investigated and will be complete in the summer of 2018. Ms. Francisco added that SIs are in process and Site 2 is a priority 1 site so the Navy is moving forward and has started sampling. Ms. Francisco also stated that there will be further investigation once other sites are identified. Ms. Fly added that if the exact crash site is unknown, then the Navy cannot investigate.

TECHNICAL PROGRESS – 2017 SITE 6A AND OU3 ANNUAL SAMPLING PROGRAMS

Mr. Forstner then provided a presentation on results from an investigation of the Site 6A source area and the status of the 2017 OU3 annual sampling events. The presentation is included in Attachment 3.

The Site 6A sampling program was initiated to evaluate increasing groundwater VOC concentrations that had been observed at two wells within the limits of the 2009/2010 removal action, specifically FC-MW02SR1 and FC-MW03SR1. The primary objectives were to determine if these VOCs were the result of upwelling from below the excavation or represented evidence of another source. The program was implemented pursuant to a NYSDEC-approved Work Plan and employed a direct-push technology (DPT) rig to evaluate shallow, intermediate and deep groundwater quality within, upgradient and downgradient of the removal area using five vertical profile borings and 12 temporary wells. Four existing monitoring wells not normally part of the OU3 basewide sampling event were also included.

The temporary well groundwater data was not suggestive of an external source. Although VOCs were detected in upgradient samples, these were low-level detections generally below MCLs. Results from within the historic removal area confirmed observations at FC-MW02SR1 and FC-MW03SR1, and also further indicated that the VOCs are limited to the shallow groundwater. VOC concentrations in intermediate and deep samples were generally below MCLs, with limited exception.

Additional monitoring wells were also installed on the PRSC property to address a data gap that existed between locations SA-MW132 and SA-PZ123. This included the installation of five new wells – two clusters with shallow and intermediate wells at SA-MW184 and SA-MW185, and one location (SA-MW186S) with a shallow well only. The purpose of these wells was to provide better delineation of the VOC plume in the vicinity of the northern shore of Donahue Pond. The wells were installed in March 2017 and sampled in April and September 2017. Analytical results from these first rounds of sampling indicated that 1,1-dichloroethane (DCA) was the only VOC to exceed its MCL (5 µg/L) and at SA-MW184I only (6.1 µg/L in April and 5.9 µg/L in September).

OU3 sampling events for 2017 were also summarized. This sampling is a continuation of the annual basewide program begun in 2011 and included surface water and groundwater sampling at four locations along the Peconic River in April and September, and a full round of groundwater sampling at 62 locations (including the four Peconic River piezometers) in September. Groundwater samples were collected from locations at Site 6A/10B (12 locations) and the Southern Area (15 locations onsite and 35 locations offsite, including seven offsite locations in the Peconic River area). In addition to the routine sampling described in the basewide program Sampling and Analysis Plan, 12 locations in the Fence Line Area were also sampled in May 2017 for purposes of monitoring performance of the FLTS. Samples of the SA-MW127 cluster were also collected in August and December to evaluate the effect of the temporary connection of SA-PTW1 to the FLTS on VOC concentrations in this area.

The samples (groundwater and surface water) were analyzed for VOCs. Three groundwater samples were also analyzed for iron, manganese and arsenic in the September sampling event. In addition, an expanded 1,4-dioxane screening program was included as part of the main sampling event in September that included ten locations along the fence line and eleven locations along Connecticut Avenue.

The interim (validated) 1,4-dioxane results from September were presented. Analytical results indicated 1,4-dioxane was not detected at ten locations, and was detected at concentrations no higher than 6.3 µg/L at 11 locations; at seven of these locations, the detected concentration was less than 1 µg/L.

Mr. Forstner concluded with a summary of sampling data related to the Fence Line Area, and in particular near SA-MW127I, where elevated concentrations over successive rounds of sampling dating back to May 2016 showed exceedances of MCLs, with DCA concentrations ranging as high as 220 µg/L (in May and December 2016). SA-MW127I is located between extraction wells EW-2 and EW-3 to the northeast and the eastern infiltration gallery to the east. It was suspected that the persistent VOCs in this area might be stagnated by hydraulic conditions, and that a temporary connection of SA-PTW1 might alleviate the VOC concentrations in this area. As a result, the temporary connection was installed and began operation in July 2017. Interim (validated) data for SA-MW127I indicated that DCA remained in excess of MCLs (58 µg/L in August 2017, 120 µg/L in September 2017, and 45 µg/L in December 2017), therefore operation of the temporary connection would continue.

Mr. Karpinski inquired about the acreage of the DCA plume, Mr. Forstner stated about 250 acres.

One community member inquired about the VOC decreases in each corner of Site 6A/Southern Area but pointed out VOC increases in the middle of Site 6A/Southern Area, then inquired about the depths of the wells. Mr. Forstner replied that the depths are in the handouts and the shallow wells are generally screened at the water table, the intermediate wells are screened generally from 30 to 40 feet below ground surface (bgs) and deep wells are screened generally from 50 to 60 feet bgs.

TECHNICAL PROGRESS – FENCE-LINE TREATMENT SYSTEM (FLTS) UPDATE

Mr. Roy, provided an update on the operation of the FLTS. The presentation is included in Attachment 3. The FLTS was constructed pursuant to the OU3 ROD for Site 6A/10B that was completed in May 2012. The selected remedy is comprised of LUCs and a system to extract, treat and infiltrate groundwater in order to achieve the remedial goal of containing the VOC plume from leaving the site.

The FLTS system uses extraction wells, air stripping equipment, and infiltration galleries, in order to control the VOC plume. Construction started in October 2012 and was completed in October 2013, and system start-up occurred on October 8, 2013. To address declining productivity in extraction well EW-2, it was taken off-line and well EW-3 was brought on-line in February 2016. In order to address persistent VOC concentrations observed in the vicinity of SA-MW127I, the FLTS was temporarily connected to an existing, adjacent pump test well (SA-PTW1) in July 2017 and pumping at EW-1 and EW-3 was suspended since VOC concentrations were below MCLs.

Operating statistics and sampling data were then presented, from system startup through March 2018. System uptime and flow rates were lower in the first four months due to issues associated with system startup; following the initial shakeout period,

average influent flowrates exceeded 78 gallons per minute (gpm) over the next year. The system operated at a reduced rate beginning in March 2015, initially due to a seasonally-elevated groundwater table followed by reduced output from extraction well EW-2. More recently, influent flowrates were decreased to below 70 gpm because of issues with the infiltration galleries, which have limited system throughput.

Influent contaminant concentration trends were presented. Generally, a downward trend has been observed from system startup until the temporary connection to SA-PTW1 was made in July 2017. Based on the influent data, it is estimated that the system was removing less than a tenth of a pound of VOCs on a monthly basis prior to the connection to SA-PTW1, with the cumulative removal through June 2017 was estimated at 50.08 pounds. After connection of the FLTS to SA-PTW1, the VOC influent concentration increased to nearly 60 µg/L and VOC removal rates increased to in excess of a half-pound per month. By September 2017, the cumulative removal was estimated at 51.93 pounds.

As noted previously, throughput had recently decreased due to issues with the infiltration gallery capacity. Test pits to investigate subsurface conditions near the infiltration galleries were completed in April 2017, and rehabilitation of the eastern infiltration gallery was conducted in August 2017. Groundwater discharge rates increased after the rehabilitation efforts, and the FLTS currently discharges to the east gallery only.

In summary, the overall decreasing trend of VOCs in influent from EW-1 and EW-3 continued, and influent concentrations had been below 5 µg/L since August 2016. In order to evaluate the presence of VOCs other than those included in the site ROD, analysis of influent for the full list of VOCs began in May 2016 as requested by NYSDEC. Since that time; perchloroethylene concentrations have ranged from 8.9 µg/L in May 2016 to 0.72 µg/L in September 2017. The connection of the FLTS to SA-PTW1 in July 2017 led to an increase influent VOC concentrations, with concentrations of DCA ranging from 41 µg/L in July 2017 to 23 µg/L in October 2017. As of March 2018, DCA is continuing to decrease (5.8 µg/L). The FLTS maintains continued compliance with all discharge goals, including effluent levels less than the relevant NYSDOH MCLs, and VOC removal efficiency is in excess of 99 percent.

TECHNICAL PROGRESS –SITE 7 REMEDIAL ACTION UPDATE

Mr. Stephane Roy (KOMAN Government Solutions) then provided an update on the status of Site 7 (the former Fuel Depot). The presentation is included in Attachment 3. A summary of recent groundwater sampling activities and a path forward was provided. Mr. Roy discussed the current results of the semiannual groundwater sampling program which includes, 11 monitoring wells analyzed for select SVOCs, 2-methylnaphthalene,

and lead. Of the monitoring wells included in the program, seven wells previously had exceedances of 2003 ROD Remediation Goals. The remaining four wells in the program are located downgradient of the contaminated groundwater. Mr. Roy presented figures portraying the historical and most recent sampling results from October 2017. The monitoring well figure presented ethylbenzene and total xylene exceedances above the Proposed Closeout Goals, in MW16S and MW17S. The SVE wells figure presented ethylbenzene and total xylene exceedances above the Proposed Closeout Goals, in SV2, SV4, and SV13.

Mr. Roy then reviewed the path forward indicating that semi-annual groundwater sampling would continue and potential optimization to reduce cleanup time needed to be evaluated.

GENERAL DISCUSSION AND CLOSING REMARKS

At the conclusion of the meeting, an opportunity to ask general questions about the site was provided. No further questions were posed. Mr. McCloud thanked the attendees for their participation. The next RAB meeting was planned for fall 2018, with a final date and location to be confirmed. The meeting was then adjourned.

LIST OF ACRONYMS AND ABBREVIATIONS

AFFF	Aqueous Film Forming Foam
AS/SVE	Air Sparge/Soil Vapor Extraction
bgs	Below ground surface
DCA	1,1-Dichloroethane
EPA	Environmental Protection Agency
FLTS	Fence Line Treatment System
gpm	Gallons per Minute
ISCO	In-Situ Chemical Oxidation
LTM	Long Term Monitoring
LUC	Land Use Control
MCL	Maximum Contaminant Level
MEC	Munitions and Explosives of Concern
ng/L	Nanograms per Liter
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PA	Preliminary Assessment
PFAS	Pefluoroalkyl Substance
PFBS	Perfluorobutane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PRSC	Peconic River Sportsman’s Club
RAB	Restoration Advisory Board
ROD	Record of Decision
RPM	Remedial Project manager
RSL	Regional Screening Level
SCDHS	Suffolk County Department of Health Services
SI	Site inspection
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
µg/L	Micrograms per Liter
UST	Underground Storage Tank
VOC	Volatile Organic Compound

ATTACHMENT 1

APRIL 17, 2018 RAB MEETING SIGN-IN SHEET

ATTACHMENT 2

APRIL 17, 2018 RAB MEETING AGENDA

ATTACHMENT 3

NAVY PRESENTATIONS – APRIL 17, 2018 RAB MEETING

LIST OF ACRONYMS AND ABBREVIATIONS

AFFF	Aqueous Film Forming Foam
AS/SVE	Air Sparge/Soil Vapor Extraction
bgs	Below ground surface
DCA	1,1-Dichloroethane
EPA	Environmental Protection Agency
FLTS	Fence Line Treatment System
gpm	Gallons per Minute
ISCO	In-Situ Chemical Oxidation
LTM	Long Term Monitoring
LUC	Land Use Control
MCL	Maximum Contaminant Level
MEC	Munitions and Explosives of Concern
ng/L	Nanograms per Liter
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PA	Preliminary Assessment
PFAS	Pefluoroalkyl Substance
PFBS	Perfluorobutane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PRSC	Peconic River Sportsman’s Club
RAB	Restoration Advisory Board
ROD	Record of Decision
RPM	Remedial Project manager
RSL	Regional Screening Level
SCDHS	Suffolk County Department of Health Services
SI	Site inspection
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
µg/L	Micrograms per Liter
UST	Underground Storage Tank
VOC	Volatile Organic Compound

ATTACHMENT 1

APRIL 17, 2018 RAB MEETING SIGN-IN SHEET

48th RAB Meeting for NWIRP Calverton
April 17, 2018
Sign-in List

Name (Print)	Phone and/or email or address if interested in being on the mailing list	Affiliation	How did you hear about the meeting?
Melissa Gushing			
JC Kreidel			
Kristi Francisco			
Jeffrey Doepp			
Steve Shapiro			
Robert Forstner			
JOE McCLAIN			
Stephen Malgan			
Frank Messina			
ROBERT PORSCHE			
Lou Cork			
Vincent Racanella			
Andrew Rapiejko			
David Brayack			
Steve Karpinski			

48th RAB Meeting for NWIRP Calverton
April 17, 2018
Sign-in List

Name (Print)	Phone and/or email or address if interested in being on the mailing list	Affiliation	How did you hear about the meeting?
GEO. BARTUNEK	[redacted]		
Kelly Zegers			
Adrienne Esposito			
Al Krupski			

48th RAB Meeting for NWIRP Calverton
April 17, 2018
Sign-in List

Name (Print)	Phone and/or email or address if interested in being on the mailing list	Affiliation	How did you hear about the meeting?
Jonathan Wanlass			
Lora Fly			

ATTACHMENT 2

APRIL 17, 2018 RAB MEETING AGENDA

Agenda

Restoration Advisory Board
Naval Weapons Industrial Reserve Plant Calverton

April 17, 2018

Riverhead Seniors Center, Riverhead NY

7:00 p.m.

Welcome and Agenda Review
Joseph McCloud, NAVFAC Mid-Atlantic

Distribution of Minutes
All Members

Community Update
Vincent Racaniello, RAB Co-chair

Technical Progress

General Overview of ER Sites
Joseph McCloud, NAVFAC Mid-Atlantic

Site 2 Interim Action for MEC Update
Kristi Francisco, Tetra Tech

Site 2 Supplemental VOC and 1,4-Dioxane Investigation
Kristi Francisco, Tetra Tech

PFAS, Site 2 and Aircraft Hangar Site Inspection and Preliminary Assessment
Kristi Francisco, Tetra Tech

2017 Site 6A, Southern Area and OU3 Sampling Results
Robert Forstner PE, Resolution Consultants

Fence Line Treatment System Update
Stephane Roy, KOMAN Government Solutions

2017 Site 7 Groundwater Results and Optimization
Stephane Roy, KOMAN Government Solutions

Closing Remarks
Joseph McCloud, NAVFAC Mid-Atlantic

Presenters will be available after the program for questions.

ATTACHMENT 3

NAVY PRESENTATIONS – APRIL 17, 2018 RAB MEETING

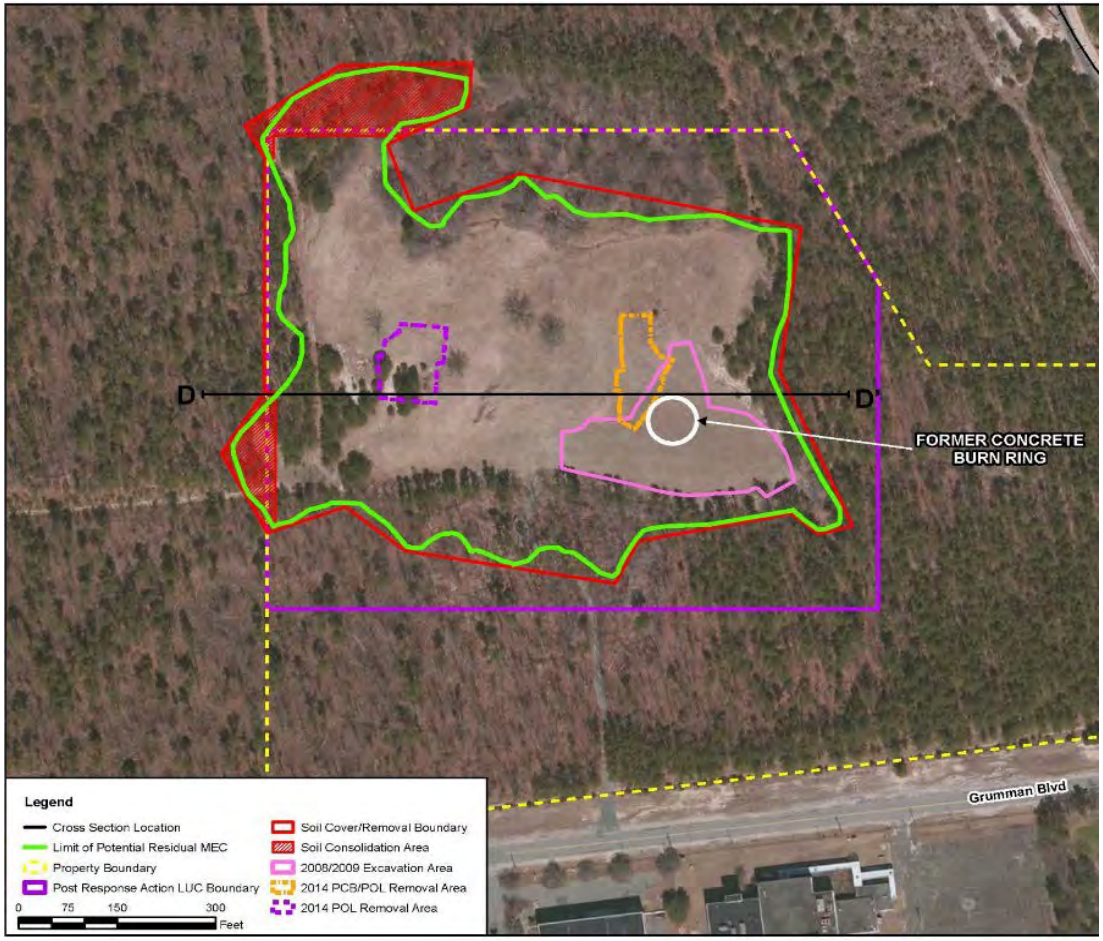
SITE 2 – FORMER FIRE TRAINING AREA
INTERIM ACTION TO ADDRESS
POTENTIAL MUNITIONS AND EXPLOSIVES OF CONCERN (MEC)

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
CALVERTON, LONG ISLAND, NEW YORK

4/17/2018

Site 2 – Former Fire Training Area
Remedy for Potential MEC

- Potential Munitions and Explosives of Concern (MEC) are present and likely originated at another location at the NWIRP (i.e., firing stop butt area)
- Remedy:
  - Consolidation of off-property material
  - Regrading, surface clearance, and addition of top soil and vegetation to stabilize the surface
  - Land Use Controls to restrict future use of the site
  - Maintenance as required for erosion control



Site 2 – Former Fire Training Area
Interim Action Update

- Record of Decision (Spring 2018)
- Remedial Action Work Plan (Spring / Summer 2018)
- Construction (Summer / Fall 2018)

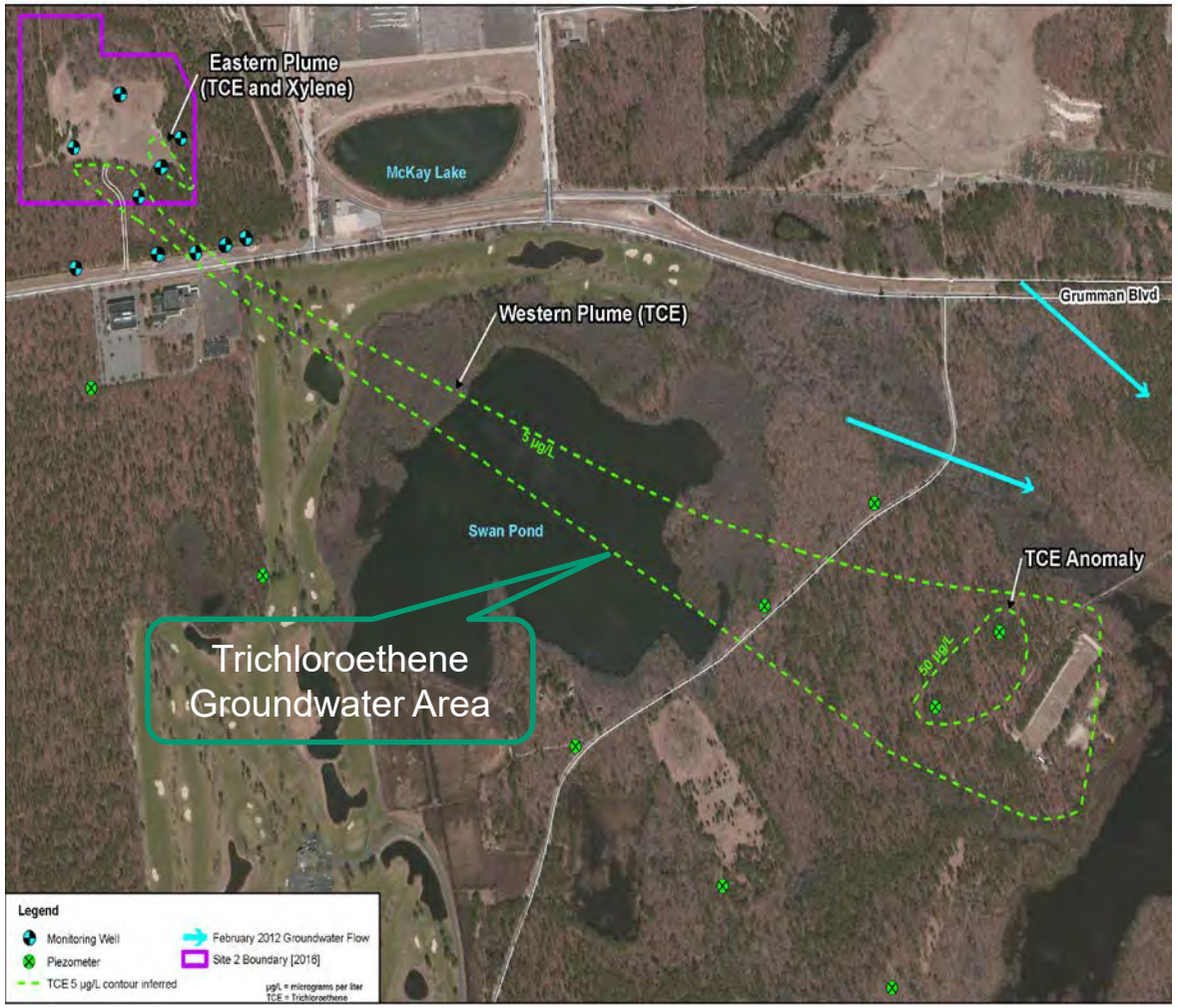
SITE 2 – FORMER FIRE TRAINING AREA
SUPPLEMENTAL VOLATILE ORGANIC COMPOUNDS (VOCs) AND 1,4-DIOXANE INVESTIGATION

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
CALVERTON, LONG ISLAND, NEW YORK

4/17/2018

Site 2 – Former Fire Training Area VOC Investigation

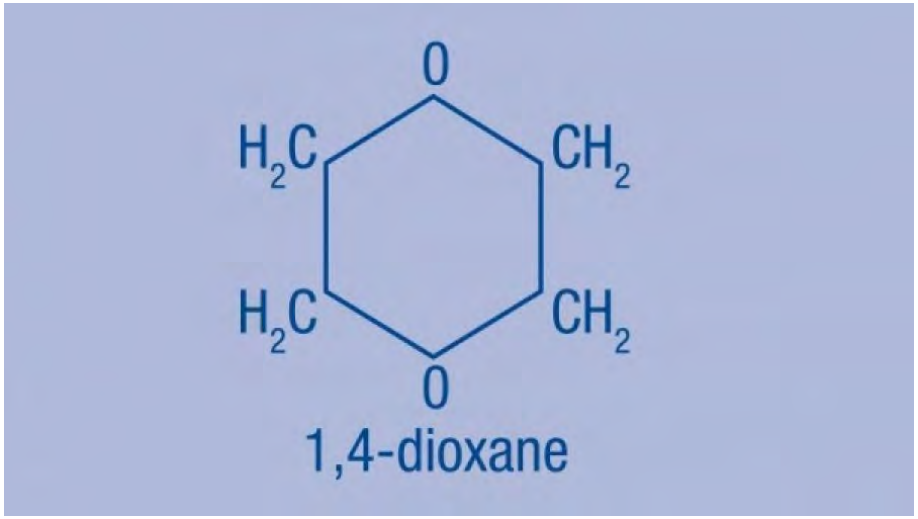
- Used as an active Fire Training Area from the 1950's until 1996
- Groundwater at the site have been impacted by petroleum, chlorinated solvents, and other chemicals
- Two VOC-contaminated groundwater plumes
- Trichloroethene (TCE) and xylene are the primary contaminants
- TCE plume extends off-property



Site 2 – Former Fire Training Area
1,4-Dioxane Investigation

- 1,4-Dioxane
  - Synthetic industrial chemical
  - Consumer products: deodorants, shampoo, and cosmetics
  - Industrial uses: paint strippers, dyes, greases, varnishes, and waxes
  - Useful properties: stabilizer for chlorinated solvents such as 1,1,1-trichloroethane (TCA)

- 1,4-Dioxane 2016 Testing
  - Two on-property wells: FT-MW09I and FT-MW10I
  - 1,4-dioxane was not detected

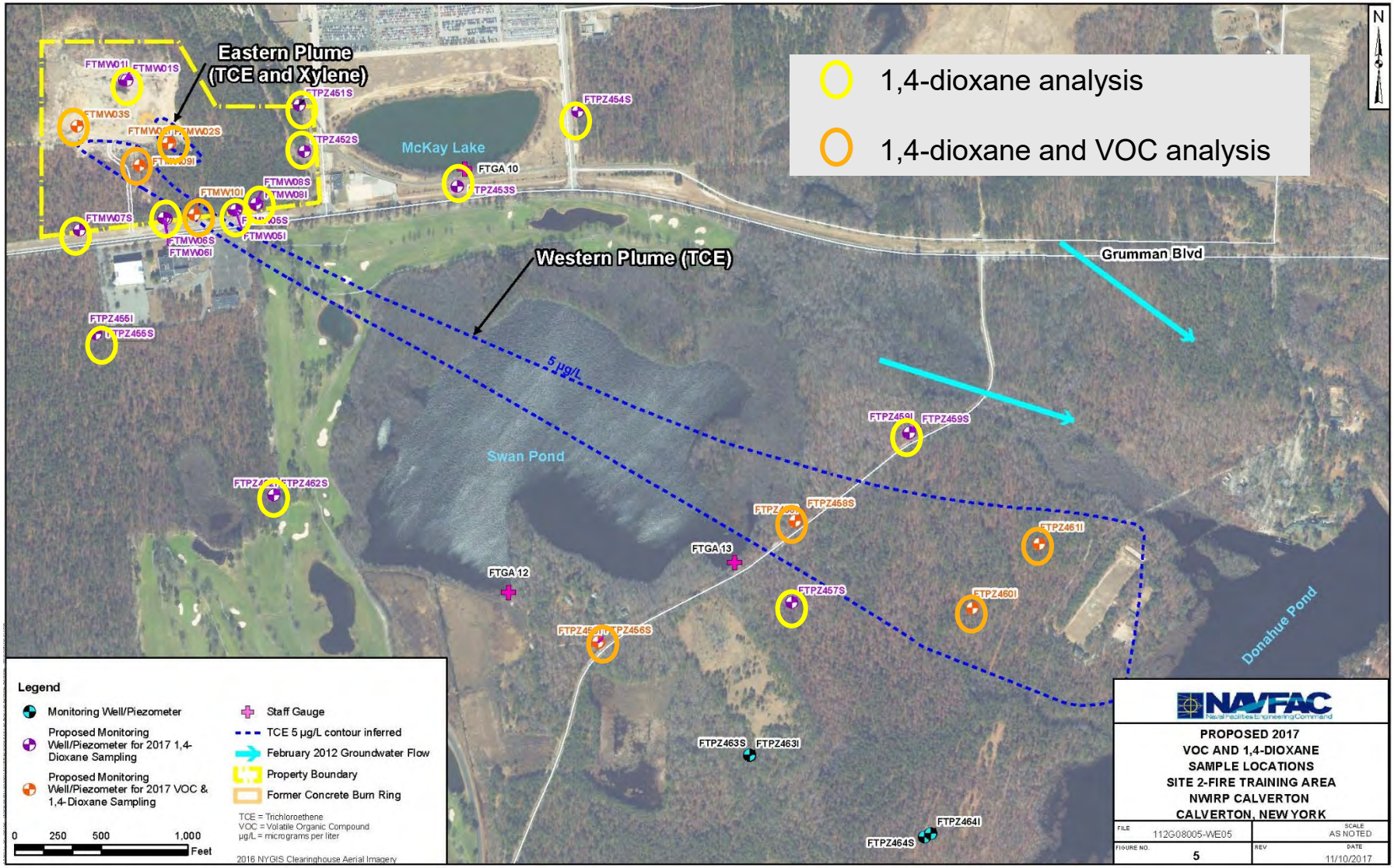


1,4-dioxane

Site 2 – Former Fire Training Area
2017 Sampling Event

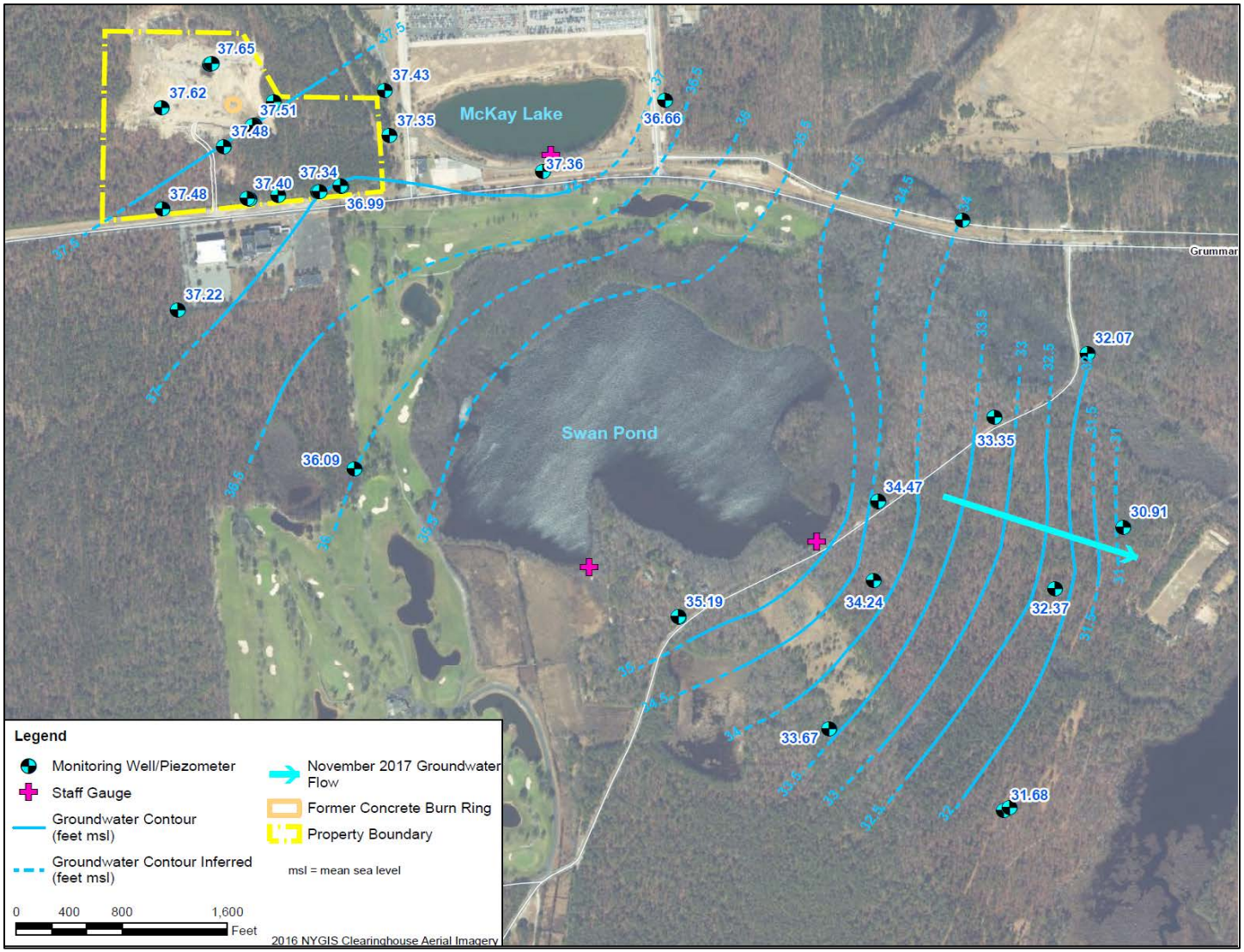
- Water Level Measurements
  - –All Site 2 monitoring wells to evaluate groundwater flow direction
- VOC Testing:
  - –11 monitoring wells to monitor migration and attenuation of VOCs
- 1,4-Dioxane Testing:
  - –31 monitoring wells to evaluate whether 1,4-dioxane is associated with the Site 2 VOC plumes

Site 2 – Former Fire Training Area
2017 VOC and 1,4-Dioxane Program

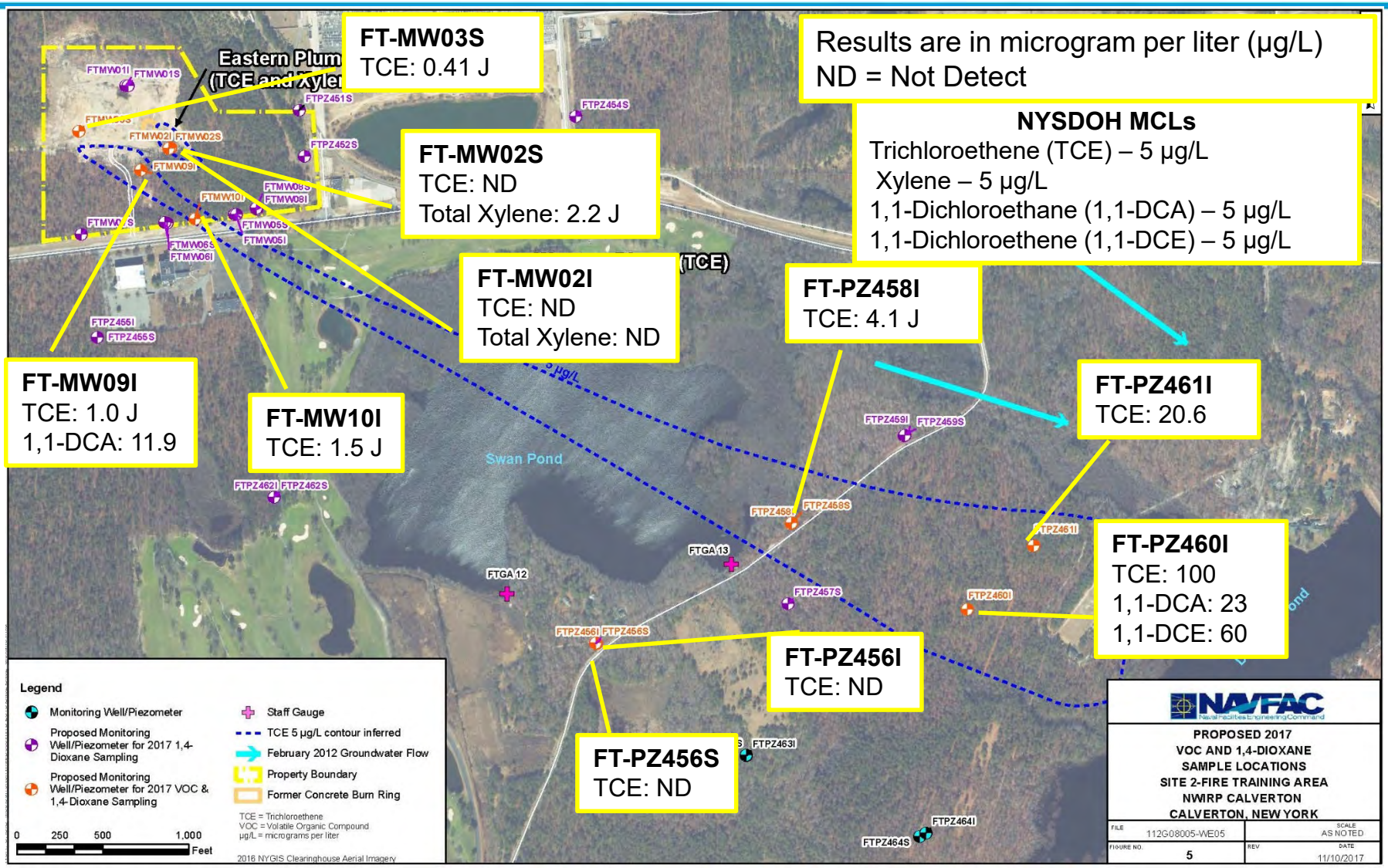


Site 2 – Former Fire Training Area
Water Level Measurements

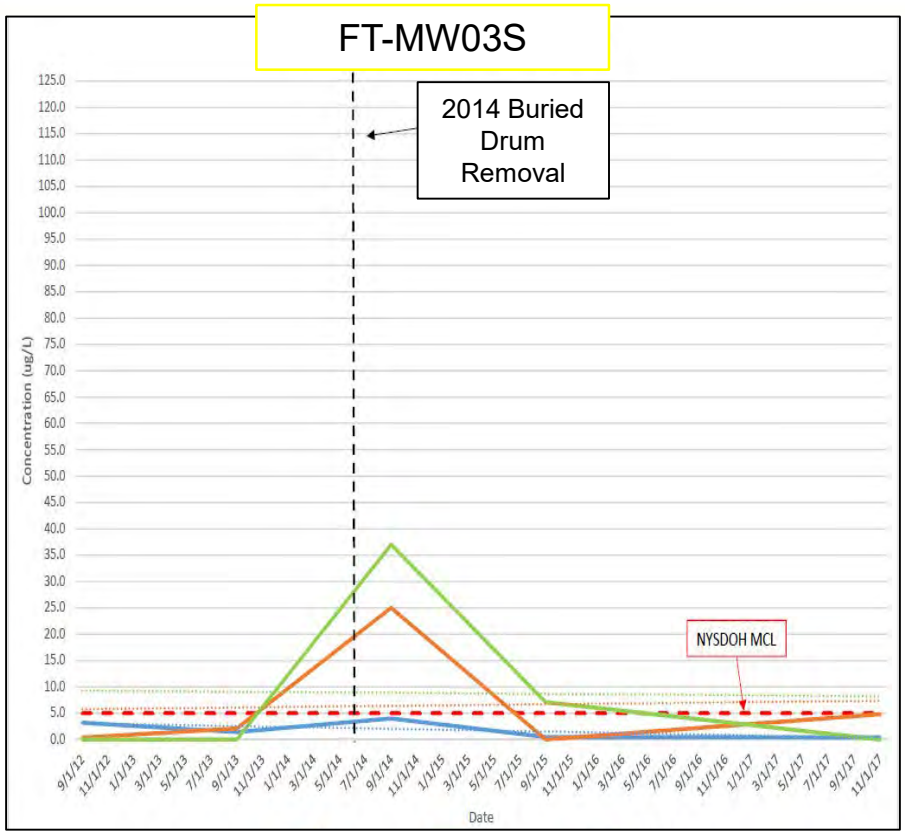
- Confirmed groundwater flow to the south east
- Elevations range from 30 to 38 feet above mean sea level

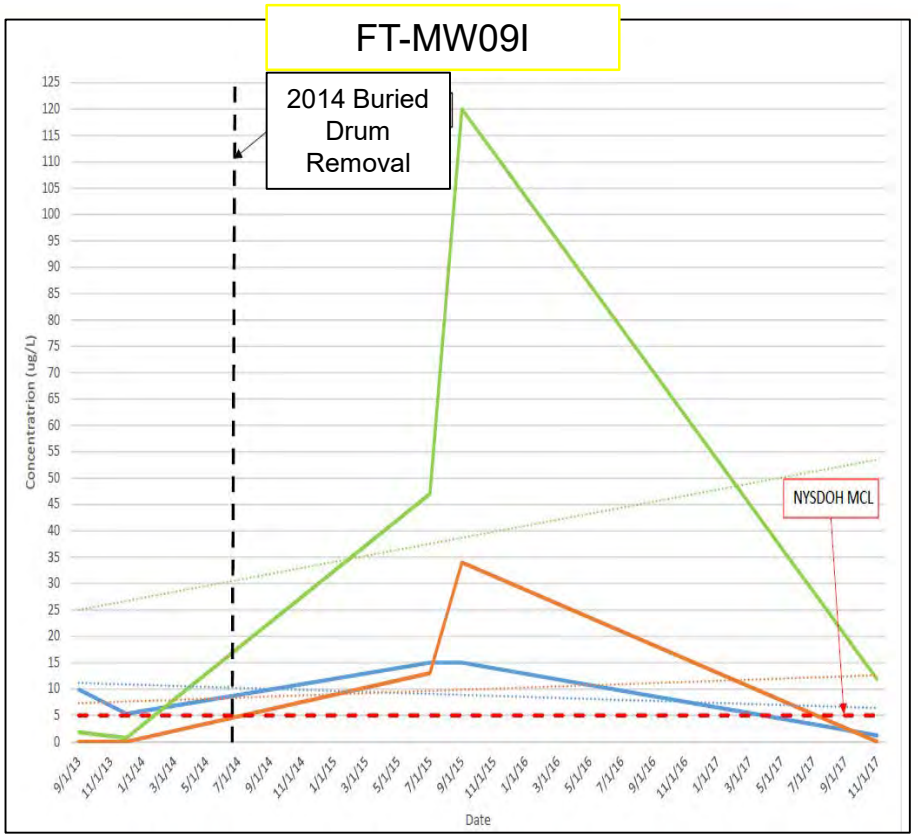


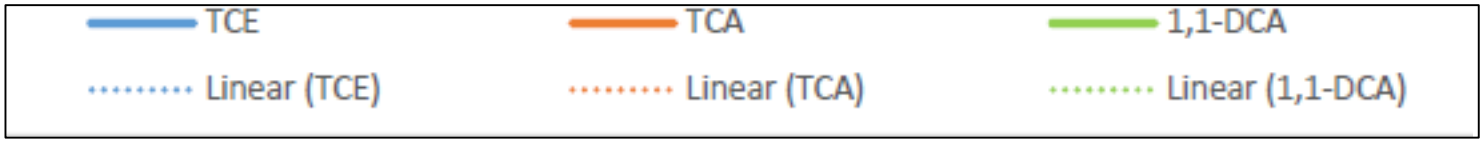
Site 2 – Former Fire Training Area
2017 VOC Results



Site 2 – Former Fire Training Area Trend Analysis

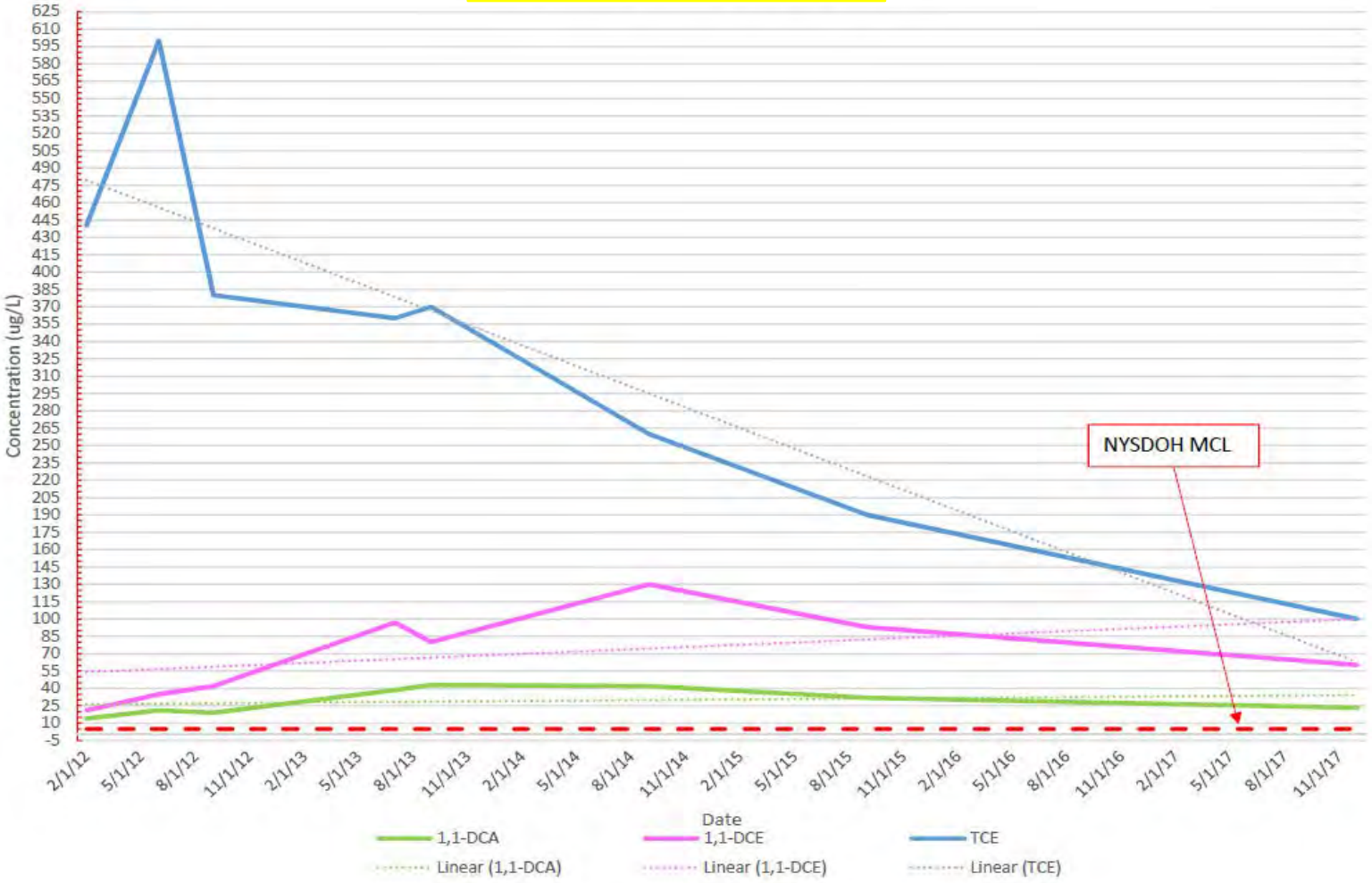




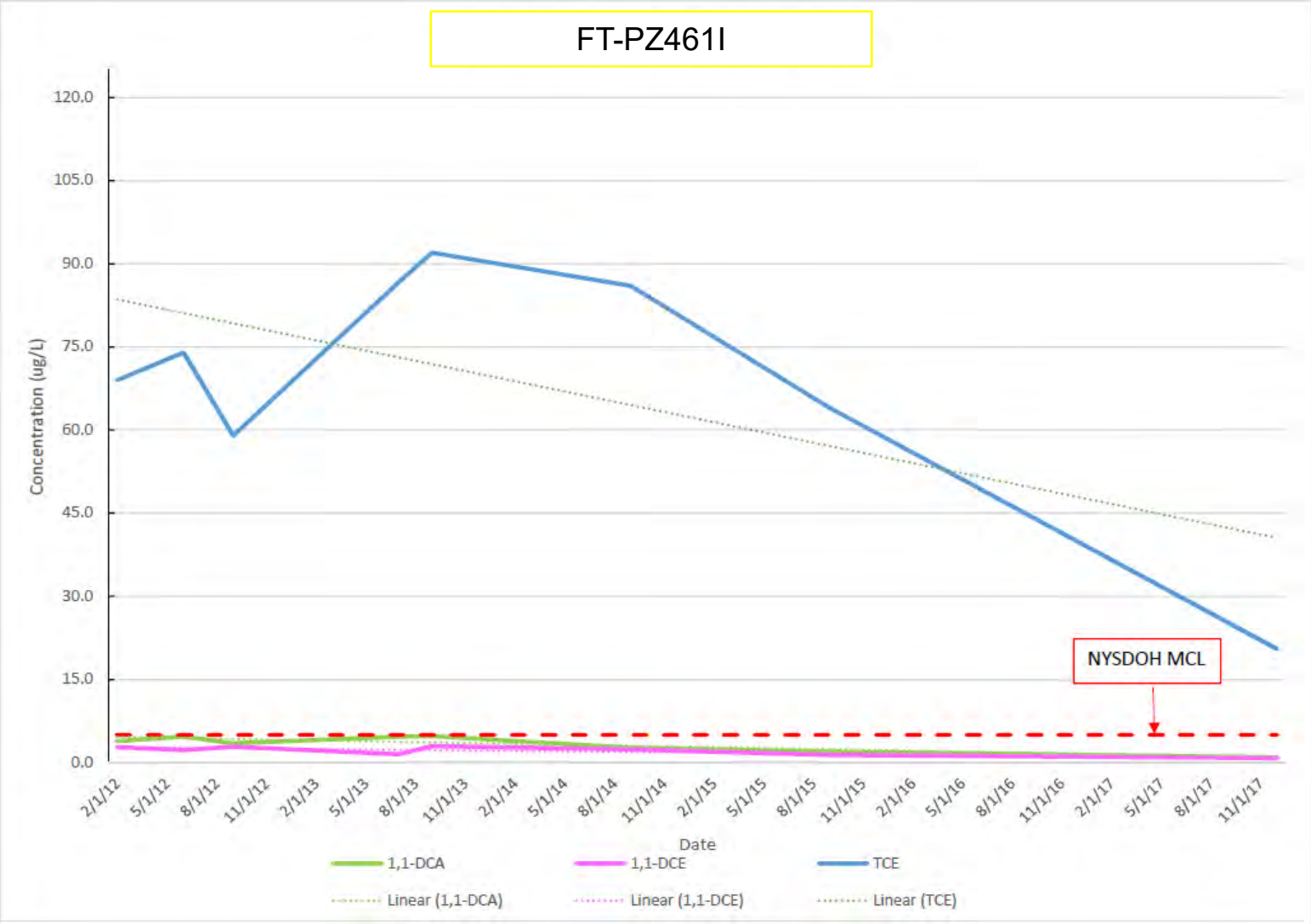


Site 2 – Former Fire Training Area Trend Analysis

FT-PZ460I

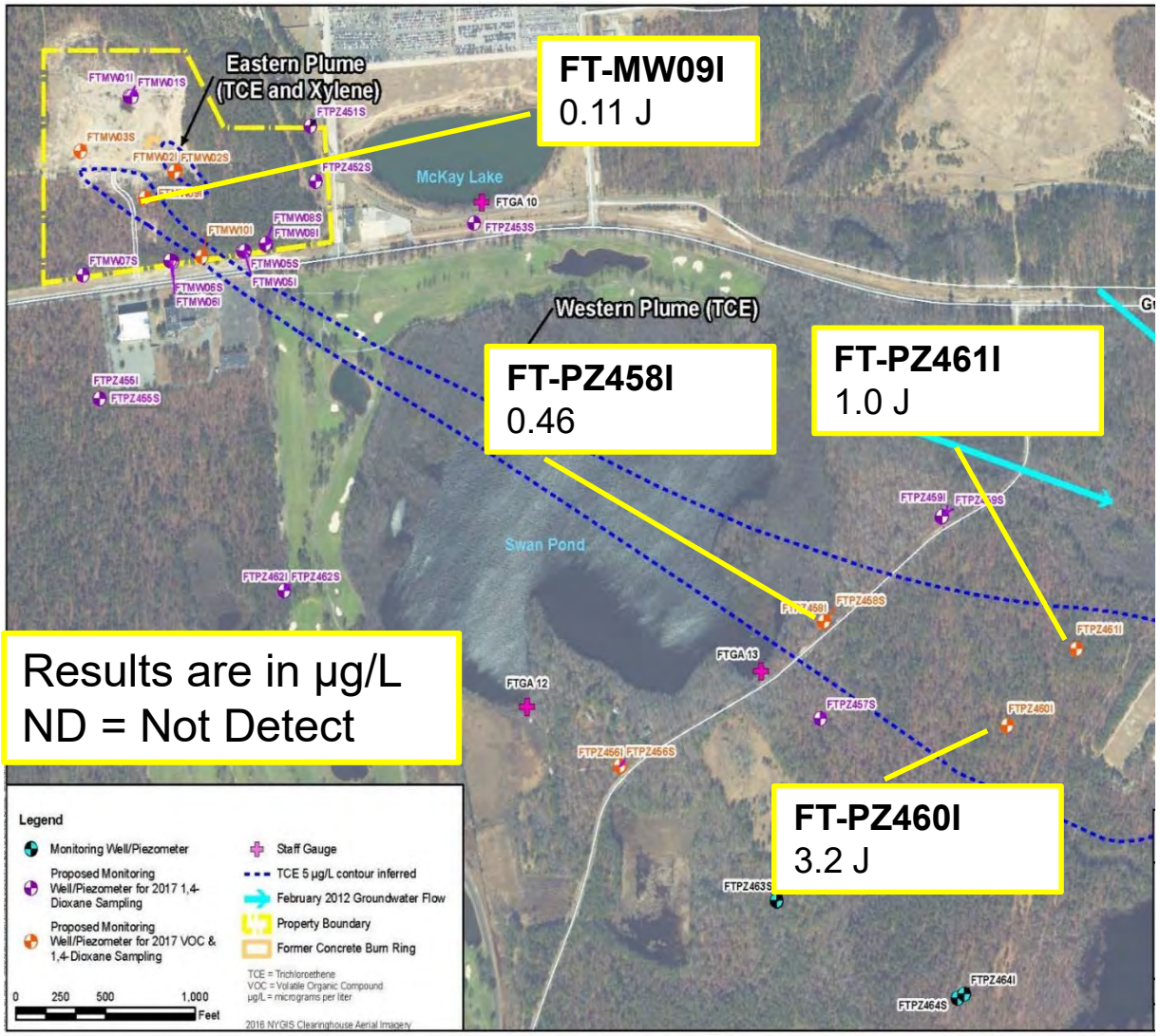


Site 2 – Former Fire Training Area Trend Analysis



Site 2 – Former Fire Training Area
2017 1,4-Dioxane Results (µg/L)

- NYSDOH MCL defaults to the Unspecified Contaminant Level of 50 µg/L
- Environmental Protection Agency (EPA) Regional Screening Level Tapwater (RSL) range = 0.46 µg/L (10^{-6}) to 46 µg/L (10^{-4})
- Method Detection Limit: 0.0423 µg/L
- 1,4-dioxane detected in 4 of 31 groundwater samples
- Results did not exceed NYSDOH MCLs
- Results exceeded the EPA RSL of 0.46 µg/L at 3 locations. No exceedances of 46 µg/L.



Site 2 – Former Fire Training Area
Path Forward

- Monitor for VOCs and 1,4-dioxane in Fall 2018
  - Data will support the next 5-Year Review
  - 1,4-dioxane data will verify correlation between the EPA methods for drinking water and groundwater

PERFLUOROALKYL SUBSTANCES (PFAS)
SITE 2 AND AIRCRAFT PAINT HANGAR SITE INSPECTION (SI) and FACILITY WIDE PRELIMINARY ASSESSMENT (PA)

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
CALVERTON, LONG ISLAND, NEW YORK

4/17/2018

Site 2 – Former Fire Training Area

- Used as an active Fire Training Area from the 1950's until 1996
- Aqueous Film Forming Foams (AFFF) used to extinguish fires
- PFAS was used to manufacture AFFF from the 1960's to 2001

Looking west northwest

Site 2 – Former Fire Training Area
PFAS Sampling Events

September 2016

- Select wells sampled and analyzed for perfluorooctanoic acid (PFOA) and perfluorooctyl sulfonate (PFOS)

November 2017 to January 2018

- SI objectives:
  - –Are PFAS associated with the VOC plumes, and if present, do they exceed the United States Environmental Protection Agency (U.S. EPA) Health Advisories?
  - –Are PFAS from Site 2 impacting water quality in McKay Lake or Swan Pond?
  - –Are former firefighting activities at Site 2 the only source of PFAS in the area?
  - –Are PFAS in soil and groundwater at Site 2 and are they associated with residual petroleum?
- Investigation activities
  - –Surface and subsurface soil sampling at the former fire training ring
  - –Temporary well installation (groundwater sampling) at the former fire training ring
  - –Groundwater sampling at wells from existing monitoring well network
  - –Surface water sampling

PFAS GUIDELINES

Guidelines

- EPA Drinking Water Health Advisories
  - –PFOS: 70 nanograms per liter (ng/L)
  - –PFOA: 70 ng/L
  - –If both are present: PFOS and PFOA should not exceed 70 ng/L
- EPA Regional Screening Level (RSL):
  - –One PFAS with an EPA RSLs: perfluorobutanesulfonic acid (PFBS)
  - –Tap Water: 400,000 ng/L (400 µg/L or 0.4 mg/L)
  - –Residential Soil: 1,300,000,000 ng/kg (1,300,000 µg/kg or 1,300 mg/kg)
- New York State Department of Environmental Conservation (NYSDEC) identified PFOA and PFOS as a hazardous substance (6 NYCRR Part 597, March 2017)
- New York State has no criteria specific to PFAS

What is a ng/L?

1 milligram per liter (mg/L) = 1,000 micrograms per liter (µg/L)

= 1,000,000 ng/L

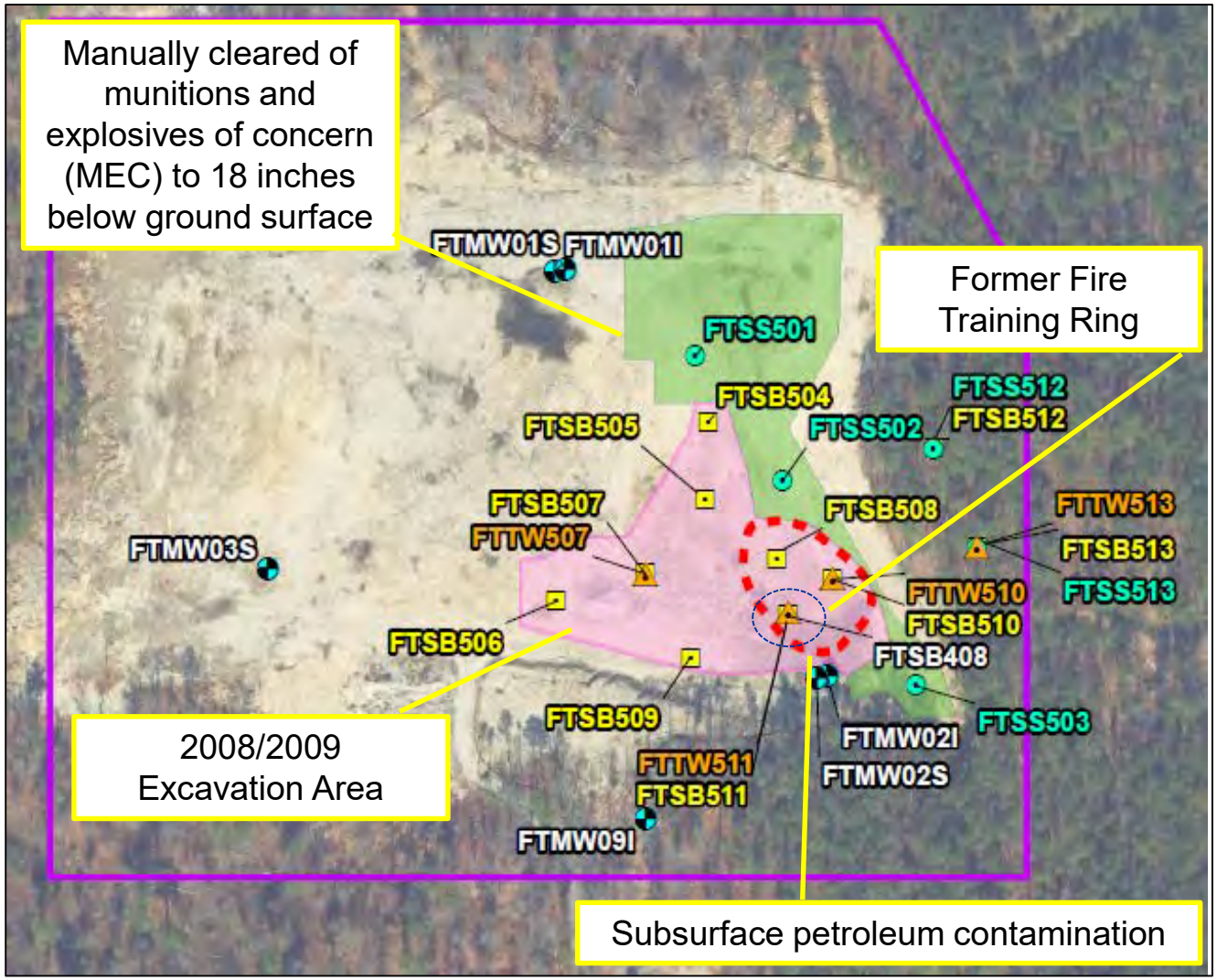
Site 2 – Former Fire Training Area
Fire Training Ring Area Investigation

Soil

- 5 surface soil samples
- 12 subsurface soil samples

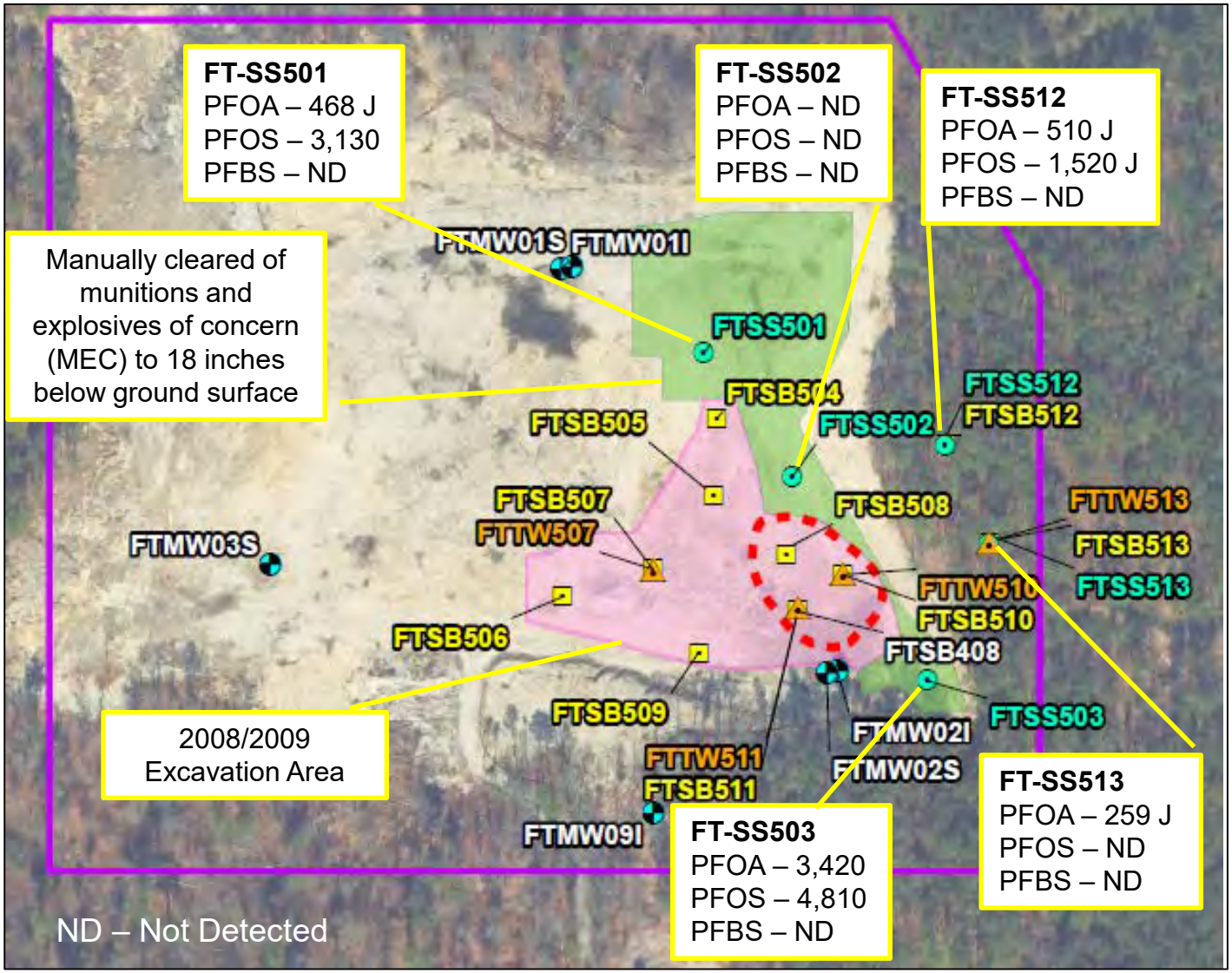
Temporary Wells

- 4 groundwater grab samples



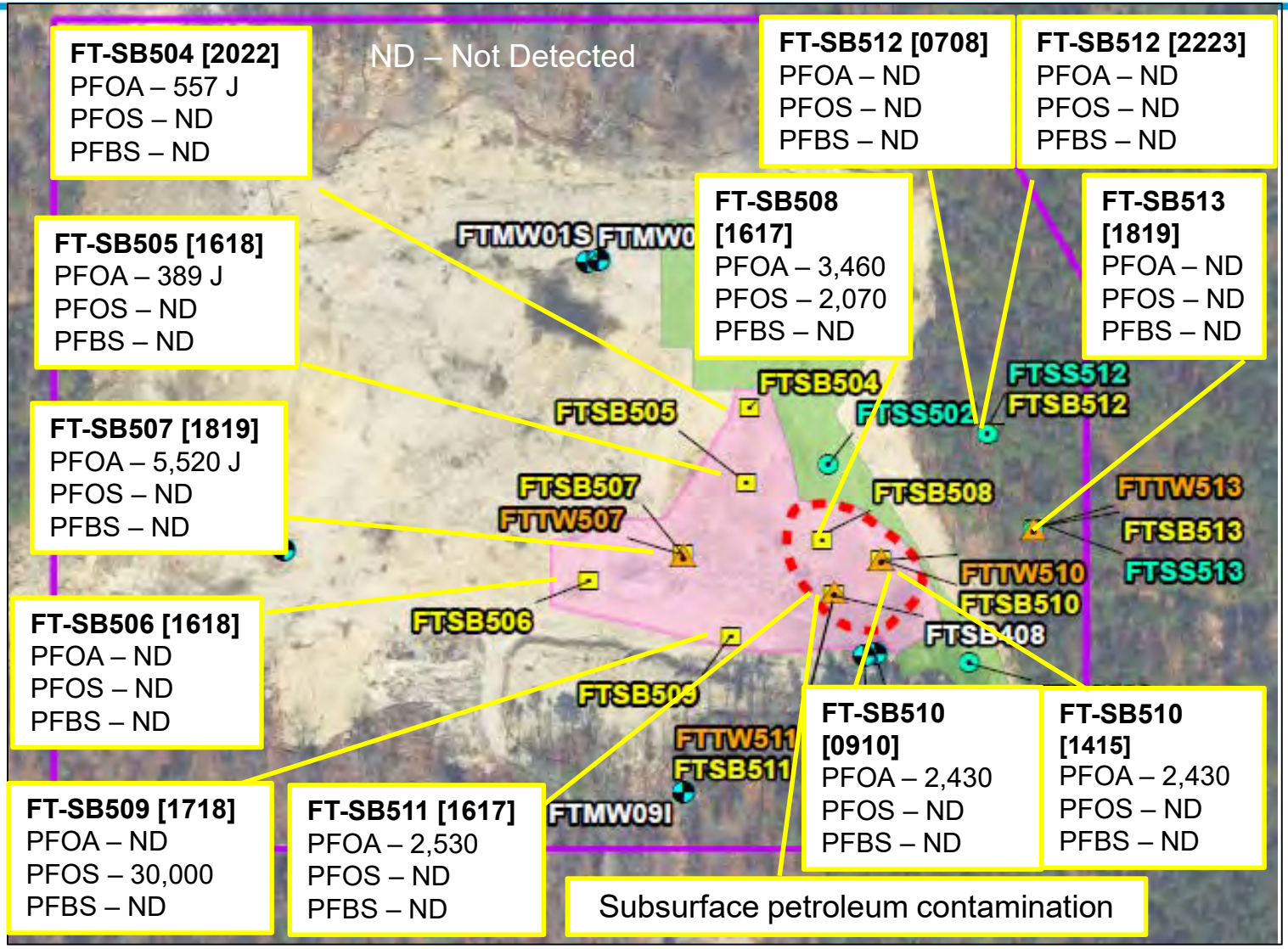
Site 2 – Former Fire Training Area Surface Soil Results (ng/kg)

- 5 surface soil samples
- PFOA: detected in 4 of the 5 samples
- PFOS: detected in 3 of 5 samples
- PFBS: Not detected



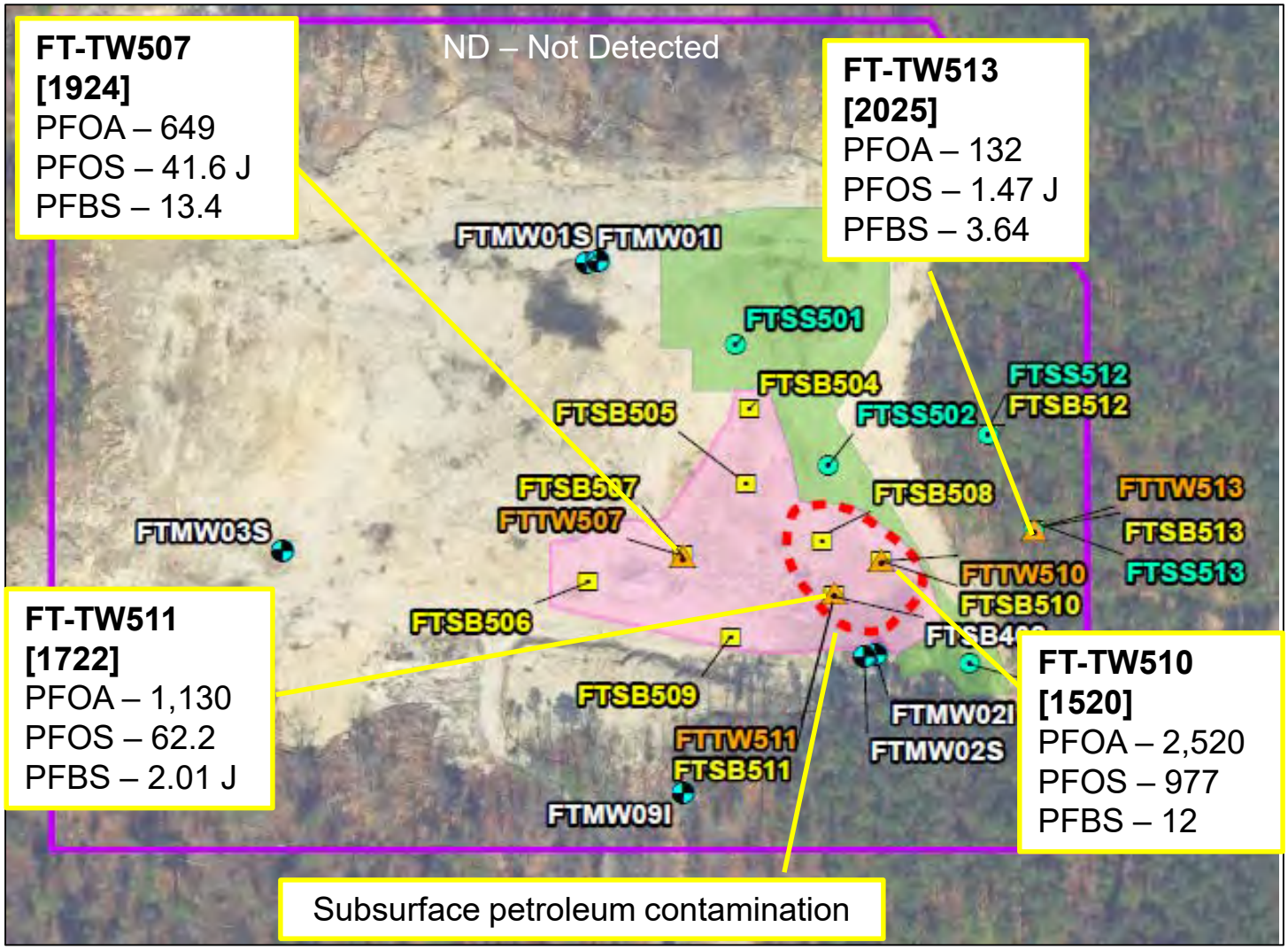
Site 2 – Former Fire Training Area Subsurface Soil Results (ng/kg)

- 12 subsurface soil samples
- PFOA: detected in 6 of the 10 samples
- PFOS: detected in 2 of 10 samples
- PFBS: Not detected

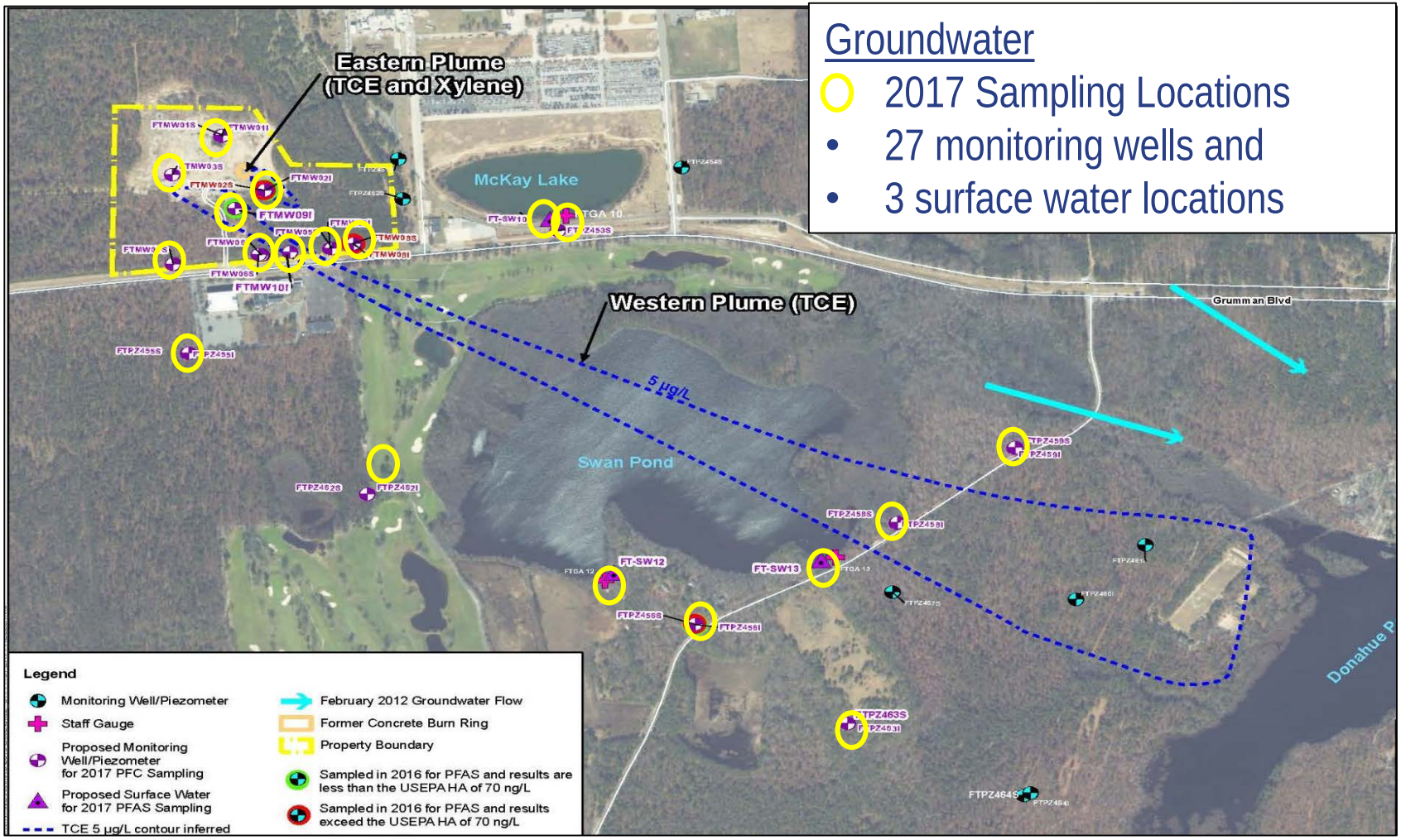


Site 2 – Former Fire Training Area Temporary Well Results (ng/L)

- 4 Groundwater grab samples collected at the water table
- PFOA, PFOS, and PFBS: Detected in each sample
- Results exceed the EPA Drinking Water Health Advisories



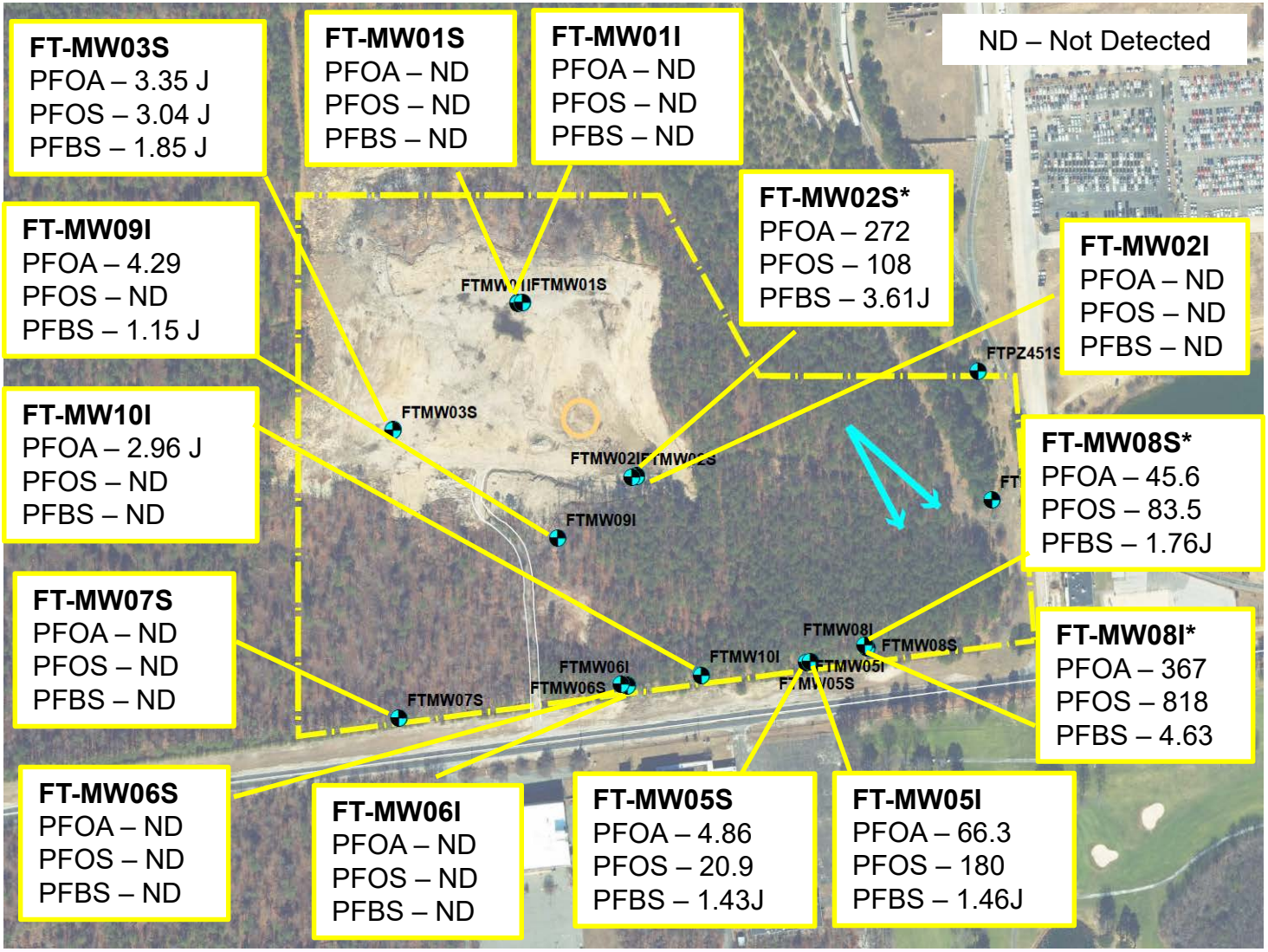
Site 2 – Former Fire Training Area
PFAS Groundwater Investigation



Site 2 – Former Fire Training Area
On-Property PFAS Results (ng/L)

- 14 permanent wells sampled on property
- 4 of 14 groundwater samples had exceedances of the EPA Health Advisories
- Moderate concentrations noted near and downgradient of the former fire training area

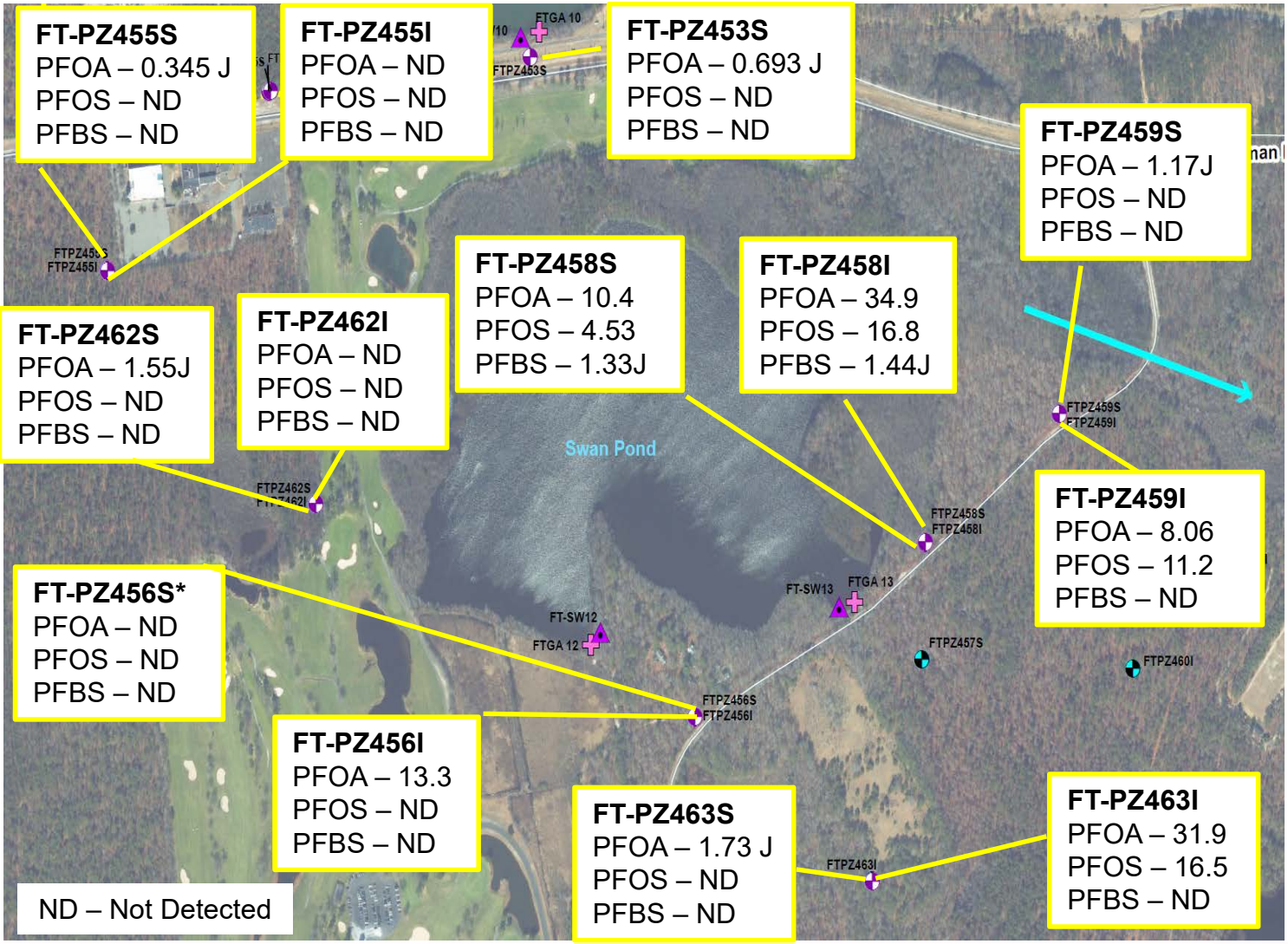
*Exceeded EPA Health Advisories in 2016 sample



Site 2 – Former Fire Training Area
Off-Property PFAS Results (ng/L)

- 13 permanent wells sampled off property
- No exceedances of the EPA Health Advisories

*FT-PZ456S exceeded EPA Health Advisories in 2016

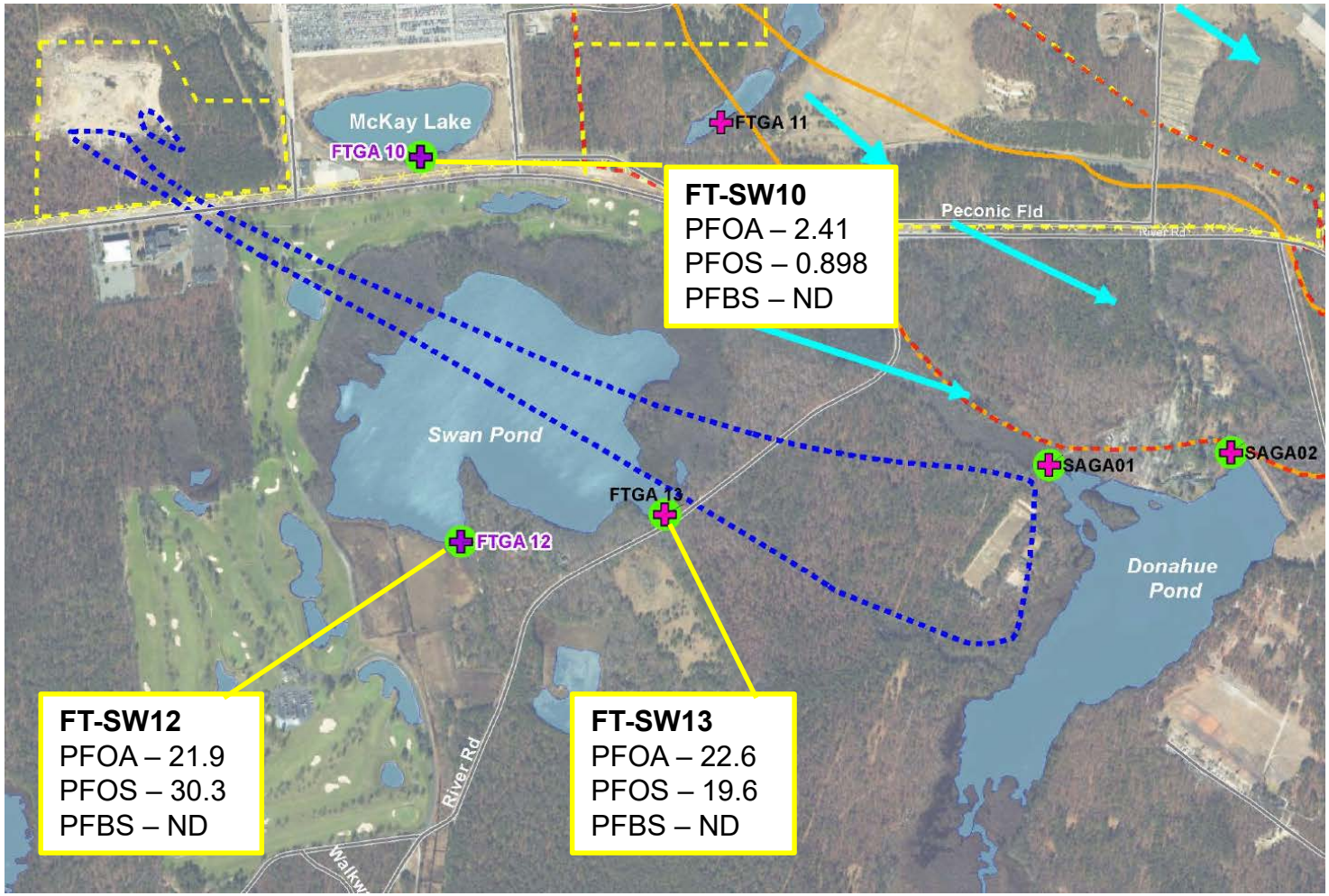


Site 2 – Former Fire Training Area
Surface Water

- Calculated Surface Water Screening Levels
- EPA RSL Calculator (June 22, 2017):
- Recreational exposure to PFOA and PFOS: 4,400 ng/L in surface water
  - 26 years: 6 years as a child and 20 years as an adult
  - Considers weight and skin surface area
  - Exposure to surface water for 4 hours a day during 52 days of the year

Site 2 – Former Fire Training Area Surface Water Results (ng/L)

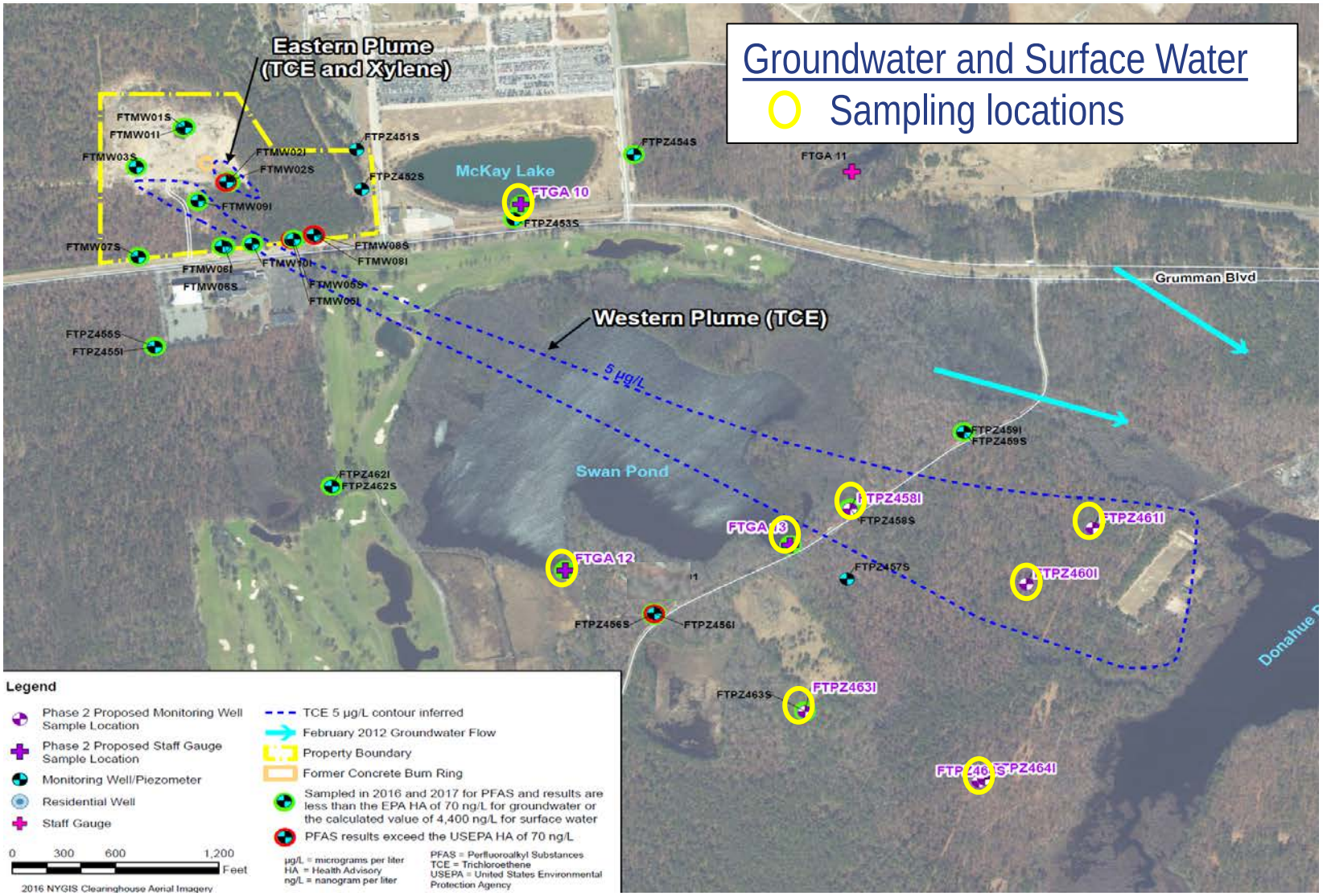
- 3 surface water samples
- Results are below the Calculated Surface Water Screening Level



Site 2 – Former Fire Training Area
Path Forward

- Summer 2018 Sampling Event
- 6 Off-property groundwater samples
  - Confirm PFAS results greater than half the EPA HA of 70 ng/L
  - Evaluate groundwater downgradient of River Road
- 3 Surface water samples – confirm 2017 results
  - McKay Lake
  - Swan Pond
- Prepare SI Report – Fall 2018
  - Determine next steps

Site 2 – Former Fire Training Area
Summer 2018 Proposed Sampling Locations



Aircraft Paint Hangars
PFAS Investigation

- Aircraft paint hangars north and west of Site 6A were identified as having fire suppression systems that contained AFFF
- 1980's: The AFFF deluge system was tested the system
- Hangars were equipped with trough drains, which would have routed water/material to an Industrial Waste Treatment Plant (IWTP)
- AFFF could have flowed through drainage swales at Site 6A or discharged to McKay Lake

Looking north west

Aircraft Paint Hangars
PFAS Sampling Events

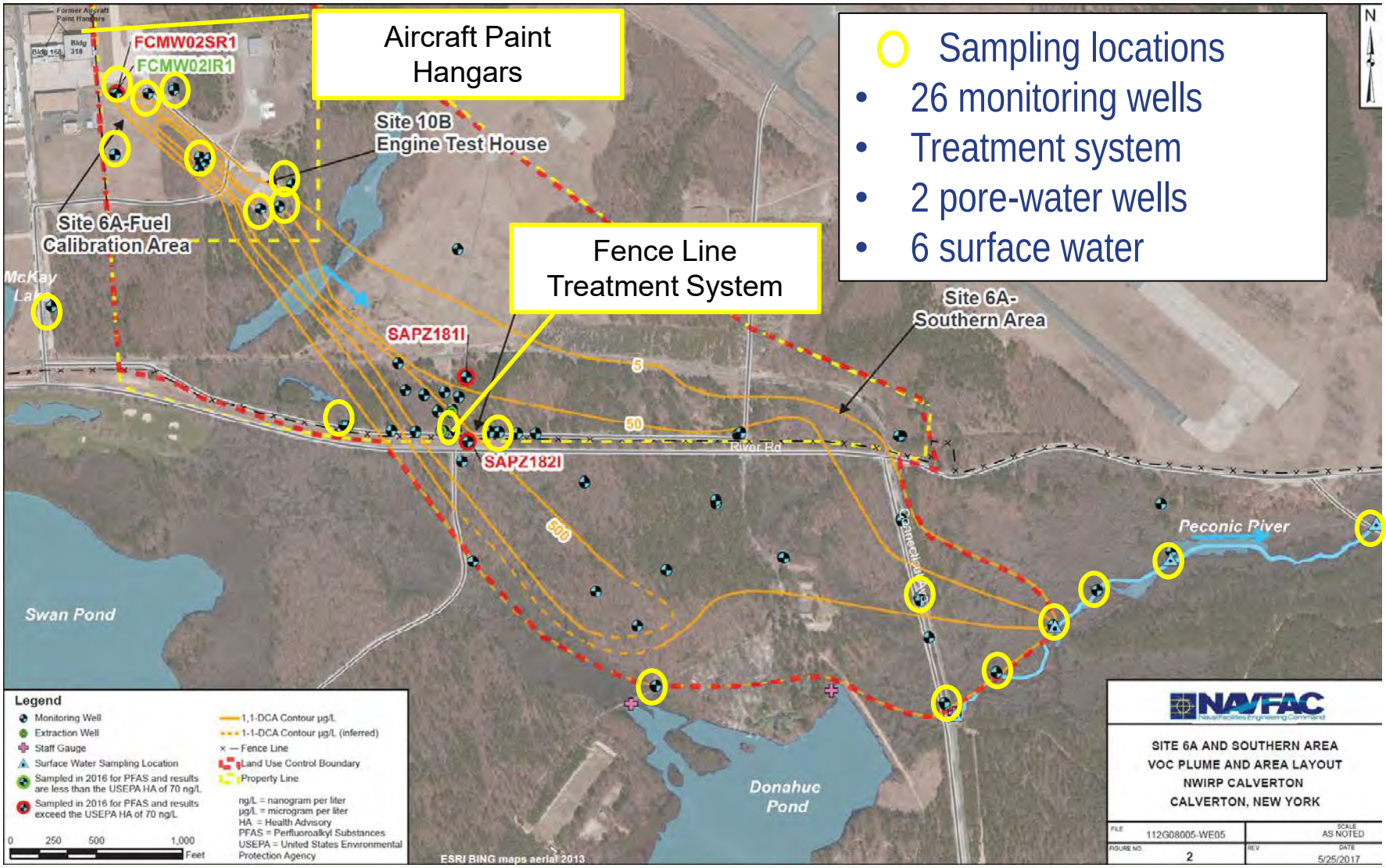
September 2016

- Select wells sampled and analyzed for PFOA and PFOS

November / December 2017

- SI objectives
  - Are there PFAS associated with the on-property or off-property portions of the Site 6A VOC (1,1-dichloroethane) plumes, and if present, do they exceed the U.S. EPA HAs?
  - If present on property, are PFAS migrating off property?
  - Are PFAS present in the Peconic River, and if present, can the detections be attributed to the former NWIRP?
- Investigation activities
  - Groundwater sampling from 26 existing monitoring wells
  - Surface water sampling for 4 existing and 1 new location

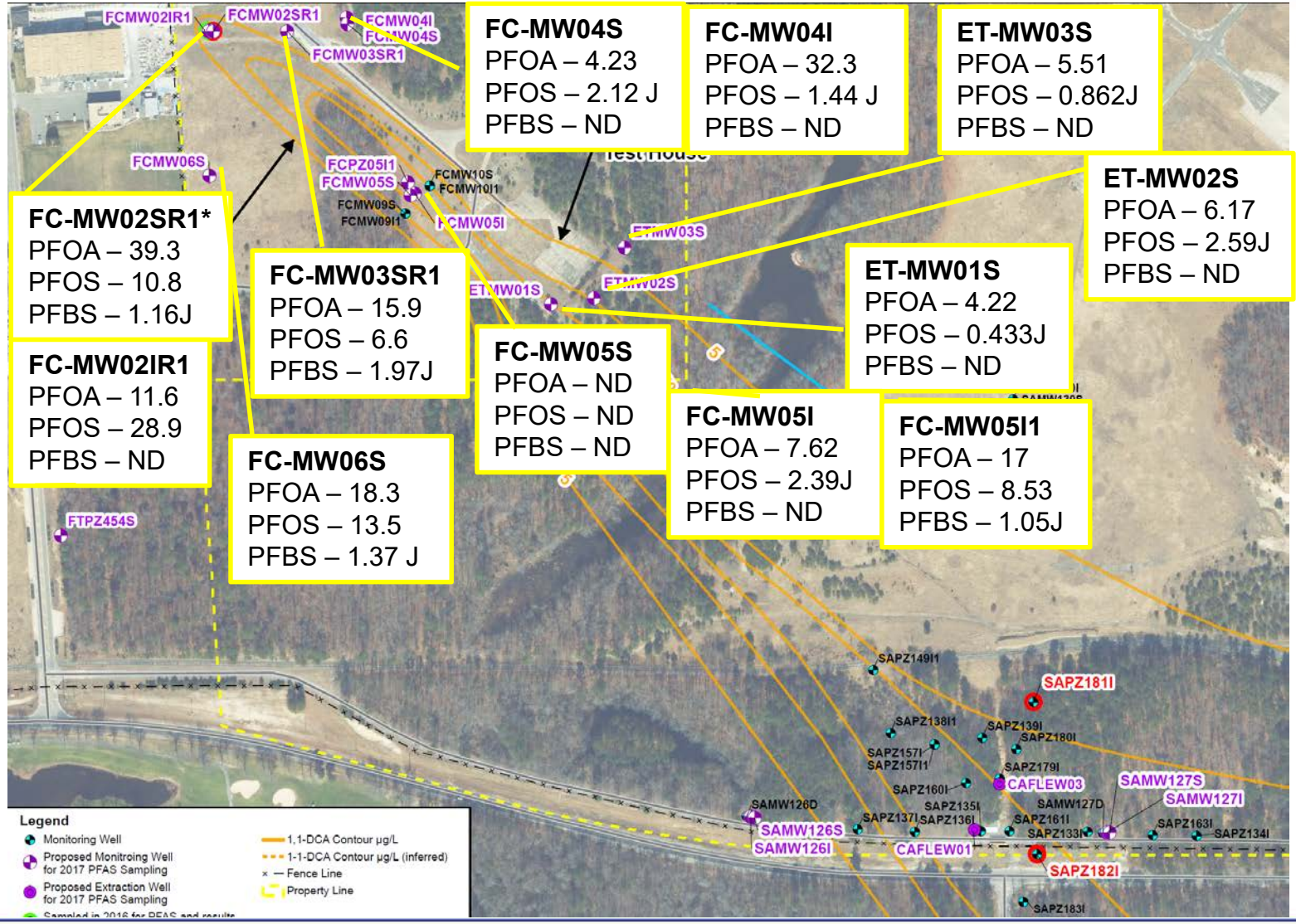
Aircraft Hangars
November / December 2017 PFAS Investigation



Aircraft Paint Hangars
On-Property PFAS Results (ng/L)

- 12 wells in the area of Site 6A
- No exceedances of the EPA Health Advisories

*Exceeded EPA Health Advisories in 2016 sample



FC-MW04S
PFOA – 4.23
PFOS – 2.12 J
PFBS – ND

FC-MW04I
PFOA – 32.3
PFOS – 1.44 J
PFBS – ND

ET-MW03S
PFOA – 5.51
PFOS – 0.862J
PFBS – ND

ET-MW02S
PFOA – 6.17
PFOS – 2.59J
PFBS – ND

FC-MW02SR1*
PFOA – 39.3
PFOS – 10.8
PFBS – 1.16J

FC-MW03SR1
PFOA – 15.9
PFOS – 6.6
PFBS – 1.97J

ET-MW01S
PFOA – 4.22
PFOS – 0.433J
PFBS – ND

FC-MW02IR1
PFOA – 11.6
PFOS – 28.9
PFBS – ND

FC-MW05S
PFOA – ND
PFOS – ND
PFBS – ND

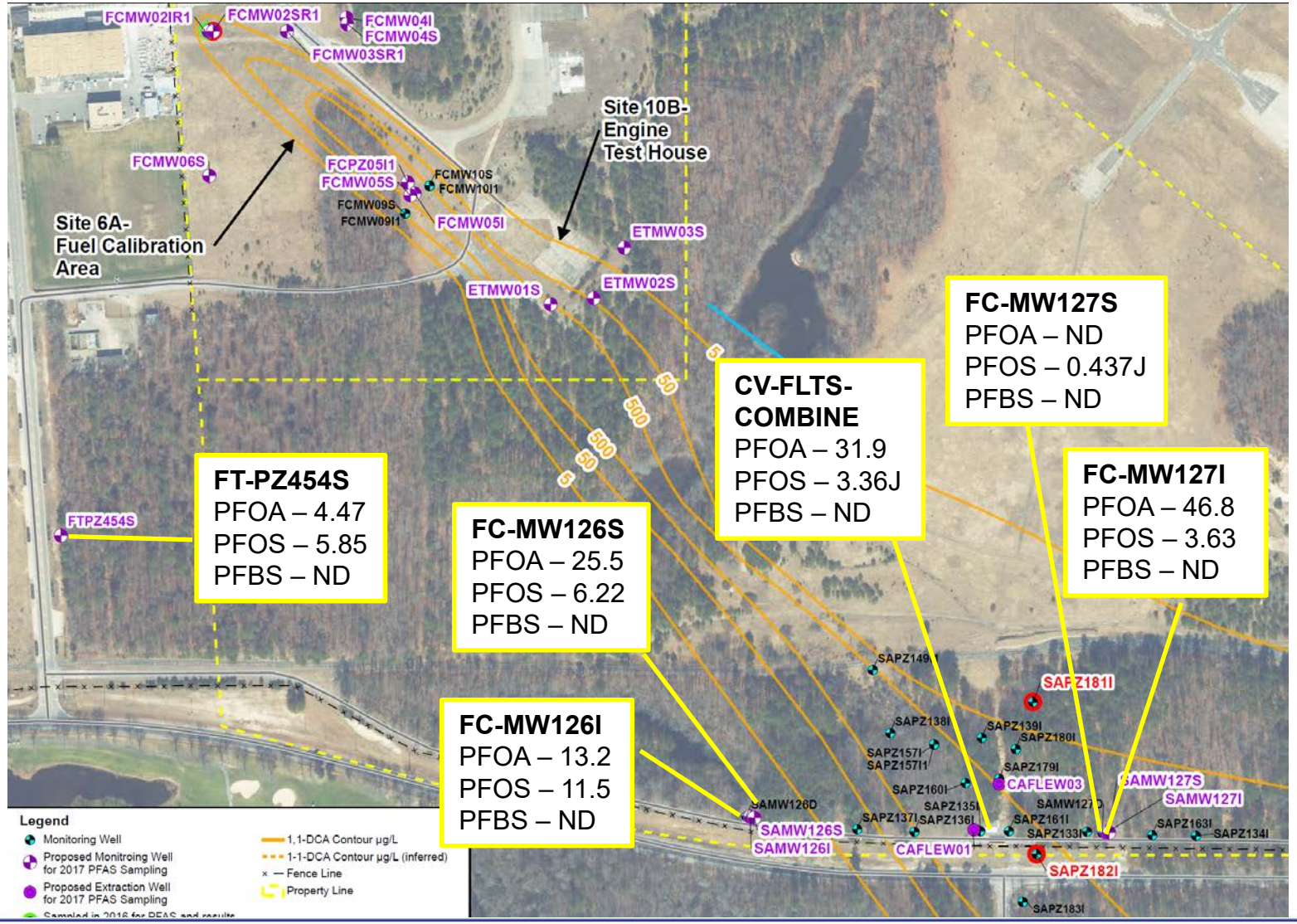
FC-MW05I
PFOA – 7.62
PFOS – 2.39J
PFBS – ND

FC-MW05I1
PFOA – 17
PFOS – 8.53
PFBS – 1.05J

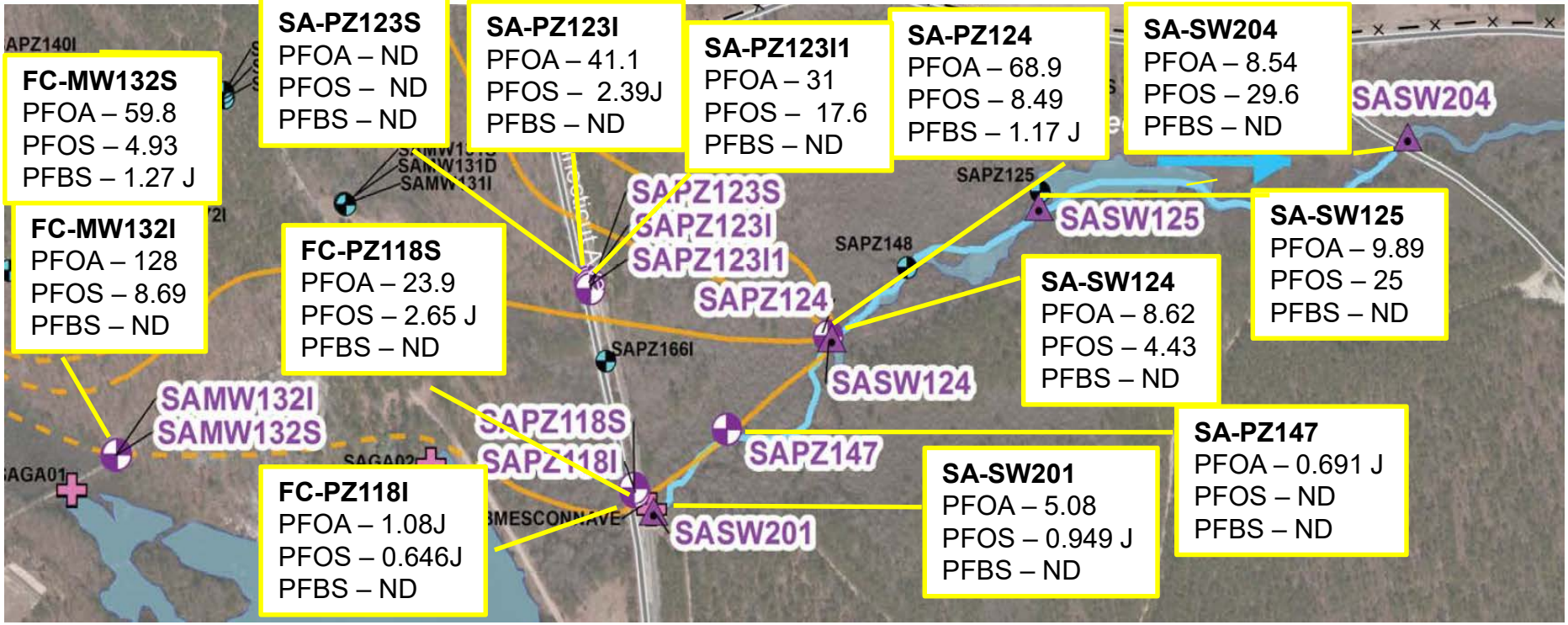
FC-MW06S
PFOA – 18.3
PFOS – 13.5
PFBS – 1.37 J

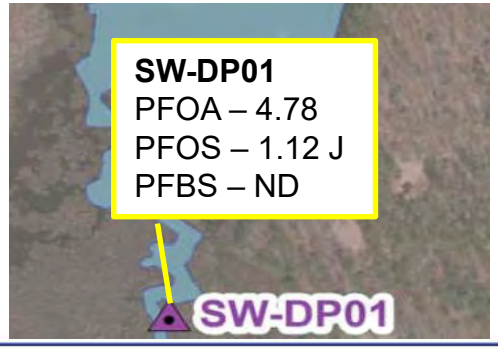
Aircraft Paint Hangars
On-Property PFAS Results (ng/L)

- 5 wells along the property line
- 1 Sample from the treatment system
- No exceedances of the EPA Health Advisories



Aircraft Paint Hangars
Off-Property PFAS Results (ng/L)



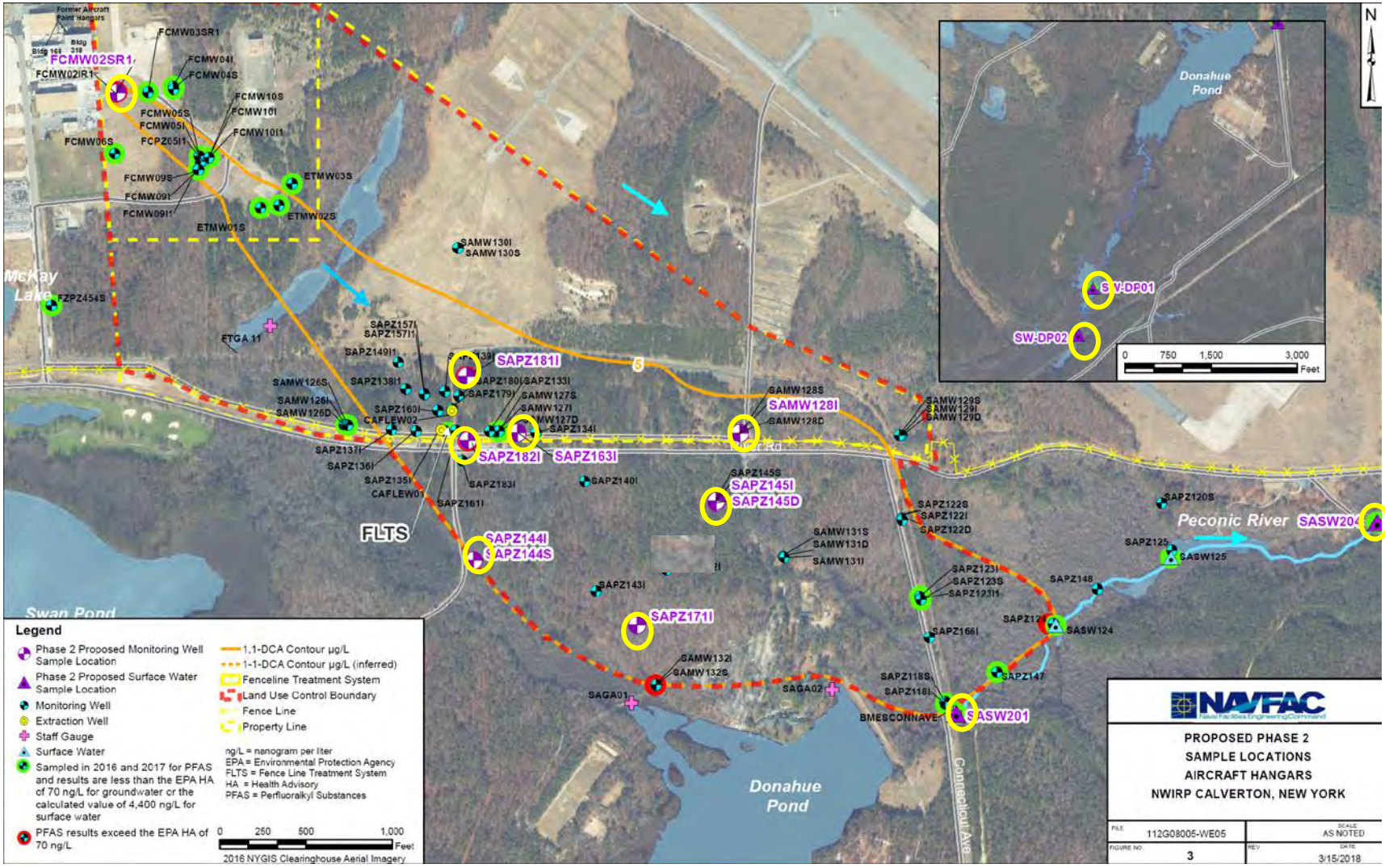


- 7 groundwater samples from monitoring wells
- 2 pore-water samples
- 5 surface water samples
- Results for 1 of 8 groundwater and 1 of 2 pore-water samples exceed the EPA Health Advisories

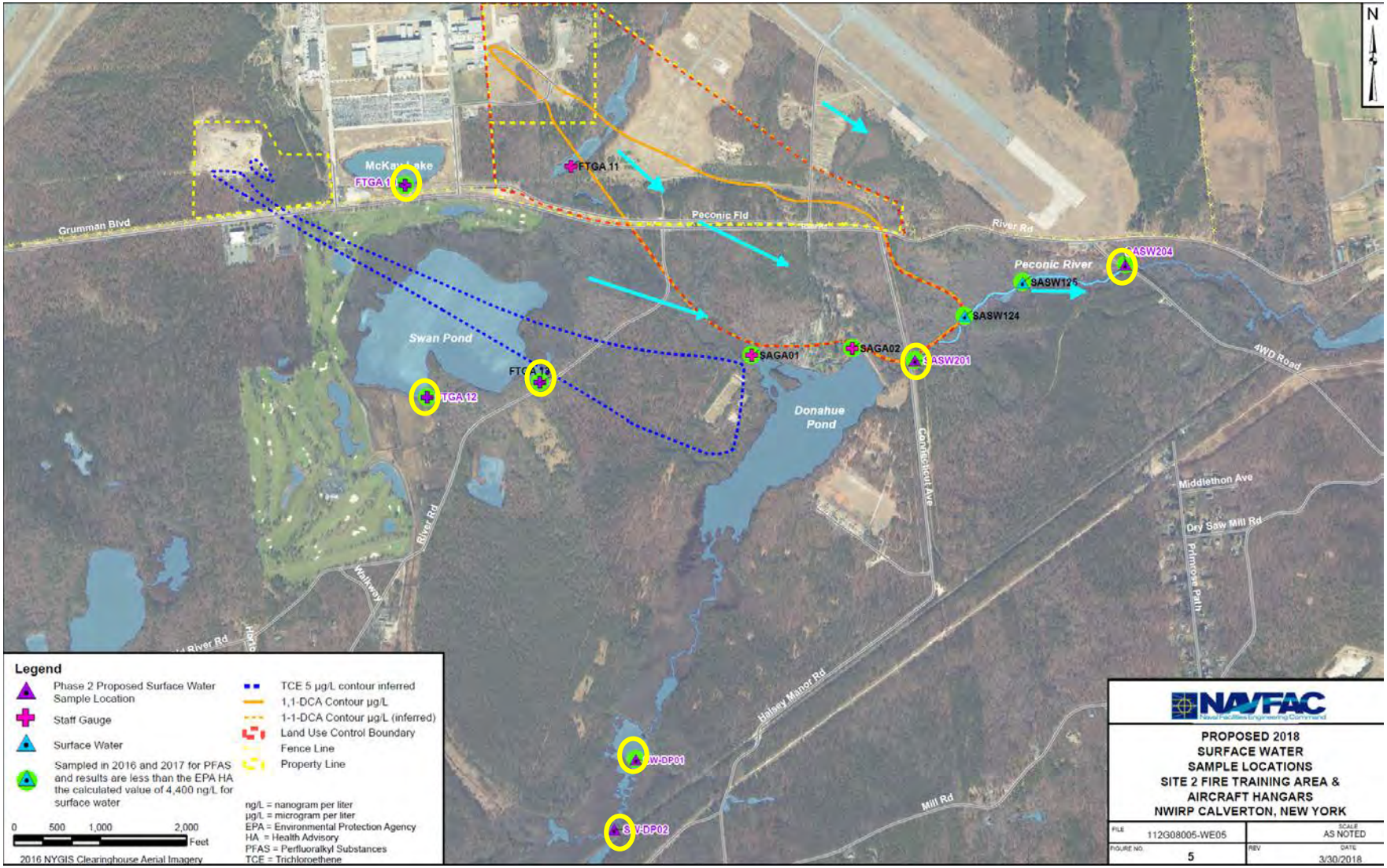
Aircraft Paint Hangars
Path Forward

- Summer 2018 Sampling Event
- 10 Groundwater samples
  - Confirm PFAS results at source area
  - Evaluate groundwater between the property line and the Peconic River
- 3 Surface water samples
  - Evaluate Peconic River surface water upstream of Swan Pond Flow
  - Evaluate Peconic River surface water downstream of Donahue Pond
  - Evaluate Peconic River surface water upstream of Donahue Pond
- Prepare SI Report – Fall 2018
  - Determine next steps

Aircraft Paint Hangars
Summer 2018 Proposed Sampling Locations



Site 2 and Aircraft Paint Hangars
Summer 2018 Proposed Surface Water Locations



Facility Wide
Preliminary Assessment (PA)

PA is currently in progress for NWIRP Calverton (Summer 2018)

- Literature Searches
  - Naval Information Restoration Information Solution (NIRIS)
  - Public Databases (EPA and State of New York)
- Site Interviews and Site Reconnaissance
- Potential PFAS sites
  - Fuel Spills
  - Fire Department Training Areas
  - Hangars
  - Crash Sites
- PA Report: Summarizes findings and recommendations for Site Inspections

2017 GROUNDWATER INVESTIGATION SUMMARY

April 2018 Restoration Advisory Board

NWIRP CALVERTON, NEW YORK

April 17, 2018

Facility Map

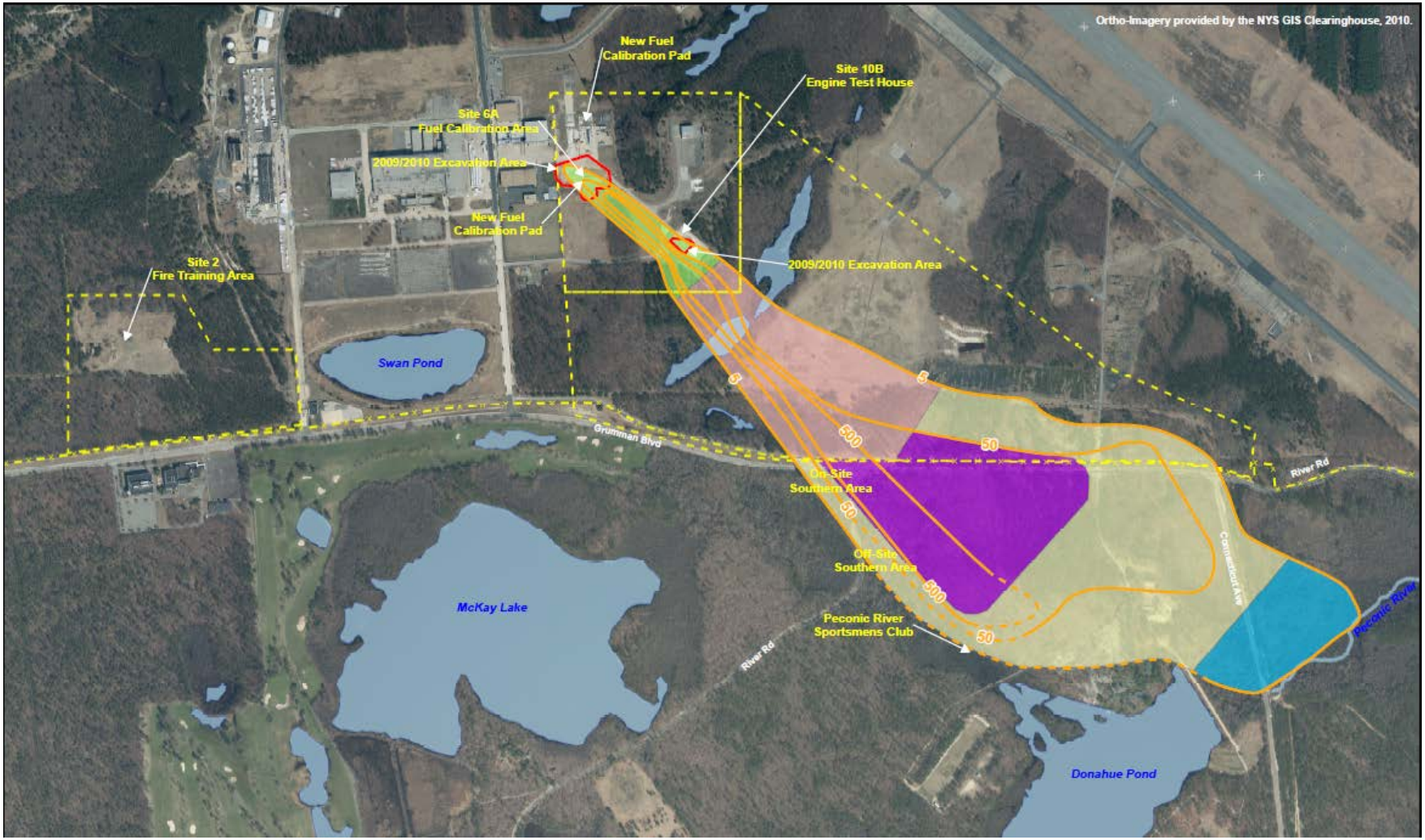
Annual Monitoring Program

- **Monitoring Well Installation**
  - **Five new wells on Peconic River Sportsman's Club (PRSC) property to address data gap along Donahue Pond**
  - **Two clusters with shallow and intermediate wells (SA-MW184S/I & 185S/I) and one shallow well (SA-MW186S)**
  - **Installed and first sampled April 2017; all five locations added to LTM program**
- **Site 6A Source Area Investigation completed March/April 2017**
  - **Determine source of VOCs at FC-MW03SR1 – upgradient source or upwelling?**
  - **Sampling of 12 temporary wells at 3 depths, plus 4 nearby permanent monitoring wells**
  - **Draft report under review**
- **Annual OU3 Well & Piezometer Sampling Event – September 2017**
  - **Site 6A (Fuel Calibration Area) – 12 locations, all on-site**
  - **Southern Area – 43 locations, 21 on-site and 22 off-site**
    - Fence Line Area – 15 locations, all on-site
    - High Concentration Area – 5 locations, all off-site
    - Low Concentration Area – 23 locations, 6 on-site and 17 off-site

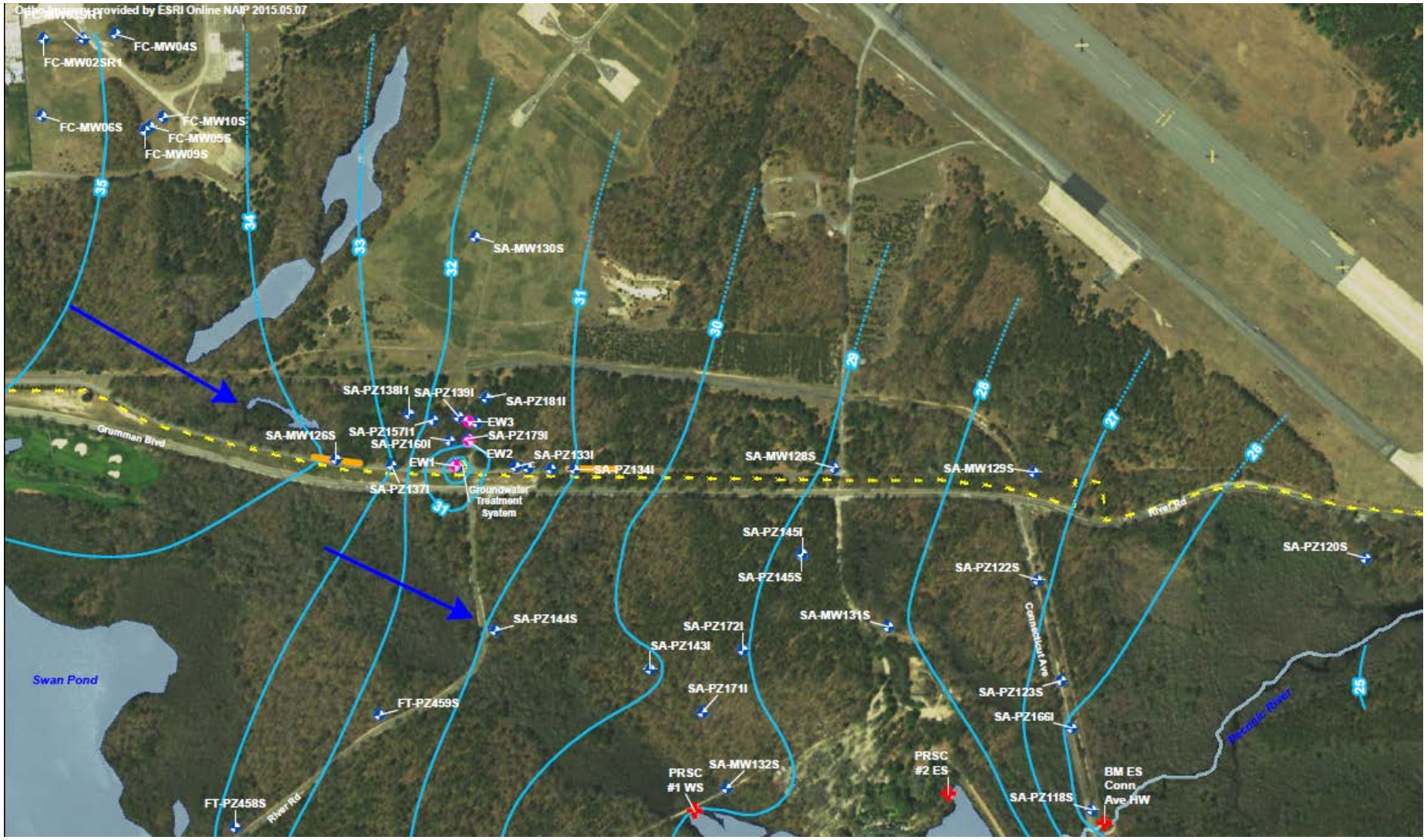
Annual Monitoring Program

- **Peconic River Surface Water, Groundwater and Porewater**
  - **Four surface water and porewater locations sampled in April and September**
  - **Three upland piezometers sampled in September**
- **Additional Sampling Events – Monitoring at SA-MW127I**
  - **Two samples collected at SA-MW127I/D in August**
  - **Three samples collected at SA-MW127S/I/D in December**
- **1,4-Dioxane Screening**
  - **21 locations – 13 along southern property line, 8 along Connecticut Avenue**
- **Water Elevation Gauging**
  - **108 wells/piezometers (8 not measured due to damage/access issues)**
  - **7 staff gauges (6 locations measured as "dry" – no reading)**

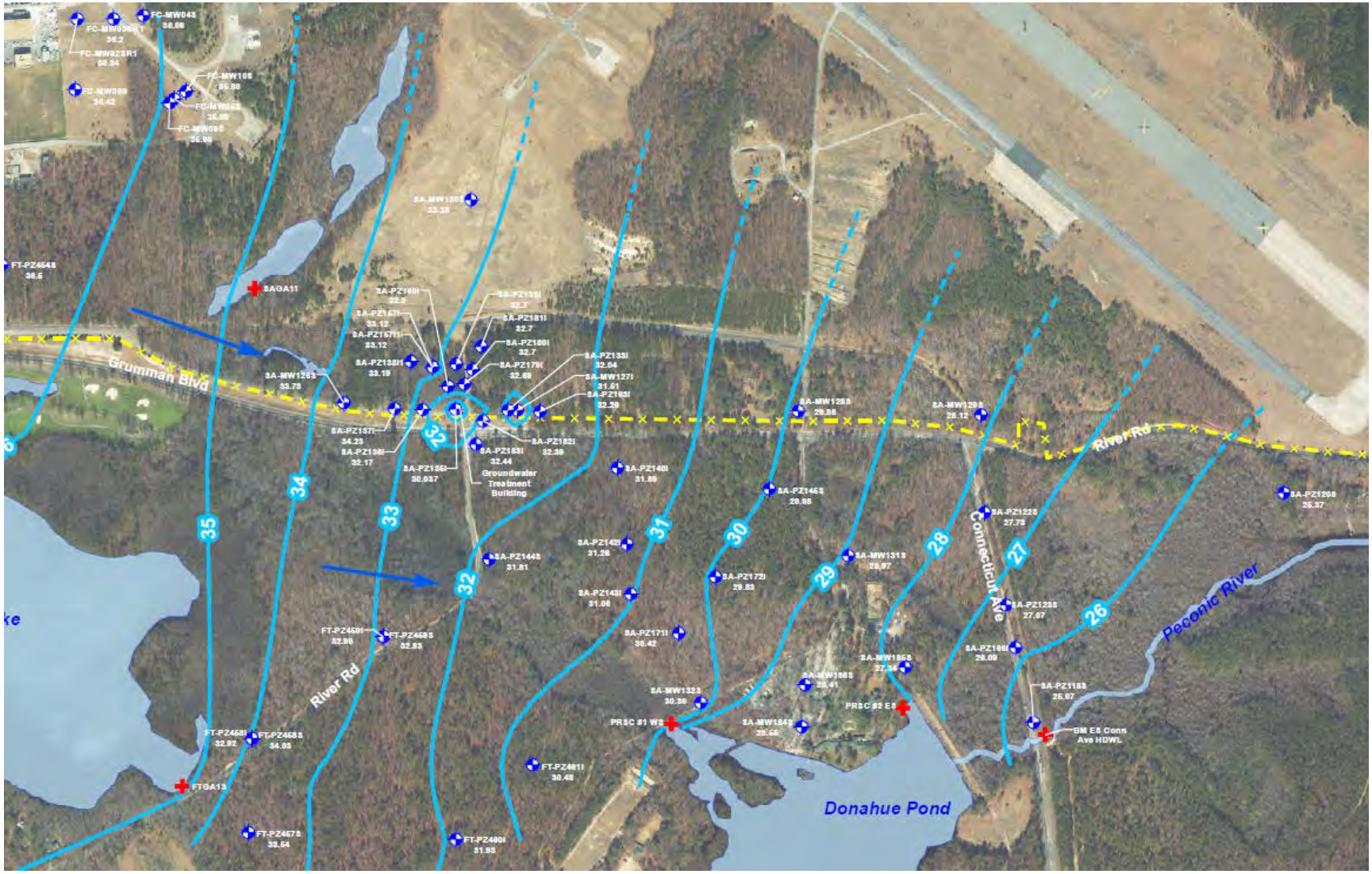
Southern Area Plume Map



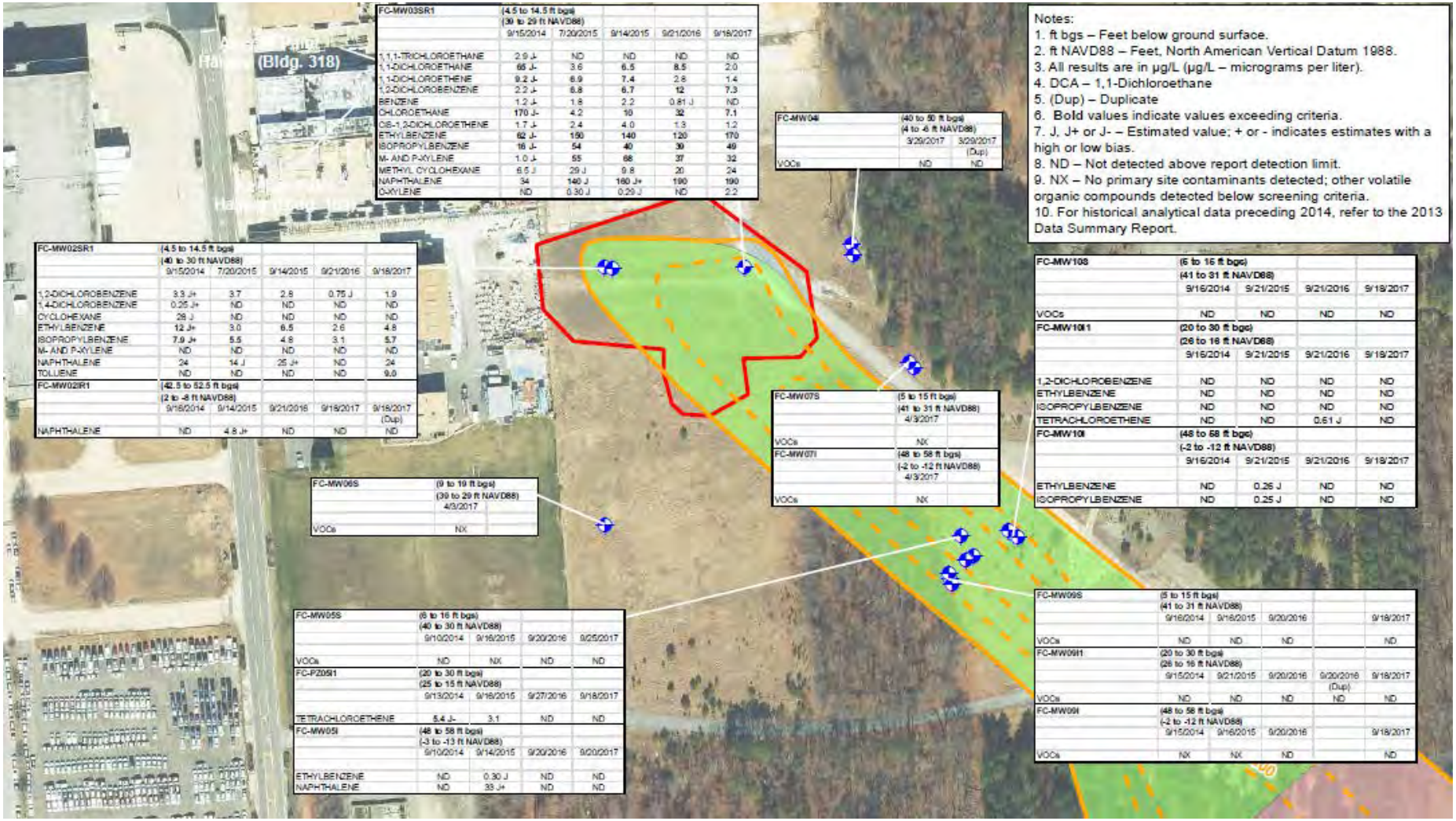
Groundwater Flow (September 2016)



Groundwater Flow (September 2017)



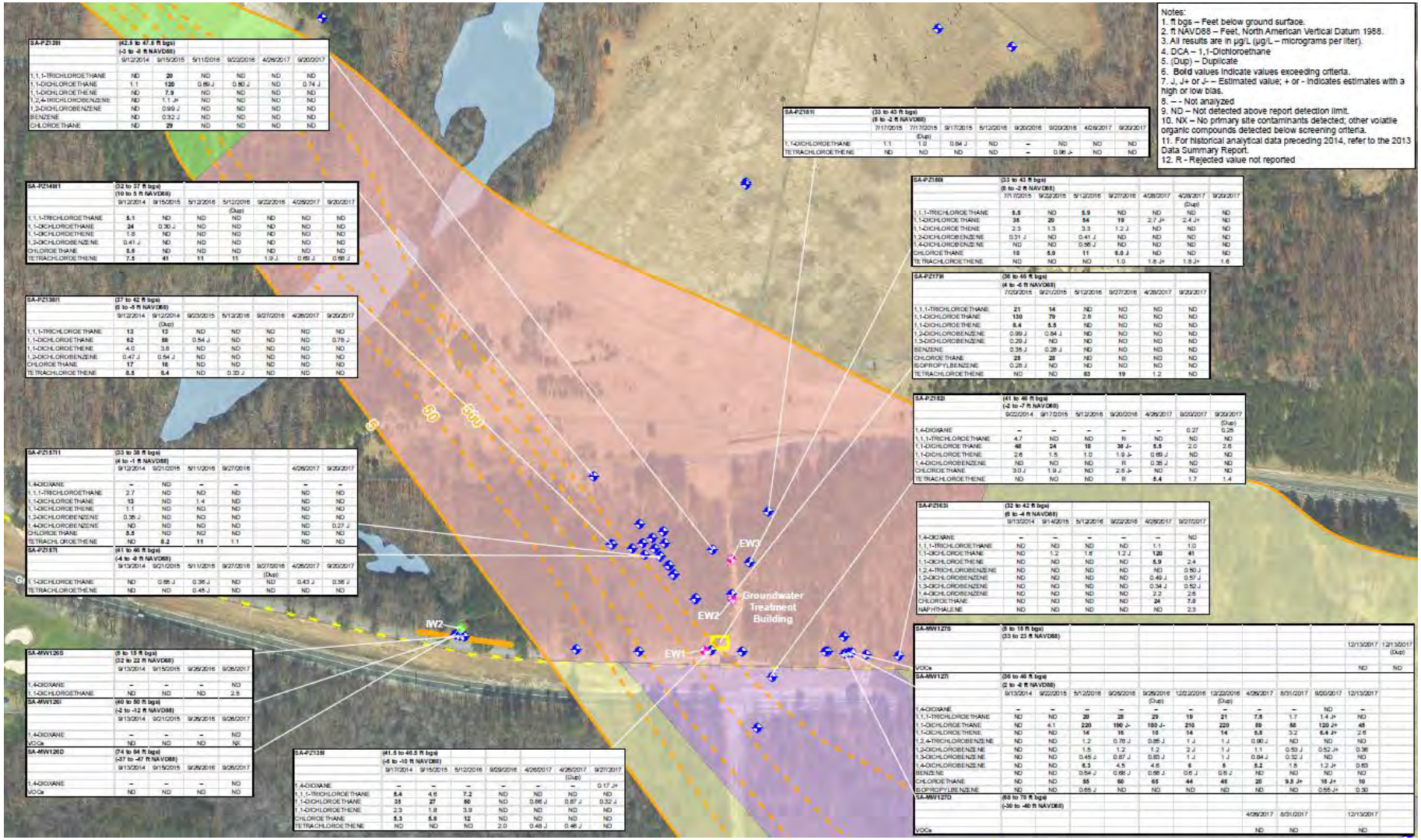
Site 6A– 2017 Results



Site 6A – 2017 Results (cont'd)

- **Site 6A**
  - **17 VOCs detected in 5 of 12 locations**
  - **Fuel-related VOC levels remain above MCLs in shallow groundwater in historic Source Area**
    - MCLs exceeded at FC-MW03SR1 for several fuel-related VOCs and chloroethane
    - MCLs exceeded at FC-MW02SR1 for isopropyl benzene and toluene
  - **VOCs not detected at "mass flux" (FC-MW05/09/10) clusters in September 2017**
  - **Current estimated VOC mass flux across FC-MW05/09/10 clusters is 0.04 lbs/yr – meets OU3 RD criterion**

Fence Line Area – 2017 Results



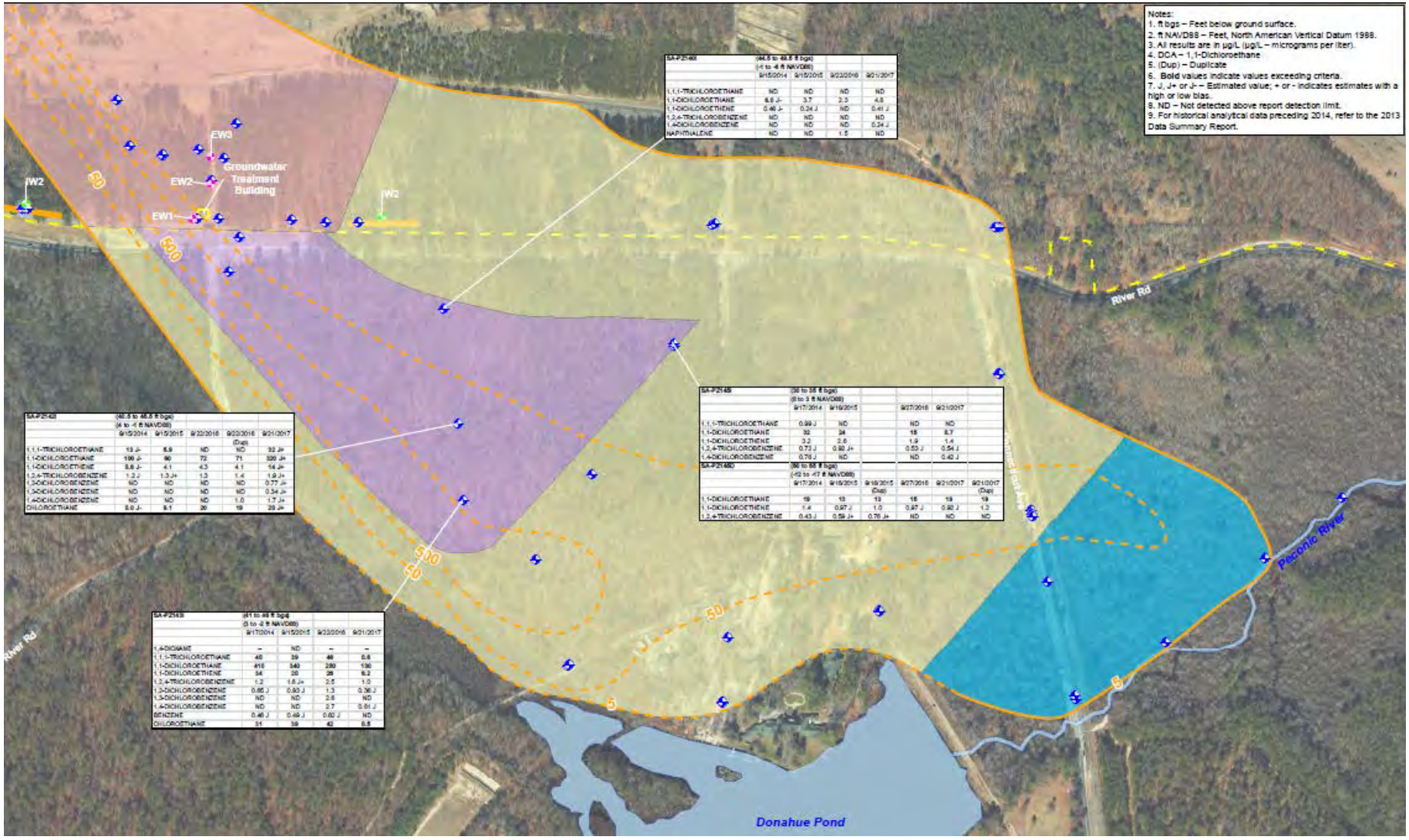
Fence Line Area – 2017 Results (cont'd)

- **Groundwater – Fence Line Area**
  - **April**
    - 11 VOCs detected in 8 of 13 locations; 6 different MCLs exceeded at 3 locations
      - 5 MCLs exceeded at SA-MW127I, 3 MCLs exceeded at SA-PZ163I; 2 MCLs exceeded at SA-PZ182I
      - All exceeded MCLs were for chlorinated VOCs; DCA exceeded MCL at all 3 locations
  - **August**
    - 8 VOCs detected at 1 of 2 locations sampled; 2 MCLs (DCA and chloroethane) exceeded at SA-MW127I
  - **September**
    - 16 VOCs detected at 12 of 15 locations
      - 3 MCLs exceeded SA-MW127I (DCA, chloroethane and DCE)
      - 2 MCLs exceeded at SA-PZ163I (DCA and chloroethane)
  - **December**
    - 6 VOCs detected at 1 of 3 locations sampled; 2 MCLs exceeded at SA-MW127I (DCA and chloroethane)

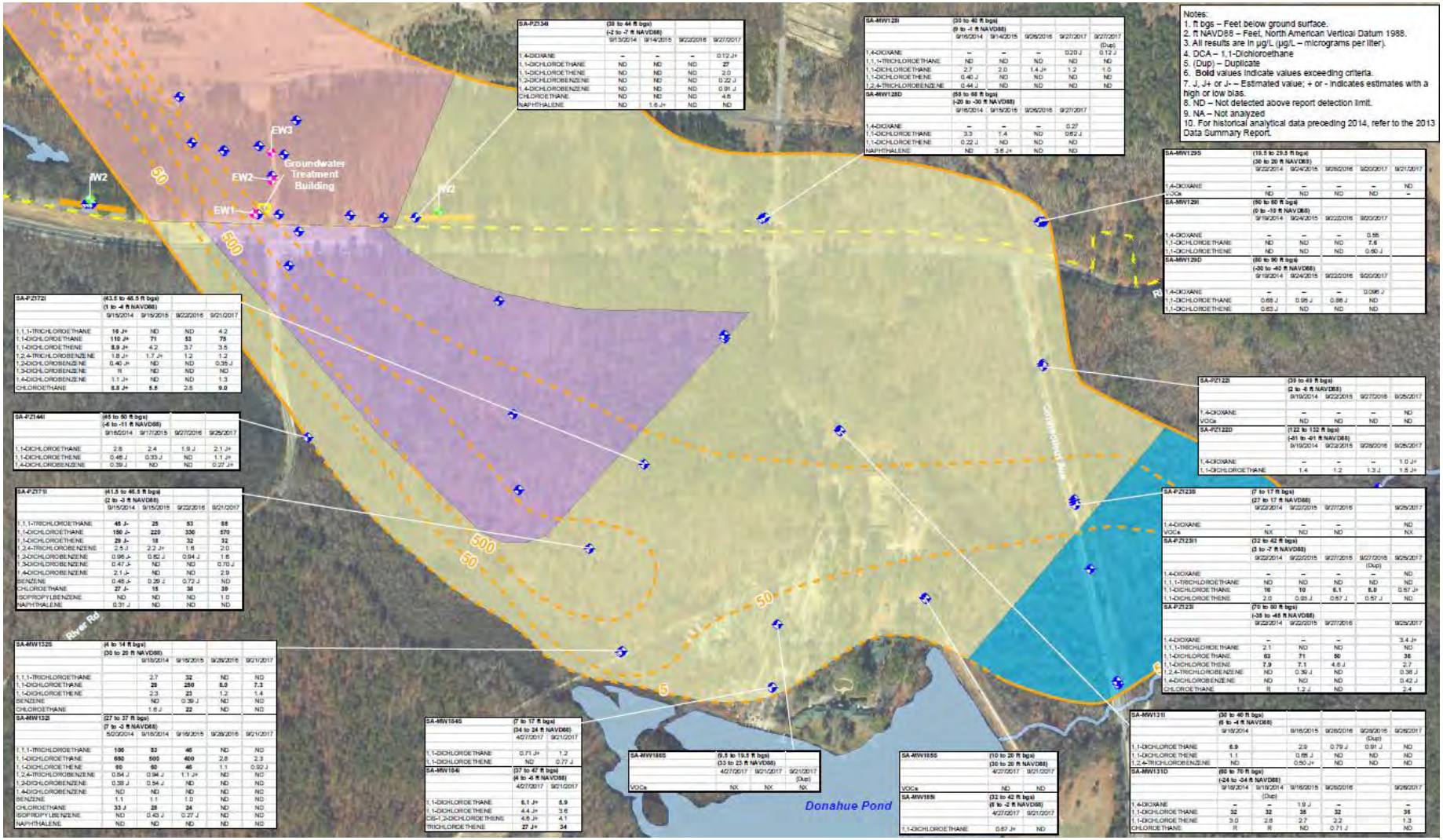
Fence Line Area – 2017 Results (cont'd)

- **Groundwater – Fence Line Area (cont'd)**
  - **FLTS shutdown criteria requires all site-related VOCs be below 50 µg/L in Fence Line Area wells, and less than 2.2 lbs/year VOCs in FLTS influent**
  - **Elevated levels at SA-MW127I suspected to represent stagnated area**
    - Temporary connection of nearby pump test well to FLTS began operation in July
  - **Two Fence Line Area locations do not meet site-related VOC concentration criterion**
    - SA-MW127I in April, August, September & December
    - SA-PZ163I in April and September
  - **Total VOCs in FLTS influent for 2017 – 3.36 lbs**
    - FLTS shutdown influent VOC mass criterion not met due to temporary connection
    - Cumulative VOC mass in FLTS influent for first six months (through June): 0.09 lbs
    - Cumulative VOC mass in FLTS influent for last six months (post-connection): 3.27 lbs

Off-Site High Concentration Area – 2017 Results



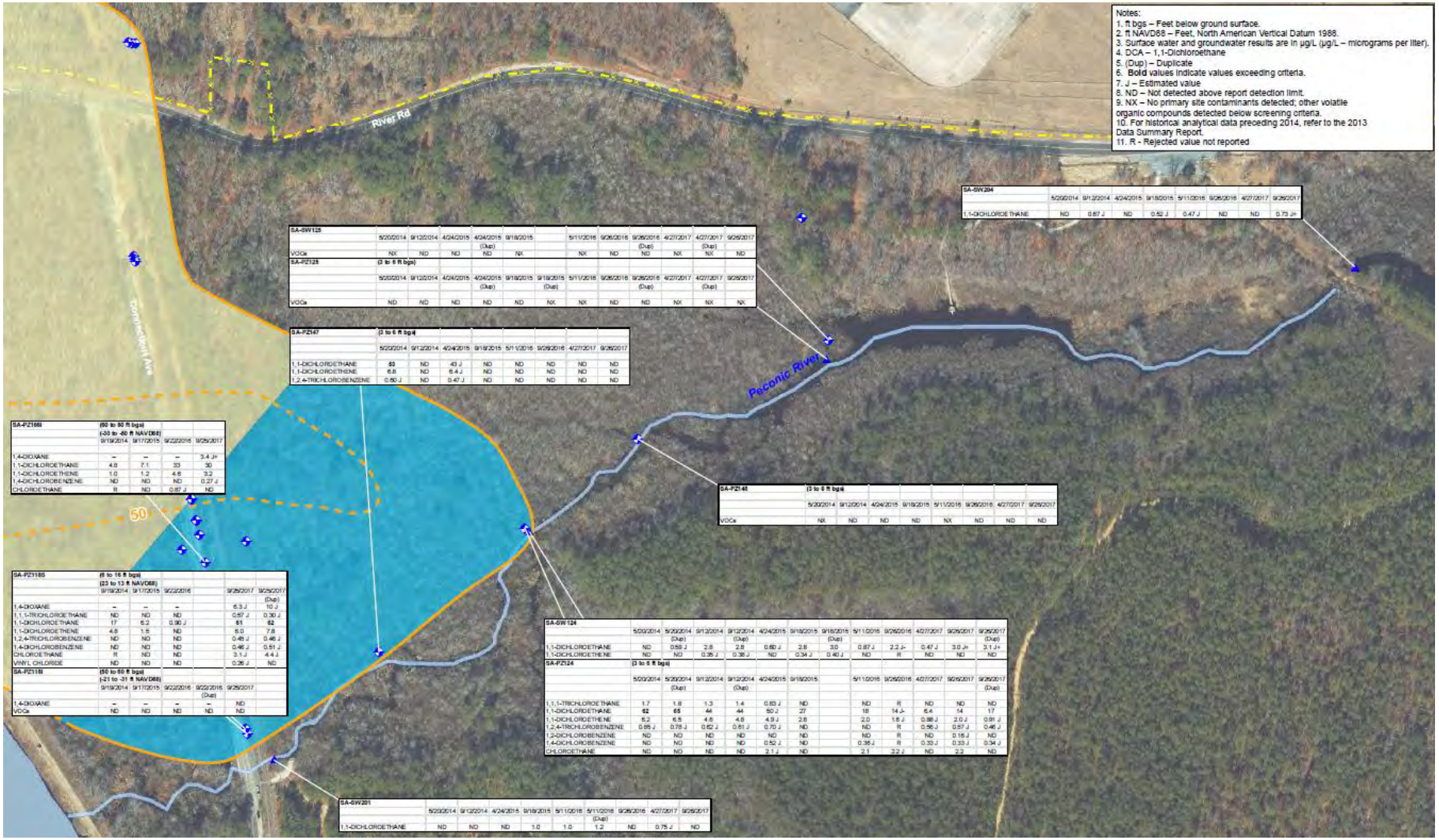
Off-Site Low Concentration Area – 2017 Results



Off-Site High/Low Concentration Areas – 2017 Results (cont'd)

- **Groundwater – Off-Site High Concentration Area**
  - **9 VOCs detected at 5 locations; MCLs exceeded at 4 locations**
    - 4 chlorinated VOC MCLs exceeded at SA-PZ142I and SA-PZ143I
    - MCL for DCA exceeded at SA-PZ145I and SA-PZ145D
  - **Results consistent with recent years and show decreasing trend at 4 locations (all except SA-PZ142I)**
- **Groundwater – Off-Site Low Concentration Area**
  - **5 new wells installed & sampled in PRSC in April (SA-MW184S/I, 185S/I, 186S)**
    - 7 VOCs detected at 4 of 5 locations; MCLs exceeded only at SA-MW184I (DCA and TCE)
  - **15 VOCs detected at 18 of 23 locations in September; MCLs exceeded at 8 locations**
    - Exceedances of 4 MCLs exceeded at SA-PZ171I, 2 MCLs at SA-PZ123I, SA-PZ172I and SA-PZ184I, and 1 MCL at SA-MW129I, SA-PZ123I1, SA-MW131D and SA-PZ134I
  - **VOC concentrations at SA-MW132S/I continued decline from elevated 2012-2015 levels**
  - **New wells SA-MW184S/I, SA-MW185S/I and SA-MW186S suggest VOCs not moving beneath Donahue Pond, and likely are being pushed eastward due to influence of impoundment**

Peconic River Area – 2017 Results



Peconic River Area – 2017 Results (cont'd)

- **Peconic River Area**
  - **Porewater (April & September Sampling in-river; September only in adjacent locations)**
    - Excluding acetone (lab contaminant) and negligible detections of chloroform, 7 VOCs detected at 3 of 7 locations, DCA OU3 RD benchmark was exceeded at one location
    - DCA, DCE, 1,2,4-trichlorobenzene and 1,4-dichlorobenzene observed at SA-PZ124 in April and September; no RD benchmarks exceeded
    - DCA, DCE and 1,4-dichlorobenzene detected at SA-PZ166I in September; no RD benchmarks exceeded
    - DCA exceeded RD porewater benchmark at SA-PZ118S (62 µg/L detection; benchmark is 51 µg/L); 6 other chlorinated VOCs also detected
  - **Surface Water (April & September Sampling)**
    - Excluding acetone (lab contaminant) and negligible detection of chloroform at SA-SW125 in April, DCA was only VOC detected
    - DCA observed at SA-SW124 in April and September, SA-SW201 in April only and SA-SW204 in September only
    - All detections were below RD benchmarks

1,4 Dioxane Screening – 2017 Results

- **1,4-Dioxane Sampling**
  - **Purpose is to evaluate whether a 1,4-dioxane plume is leaving the site and/or approaching the Peconic River**
    - In 2015, 1,4-dioxane was evaluated at 6 locations; only one detection, SA-MW131D – 1.9 µg/L
  - **Sampling targeted southern property boundary and Connecticut Avenue**
    - 13 locations along southern property boundary
    - 8 locations along Connecticut Avenue
- **1,4-Dioxane Results**
  - **Not detected at 10 locations**
  - **Detected at 11 locations**
    - 6.3 µg/L at SA-MW118S (10 µg/L in duplicate), 3.4 µg/L at SA-PZ166I, 3.4 µg/L at SA-PZ123I, 1.0 µg/L at SA-PZ122D
    - Detected below 1 µg/L at seven other locations

SITE 6A - SOUTHERN AREA FENCE LINE GROUNDWATER EXTRACTION TREATMENT SYSTEM (FLTS) APRIL 2018 RESTORATION ADVISORY BOARD (RAB)

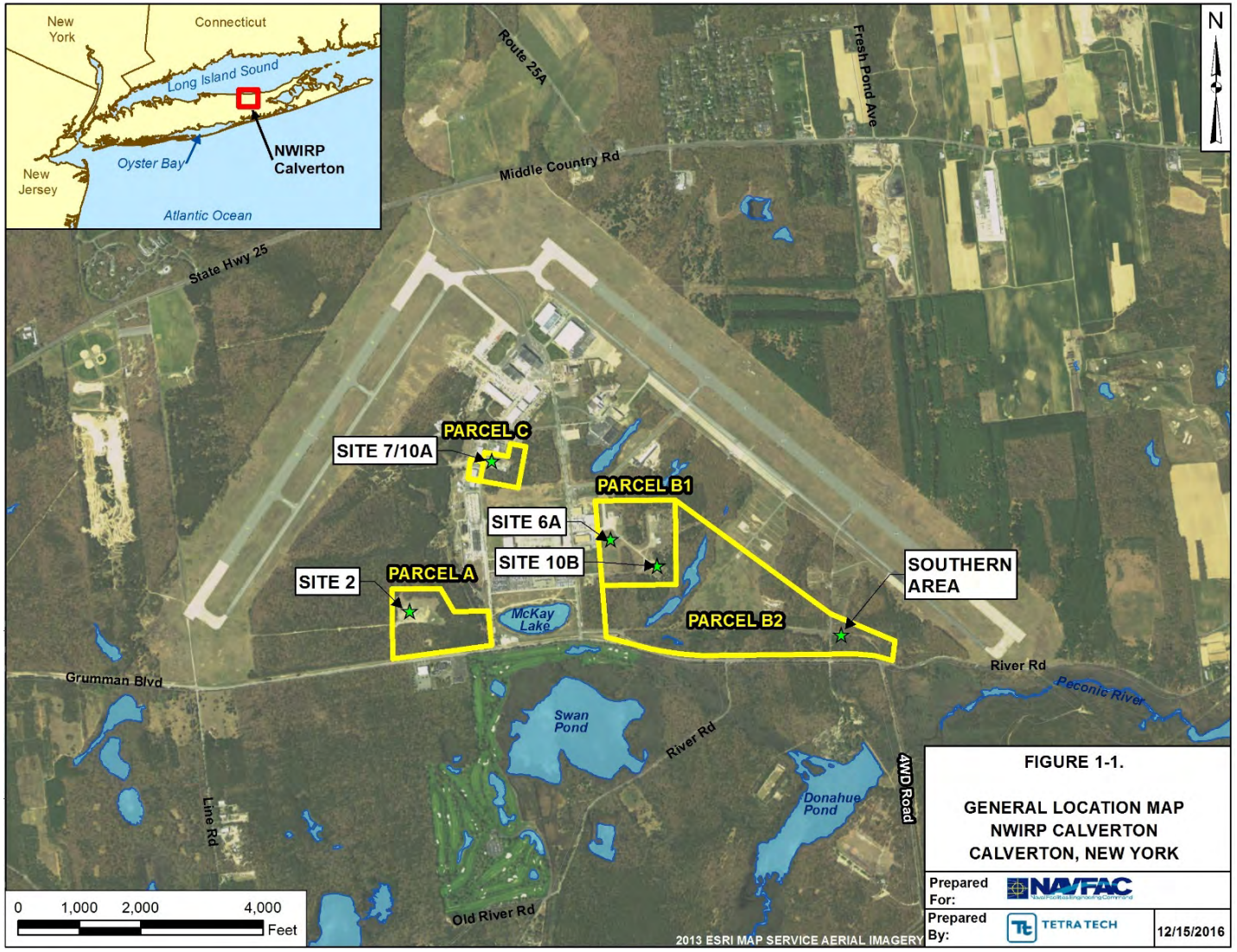
NWIRP CALVERTON, NEW YORK

April 17, 2018

Presentation Agenda

- Introduction
- System Overview
- System Performance / Recent Activities
- System Performance Summary / Future Activities

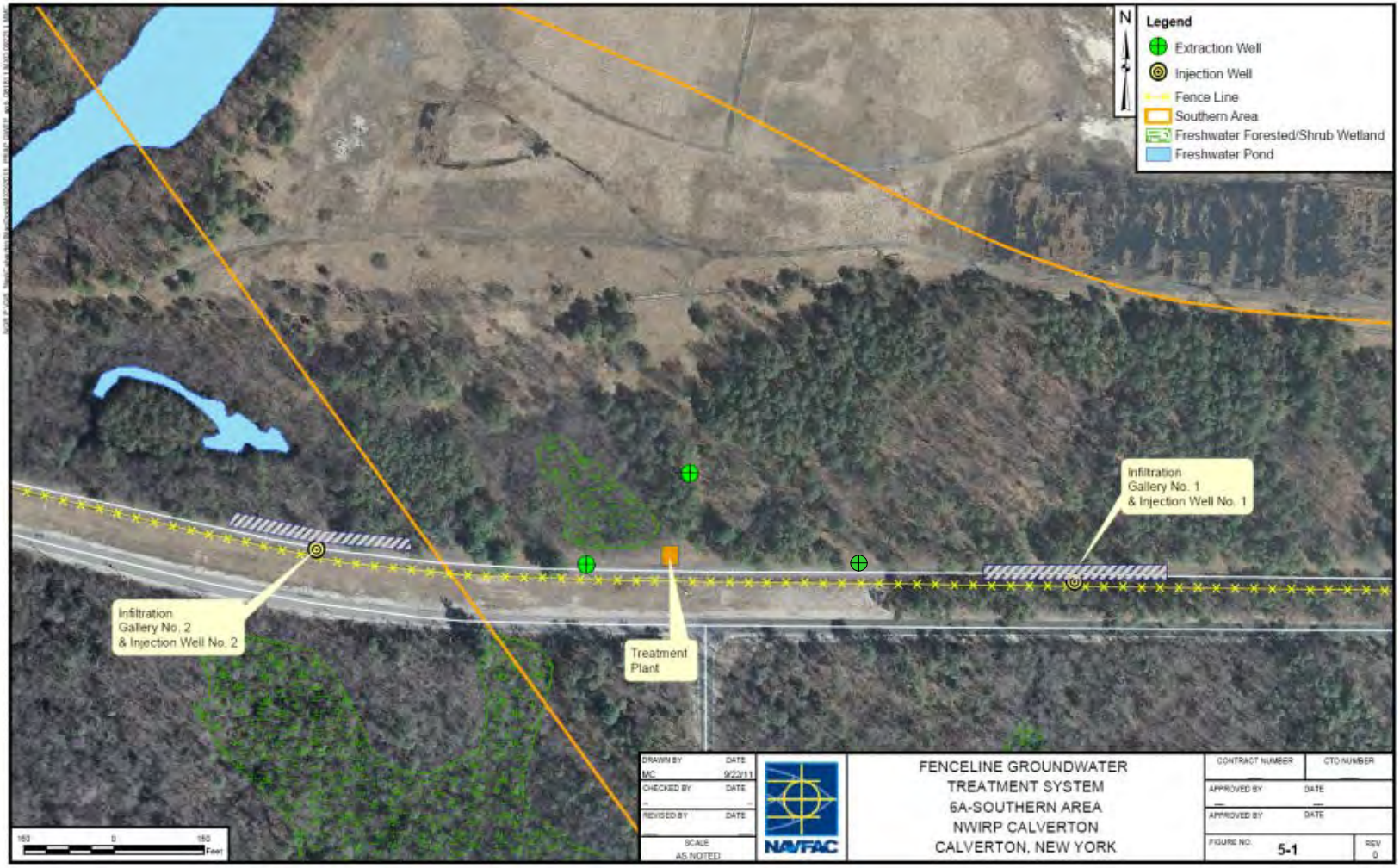
Site Layout


New York
Connecticut
Long Island Sound
NWIRP Calverton
Oyster Bay
New Jersey
Atlantic Ocean
Route 25A
Fresh Pond Ave
Middle Country Rd
State Hwy 25
PARCEL C
SITE 7/10A
PARCEL B1
SITE 6A
SITE 10B
SITE 2
PARCEL A
SOUTHERN AREA
McKay Lake
PARCEL B2
Grumman Blvd
River Rd
Peconic River
Swan Pond
River Rd
Donahue Pond
4WD Road
Line Rd
Old River Rd
N
0 1,000 2,000 4,000 Feet
2013 ESRI MAP SERVICE AERIAL IMAGERY
FIGURE 1-1.
GENERAL LOCATION MAP
NWIRP CALVERTON
CALVERTON, NEW YORK
Prepared For: NAVFAC
Prepared By: TETRA TECH
12/15/2016

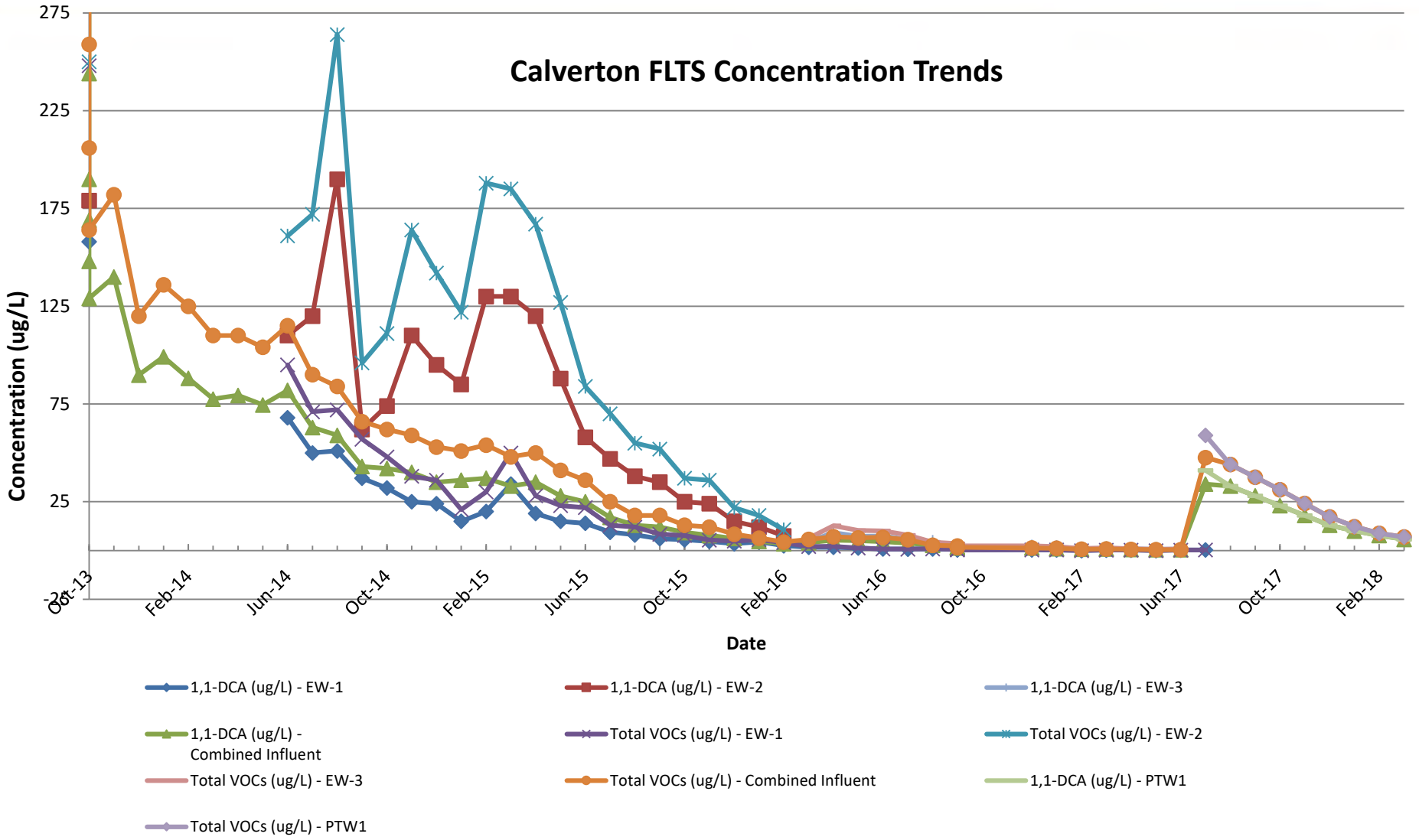
Fence Line Treatment System Overview

- Record of Decision (ROD) in May 2012.
- Selected remedy for Fence Line Area – LUCs and monitoring with extraction, treatment, and infiltration.
- Fence Line Treatment System overview:
  - Four extraction wells (EW-1, EW,2, EW-3 and SA-PTW1), design capacity up to 100 gpm.
  - VOCs removed via air stripping.
  - Treated groundwater re-injected through infiltration galleries, meeting MCLs.
- Construction began in October 2012, and system start-up occurred 8 October 2013.
- EW-2 taken off-line and well EW-3 brought on-line in February 2016 to increase flow recovery.
- Pumping at EW-2/EW-3 suspended as VOC concentrations are below MCLs.
- SA-PTW1 temporary connection to FLTS in July 2017 to treat persisting VOCs in the vicinity of nearby well SA-MW127i.

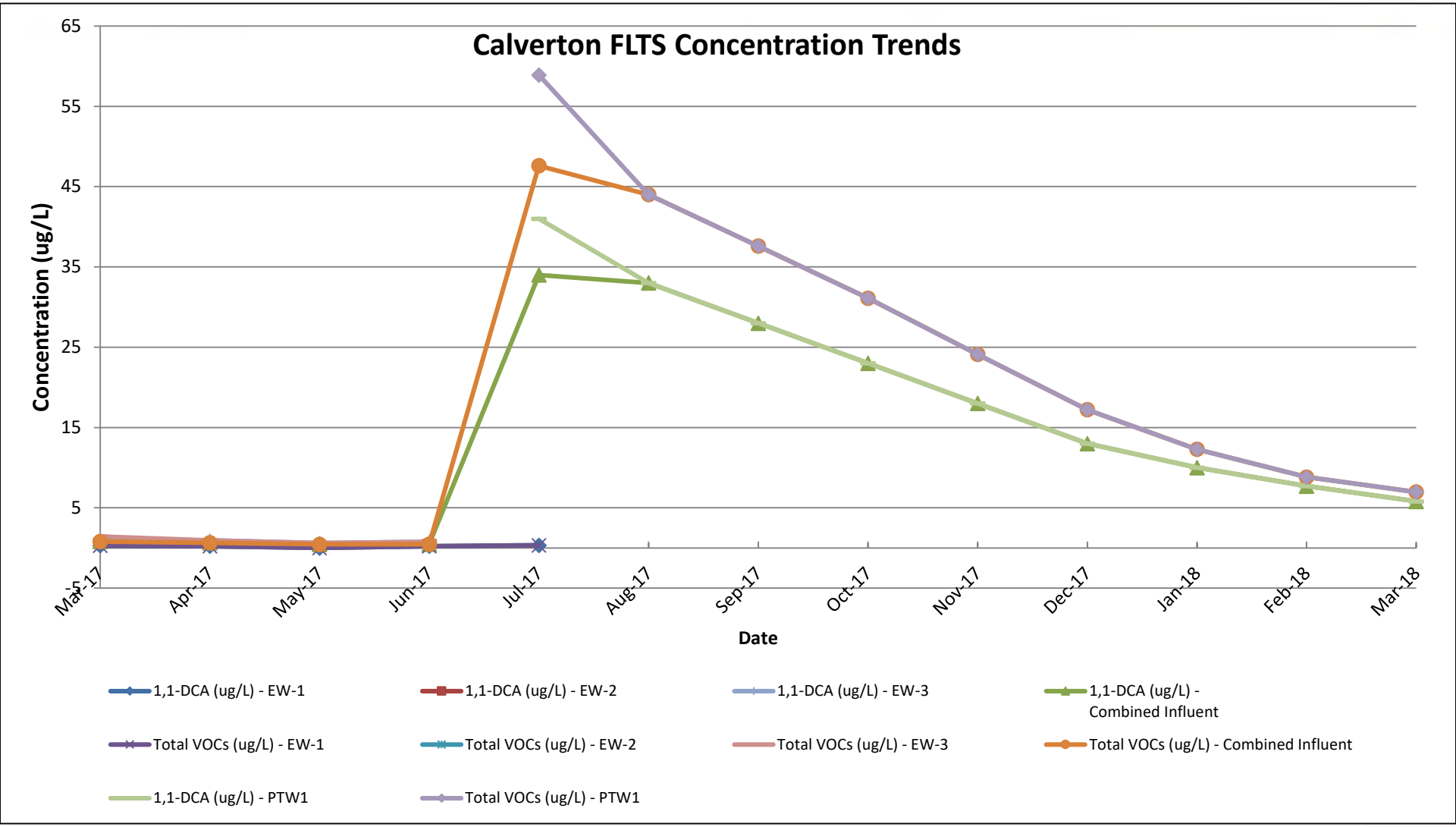
Fence Line Treatment System Overview



Fence Line Treatment System Operation



Fence Line Treatment System Operation



Fence Line Treatment System Performance / Recent Activities

- Letter work plan to connect test well SA-PTW1 to perform groundwater extraction and treatment via the FLTS was approved in May 2017.
  - Groundwater extraction at test well SA-PTW1 started in July 2017.
- Infiltration gallery optimization activities initiated in March 2017.
  - Video camera survey of the infiltration gallery and injection wells conducted in March 2017.
  - Test pits along the infiltration galleries conducted in April 2017. Test pits confirmed discharge pipping was fouled with apparent iron sludge.
  - Rehabilitation of the eastern infiltration gallery was conducted in August 2017. Groundwater discharge flow and distribution significantly increased.
  - The FLTS effluent discharge is now going to the east gallery only. Currently, no discharge flow is going to the west infiltration gallery.

Fence Line Treatment System Performance Summary / Future Activities

- Continued compliance with all discharge goals.
- Continued VOC removal efficiencies of >99%.
  - 3.36 lbs of VOCs removed in 2017
- Influent analytical results above MCLs at SA-PTW1
  - 1,1-DCA = 5.8 ug/L (March 2018).
- Continue evaluating groundwater concentrations in Area / shut-down criteria.
  - FLTS Influent individual Site-related concentrations < 5ug/L
  - FLTS Monitoring wells individual Site-related concentration < 50 ug/L
- Continue evaluating infiltration gallery capacity and perform system modifications if needed.
- Continue to perform monthly compliance sampling and submit monthly compliance reports.

SITE 7 – FUEL DEPOT
GROUNDWATER MONITORING UPDATE
April 2017 RESTORATION ADVISORY BOARD (RAB)

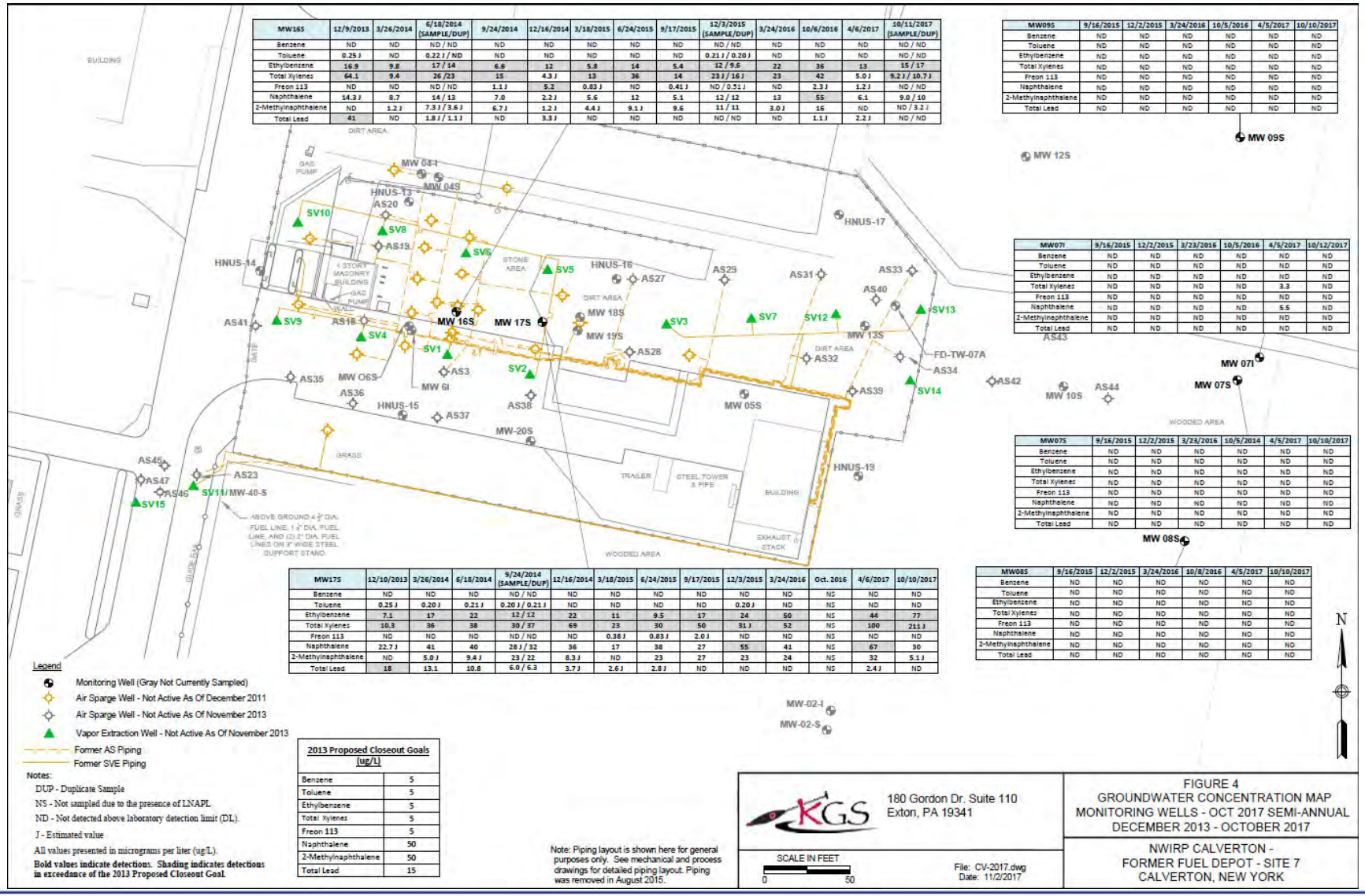
NWIRP CALVERTON, NEW YORK

April 17, 2018

Monitoring Requirements

- **Semiannual Groundwater Sampling**
  - **Select Volatile Organic Compounds (VOCs),** 2-methylnaphthalene, and lead
  - Currently 11 monitoring wells are sampled each Spring and Fall
    - 7 wells which previously had exceedances of 2003 ROD Remediation Goals and;
    - 4 on-site monitoring wells located downgradient of contaminated groundwater
- **Annual Monitoring Report**

Semi-Annual Groundwater Sampling



Semi-Annual Groundwater Sampling

SV4	12/12/2013	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015 (SAMPLE/DUP)	9/17/2015	12/3/2015	3/23/2016	10/6/2016 (SAMPLE/DUP)	4/6/2017	10/11/2017
Benzene	ND	ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND /ND	ND	ND	ND	ND / ND	ND	ND
Ethylbenzene	ND	1.9	1.7 J	4.6 J	5.2	8.2	8.7 / 8.8	11	6.9	4.9 J	12 / 12	6.1	7.6
Total Xylenes	5.0	2.5	1.6 J	11	14	29	43 / 43	83	41	25	103 / 99	46	76
Freon 113	ND	ND	0.45 J	2.6 J	0.41 J	0.77 J	1.6 J / 1.4 J	1.0 J	0.44 J	ND	5.8 / 6.4	0.84 J	2.10 J
Naphthalene	17.4 J	7.0	7.1	14	11	7.4	9.3 / 11	12	5.3	ND	10 J / 5.9 J	19	16
2-Methylnaphthalene	ND	6.7 J	4.3 J	11	4.3 J	5.9 J	7.7 J / 7.5 J	11	6.6 J	ND	4.6 J / 4.2J	ND	9.7
Total Lead	2.5	ND	1.1 J	ND	0.906 J	ND	ND / ND	ND	ND	ND	5.0 J / ND	3.6 J	ND

SV13	12/11/2013	3/26/2014	6/18/2014	9/24/2014	12/16/2014 (SAMPLE/DUP	3/17/2015	6/24/2015	9/16/2015	12/2/2015	3/23/2016	10/5/2016	4/5/2017 (SAMPLE/DUP)	10/11/2017
Benzene	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND
Toluene	ND	1.4	0.89 J	1.1 J	0.25 J / 0.21 J	1.0 J	0.72 J	0.30 J	ND	0.33 J	ND	ND / ND	ND
Ethylbenzene	0.40 J	8.7	8.5	9.2	6.2 / 6.2	15	7.9	6.1	1.8 J	12	3.2 J	3.9 J / 4.4 J	12
Total Xylenes	2.7 J	23	18	25	13 / 13	28	18	17	2.7 J	22	4.2 J	11 / 12	56
Freon 113	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND
Naphthalene	ND	4.4	6.6	7.0	4.0 J / 4.8 J	7.5	6.6	4.9 J	ND	ND	0.70 J	5.0 J / 5.8	15
2-Methylnaphthalene	ND	ND	1.0 J	9.7	ND / ND	ND	ND	ND	ND	ND	ND	1.2 J / 15 J	ND
Total Lead	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND

SV2	12/12/2013 (SAMPLE/DUP)	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015 (SAMPLE/DUP)	6/24/2015	9/17/2015	12/3/2015	3/24/2016 (SAMPLE/DUP)	10/6/2016	4/6/2017	10/10/2017
Benzene	ND / ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	ND	ND
Toluene	1.4 / 1.4	0.77 J	1.0 J	1.6 J	1.2 J	0.98 J / 0.88 J	1.4 J	1.4 J	ND	ND / 0.38 J	ND	ND	ND
Ethylbenzene	98.9 / 102	140	130	140	160	160 / 170	210	220	310	210 / 170	390	98	120
Total Xylenes	645 / 626	275	392	726	836	921 / 866	1282	1630	1443	510 J / 339 J	1,949	356	785
Freon 113	ND / ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	3.4 J / 3.5 J	ND	ND	ND
Naphthalene	28.2 J / 29.6 J	24	26	37	33	33 / 37	36	51	71	38 / 41	66	23	33
2-Methylnaphthalene	20.2 / 20.4	42	58	83	70	60 / 62	56	69	ND	40 / 45	52	ND	21
Total Lead	26 / 33	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	3.0 J	ND

SV15	12/12/2013	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015	9/17/2015	12/2/2015	3/23/2016	10/5/2016	4/6/2017	10/11/2017
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	0.77 J	0.63 J	0.39 J	0.40 J	ND	ND	ND	ND	0.62 J	ND	1.4 J	2.6 J	
Naphthalene	ND	1.2	ND	ND	0.63 J	ND	ND	0.27 J	ND	ND	ND	ND	0.67
2-Methylnaphthalene	9.8	9.0 J	ND	1.4	4.0 J	ND	ND	ND	ND	3.4 J	ND	ND	ND
Total Lead	1.1 J	ND	1.7 J	ND	ND	15.4	ND	ND	ND	ND	ND	ND	ND

SV11/MW40S	12/12/2013	3/27/2014 (SAMPLE/DUP	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015	9/17/2015 (SAMPLE/DUP)	12/2/2015	3/23/2016	10/5/2016	4/6/2017	10/11/2017
Benzene	ND	ND / ND	ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND
Toluene	3.2 J	0.64 J / 0.48 J	0.28 J	0.78 J	ND	ND	0.27 J	0.47 J / 0.33 J	0.21 J	0.24 J	ND	ND	ND
Ethylbenzene	1.8 J	1.2 / 0.86 J	0.27 J	0.54 J	0.21 J	0.27 J	0.20 J	0.93 J / 0.68 J	0.36 J	0.24 J	0.50 J	ND	ND
Total Xylenes	9.1 J	8.5 / 6.8	1.4 J	5.9 J	2.0 J	1.2 J	1.7 J	10.4 J / 7.5 J	2.8 J	1.4 J	2.2 J	0.24 J	1.77 J
Freon 113	137	52 J / 36 J	31	32	15	8.8	11	38 J / 28 J	15	11	3.9 J	4.2 J	2.6 J
Naphthalene	23.6 J	9.1 / 7.9	ND	6.9	2.6 J	ND	ND	9.6 / 7.3	ND	ND	4.3 J	ND	2.7 J
2-Methylnaphthalene	ND	2.6 J / 2.5 J	ND	ND	ND	ND	ND	3.7 J / 3.6 J	1.1 J	ND	ND	ND	ND
Total Lead	9.5	ND / ND	ND	ND	ND	ND	ND	ND /ND	ND	ND	ND	ND	ND

Legend

- Monitoring Well (Gray Not Currently Sampled)
- Air Sparge Well - Not Active As Of December 2011
- Air Sparge Well - Not Active As Of November 2013
- Vapor Extraction Well - Not Active As Of November 2013
- Former AS Piping
- Former SVE Piping

Notes:
DUP - Duplicate Sample
ND - Not detected above laboratory detection limit (DL).
J - Estimated value
All values presented in micrograms per liter (ug/L).
Bold values: indicate detections. Shading indicates: detection: in exceedance of the 2013 Proposed Closeout Goal.

2013 Proposed Closeout Goals (ug/L)	
Benzene	5
Toluene	5
Ethylbenzene	5
Total Xylenes	5
Freon 113	5
Naphthalene	50
2-Methylnaphthalene	50
Total Lead	15

Note: Piping layout is shown here for general purposes only. See mechanical and process drawings for detailed piping layout. Piping was removed in August 2015.

KGS
180 Gordon Dr. Suite 110
Exton, PA 19341

SCALE IN FEET
0 50

File: CV-2017.dwg
Date: 11/2/2017

FIGURE 5
GROUNDWATER CONCENTRATION MAP
SVE WELLS - OCT 2017 SEMI-ANNUAL
DECEMBER 2013 - OCTOBER 2017

NWIRP CALVERTON -
FORMER FUEL DEPOT - SITE 7
CALVERTON, NEW YORK

Summary and Path Forward

- Continue semi-annual groundwater sampling in accordance with the Operable Unit 2 (OU2) Record of Decision (ROD)
- Evaluate potential optimization to reduce cleanup time

FTMW01S (18.5 to 28.5 ft bgs) (44 to 34 ft msl)

VOCs	9/17/12	9/26/13	9/17/14	9/18/15	11/30/17
1,4-Dioxane	--	--	--	--	ND

FT-MW01I (68 to 78 ft bgs) (-6 to -16 ft msl)

VOCs	9/17/12	9/26/13	9/17/14	9/18/15	9/28/16	11/30/17	11/30/17 (Dup)
Carbon disulfide	0.58 J	ND	ND	ND	ND	--	--
Chloroform	ND	ND	0.33 J	0.64 J	ND	--	--
1,4-Dioxane	--	--	--	--	--	ND	ND

FT-MW03S (21.5 to 31.5 ft bgs) (43 to 33 ft msl)

VOCs	9/17/12	9/26/13	9/17/14	9/24/15	11/30/17
1,1,1-TCA	0.36 J	2.1 J	25	ND	4.8 J
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ND	7.6 J	4.4 J	ND
1,1-DCA	ND	ND	37	7.1	ND
Acetone	ND	ND	ND	ND	2.5 J
TCE	3.2	1.4 J	4.0	0.50 J	0.41 J
1,4-Dioxane	--	--	--	--	ND

FTMW09I (28 to 38 ft bgs) (37 to 27 ft msl)

VOCs	9/26/13	12/16/13	7/17/15	9/23/15	11/30/17	11/30/17 DUP
1,1,1-TCA	ND	ND	13	34	ND	ND
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ND	2.4	6.9	ND	ND
1,1-DCA	1.8 J	0.72 J	47	120	11.9	11.5
1,1-DCE	ND	ND	ND	0.55 J	ND	ND
Chloroform	ND	0.38 J	ND	0.51 J	ND	ND
TCE	9.9 J	5.3	15	15	1.2 J	1.0 J
1,4-Dioxane	--	ND	--	ND	0.12 J	0.11 J

FT-MW02S (10.5 to 20.5 ft bgs) (43 to 33 ft msl)

VOCs	9/17/12	9/26/13	9/17/14	9/18/15	11/30/17
1,1-DCA	0.90 J	2.6 J	1.8	2.2	ND
1,2,4-Trichlorbenzene	ND	ND	0.56 J	ND	ND
1,2-Dichlorbenzene	1.3	3.0 J	2.6	3.5	ND
1,4-Dichlorbenzene	0.60 J	0.96 J	ND	1.2	ND
2-Butanone	--	--	--	--	1.9 J
Acetone	ND	18 J	13 J+	7.6 J	5 J
Carbon disulfide	ND	ND	0.43 J	ND	ND
CIS-1,2-DCE	2.2	3.5 J	0.36 J	ND	ND
Ethylbenzene	0.44 J	2.4 J	4.3	**5.2**	0.94 J
Isopropylbenzene	0.45 J	1.9 J	2.0	1.7	ND
M- & P-Xylene	ND	0.67 J	0.85 J	0.94 J	ND
Naphthalene	ND	2.8	0.95 J	ND	ND
O-Xylene	0.70 J	2.8 J	2.2	1.4	2.2 J
PCE	ND	ND	ND	ND	0.45 J
Toluene	ND	0.29 J	0.57 J	0.81 J	0.99 J
TCE	0.54 J	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	0.55 J
1,4-Dioxane	--	--	--	--	ND

FT-MW02I (70 to 80 ft bgs) (-17 to -27 ft msl)

VOCs	9/17/12	9/26/13	9/17/14	9/18/15	9/18/15 (Dup)	11/30/17
Acetone	ND	ND	ND	3.0 J	ND	ND
Chloroform	ND	ND	0.25 J	0.30 J	0.25 J	ND
1,4-Dioxane	--	--	--	--	--	ND

FTMW07S (25 to 35 ft bgs) (43 to 33 ft msl)

VOCs	9/17/12	9/26/13	9/18/14	9/23/15	11/30/17
1,4-Dioxane	--	--	--	--	ND

FTMW06S (17 to 27 ft bgs) (42 to 32 ft msl)

VOCs	9/18/12	9/27/13	9/18/14	9/24/15	11/30/17
Acetone	ND	5.5 J	ND	ND	--
Carbon Disulfide	0.31 J	ND	ND	ND	--
Chloromethane	ND	ND	0.34 J	ND	--
1,4-Dioxane	--	--	--	--	ND

FTMW06I (65 to 75 ft bgs) (-5 to -15 ft msl)

VOCs	9/18/12	9/27/13	9/18/14	9/24/15	11/30/17
Carbon Disulfide	0.30 J	ND	ND	ND	--
Chloroform	0.44 J	0.38 J	0.35 J	ND	--
1,4-Dioxane	--	--	--	--	ND

FTMW05S (7.5 to 17.5 ft bgs) (42 to 32 ft msl)

VOCs	9/17/12	9/26/13	9/18/14	9/23/15	11/30/17
Acetone	ND	**95 J**	ND	ND	--
1,4-Dioxane	--	--	--	--	ND

FTMW05I (48 to 58 ft bgs) (2 to -8 ft msl)

VOCs	9/17/12	9/17/12 (Dup)	9/26/13	9/26/13 (Dup)	9/18/14	9/18/14 (Dup)	9/23/15	11/30/17
Chloroform	0.68 J	0.66 J	0.80 J	0.87 J	0.69 J	0.66 J	0.31 J	--
1,4-Dioxane	--	--	--	--	--	--	--	ND

FTMW08S (3 to 14 ft bgs) (45 to 34 ft msl)

VOCs	9/18/12	9/26/13	9/18/14	9/24/15	11/29/17	11/29/17 (DUP)
1,4-Dioxane	--	--	--	--	ND	ND

FTMW08I (23 to 33 ft bgs) (25 to 15 ft msl)

VOCs	9/18/12	9/26/13	9/18/14	9/24/15	11/30/17
1,1-DCA	1.2	0.28 J	ND	0.50 J	--
1,2-Dichlorobenzene	ND	ND	ND	0.33 J	--
Carbon disulfide	0.33 J	ND	ND	ND	--
Cis-1,2-DCE	ND	1.3 J	ND	0.37 J	--
TCE	0.38 J	ND	ND	ND	--
1,4-Dioxane	--	--	--	--	ND

FTMW10I (20 to 30 ft bgs) (35 to 25 ft msl)

VOCs	9/26/13	12/16/13	7/17/15	9/24/15	11/30/17
1,1,1-TCA	0.46 J	ND	ND	ND	ND
1,1-DCA	0.93 J	0.62 J	ND	ND	ND
TCE	6.4 J	6.6	0.93 J	1.1	1.5 J
1,4-Dioxane	--	ND	--	ND	ND

FTPZ451S

FTPZ452S

Legend

- Monitoring Well/Piezometer
- Staff Gauge
- TCE 5 µg/L contour inferred
- February 2017 Groundwater Flow
- Former Concrete Burn Ring
- Property Boundary

0 150 300 600 Feet

2016 NYGIS Clearinghouse Aerial Imagery

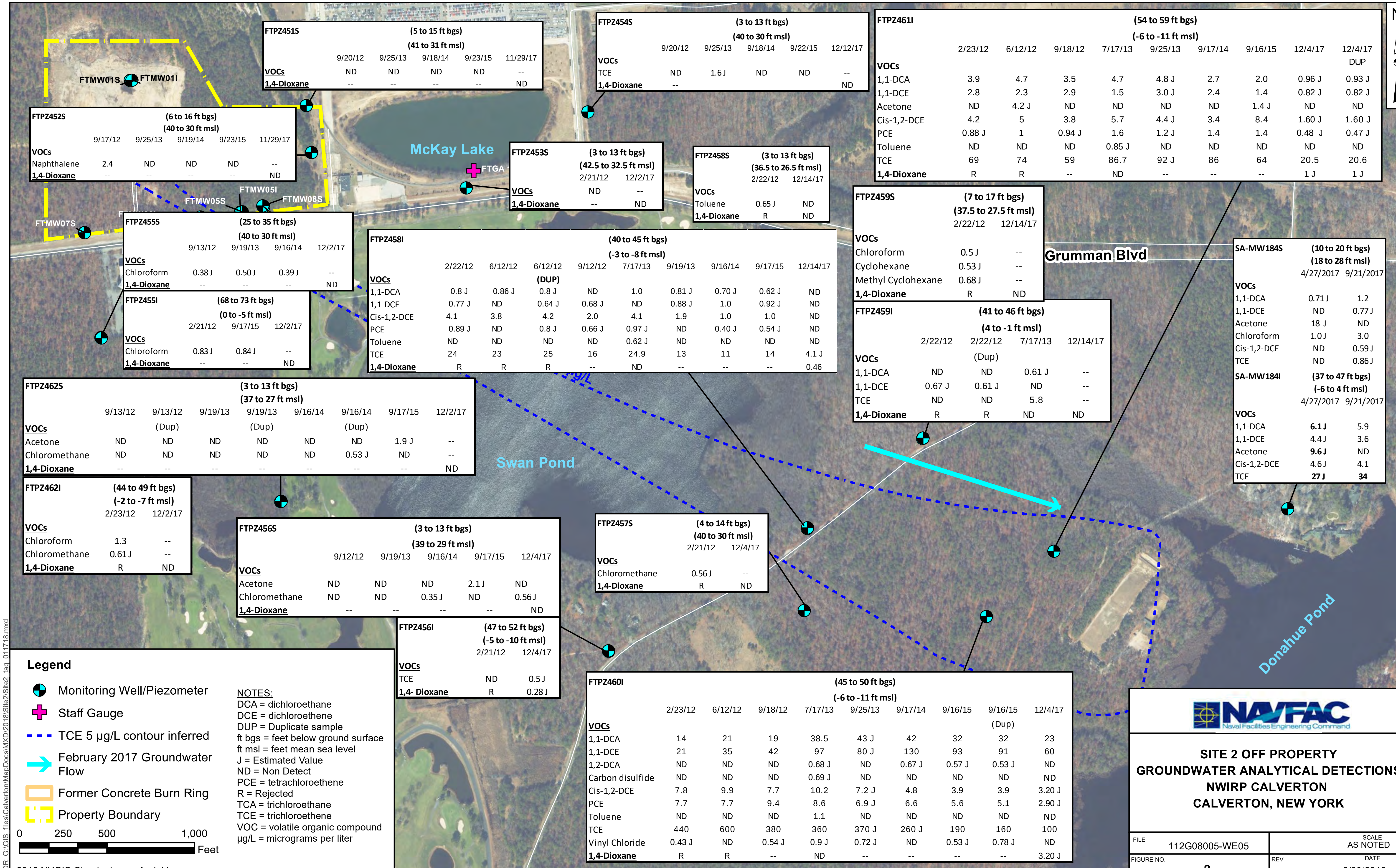
NOTES:
DCA = dichloroethane
DCE = dichloroethene
DUP = Duplicate sample
ft bgs = feet below ground surface
ft msl = feet mean sea level
J = Estimated Value
ND = Non Detect
PCE = tetrachloroethene
TCA = trichloroethane
TCE = trichloroethene
VOC = volatile organic compound
µg/L = micrograms per liter

NAVFAC Naval Facilities Engineering Command

SITE 2 ON PROPERTY GROUNDWATER ANALYTICAL DETECTIONS NWIRP CALVERTON CALVERTON, NEW YORK

FILE	SCALE
112G08005-WE05	AS NOTED
FIGURE NO. 1	REV / DATE 3/30/2018

NOR: G:\GIS_files\Calverton\MapDocs\MXD\2018\Site2\Site2_tag_onproperty_011818.mxd



FTPZ451S (5 to 15 ft bgs) (41 to 31 ft msl)

	9/20/12	9/25/13	9/18/14	9/23/15	11/29/17
VOCs	ND	ND	ND	ND	--
1,4-Dioxane	--	--	--	--	ND

FTPZ454S (3 to 13 ft bgs) (40 to 30 ft msl)

	9/20/12	9/25/13	9/18/14	9/22/15	12/12/17
VOCs					
TCE	ND	1.6 J	ND	ND	--
1,4-Dioxane	--				ND

FTPZ461I (54 to 59 ft bgs) (-6 to -11 ft msl)

	2/23/12	6/12/12	9/18/12	7/17/13	9/25/13	9/17/14	9/16/15	12/4/17	12/4/17 DUP
VOCs									
1,1-DCA	3.9	4.7	3.5	4.7	4.8 J	2.7	2.0	0.96 J	0.93 J
1,1-DCE	2.8	2.3	2.9	1.5	3.0 J	2.4	1.4	0.82 J	0.82 J
Acetone	ND	4.2 J	ND	ND	ND	ND	1.4 J	ND	ND
Cis-1,2-DCE	4.2	5	3.8	5.7	4.4 J	3.4	8.4	1.60 J	1.60 J
PCE	0.88 J	1	0.94 J	1.6	1.2 J	1.4	1.4	0.48 J	0.47 J
Toluene	ND	ND	ND	0.85 J	ND	ND	ND	ND	ND
TCE	69	74	59	86.7	92 J	86	64	20.5	20.6
1,4-Dioxane	R	R	--	ND	--	--	--	1 J	1 J

FTPZ452S (6 to 16 ft bgs) (40 to 30 ft msl)

	9/17/12	9/25/13	9/19/14	9/23/15	11/29/17
VOCs					
Naphthalene	2.4	ND	ND	ND	--
1,4-Dioxane	--	--	--	--	ND

FTPZ453S (3 to 13 ft bgs) (42.5 to 32.5 ft msl)

	2/21/12	12/2/17
VOCs	ND	--
1,4-Dioxane	--	ND

FTPZ458S (3 to 13 ft bgs) (36.5 to 26.5 ft msl)

	2/22/12	12/14/17
VOCs		
Toluene	0.65 J	ND
1,4-Dioxane	R	ND

FTPZ459S (7 to 17 ft bgs) (37.5 to 27.5 ft msl)

	2/22/12	12/14/17
VOCs		
Chloroform	0.5 J	--
Cyclohexane	0.53 J	--
Methyl Cyclohexane	0.68 J	--
1,4-Dioxane	R	ND

FTPZ455S (25 to 35 ft bgs) (40 to 30 ft msl)

	9/13/12	9/19/13	9/16/14	12/2/17
VOCs				
Chloroform	0.38 J	0.50 J	0.39 J	--
1,4-Dioxane	--	--	--	ND

FTPZ455I (68 to 73 ft bgs) (0 to -5 ft msl)

	2/21/12	9/17/15	12/2/17
VOCs			
Chloroform	0.83 J	0.84 J	--
1,4-Dioxane	--	--	ND

FTPZ458I (40 to 45 ft bgs) (-3 to -8 ft msl)

	2/22/12	6/12/12	6/12/12 (DUP)	9/12/12	7/17/13	9/19/13	9/16/14	9/17/15	12/14/17
VOCs									
1,1-DCA	0.8 J	0.86 J	0.8 J	ND	1.0	0.81 J	0.70 J	0.62 J	ND
1,1-DCE	0.77 J	ND	0.64 J	0.68 J	ND	0.88 J	1.0	0.92 J	ND
Cis-1,2-DCE	4.1	3.8	4.2	2.0	4.1	1.9	1.0	1.0	ND
PCE	0.89 J	ND	0.8 J	0.66 J	0.97 J	ND	0.40 J	0.54 J	ND
Toluene	ND	ND	ND	ND	0.62 J	ND	ND	ND	ND
TCE	24	23	25	16	24.9	13	11	14	4.1 J
1,4-Dioxane	R	R	R	--	ND	--	--	--	0.46

FTPZ459I (41 to 46 ft bgs) (4 to -1 ft msl)

	2/22/12	2/22/12 (Dup)	7/17/13	12/14/17
VOCs				
1,1-DCA	ND	ND	0.61 J	--
1,1-DCE	0.67 J	0.61 J	ND	--
TCE	ND	ND	5.8	--
1,4-Dioxane	R	R	ND	ND

SA-MW184S (10 to 20 ft bgs) (18 to 28 ft msl)

	4/27/2017	9/21/2017
VOCs		
1,1-DCA	0.71 J	1.2
1,1-DCE	ND	0.77 J
Acetone	18 J	ND
Chloroform	1.0 J	3.0
Cis-1,2-DCE	ND	0.59 J
TCE	ND	0.86 J

SA-MW184I (37 to 47 ft bgs) (-6 to 4 ft msl)

	4/27/2017	9/21/2017
VOCs		
1,1-DCA	**6.1 J**	5.9
1,1-DCE	4.4 J	3.6
Acetone	**9.6 J**	ND
Cis-1,2-DCE	4.6 J	4.1
TCE	**27 J**	**34**

FTPZ462S (3 to 13 ft bgs) (37 to 27 ft msl)

	9/13/12	9/13/12 (Dup)	9/19/13	9/19/13 (Dup)	9/16/14	9/16/14 (Dup)	9/17/15	12/2/17
VOCs								
Acetone	ND	ND	ND	ND	ND	ND	1.9 J	--
Chloromethane	ND	ND	ND	ND	ND	0.53 J	ND	--
1,4-Dioxane	--	--	--	--	--	--	--	ND

FTPZ462I (44 to 49 ft bgs) (-2 to -7 ft msl)

	2/23/12	12/2/17
VOCs		
Chloroform	1.3	--
Chloromethane	0.61 J	--
1,4-Dioxane	R	ND

FTPZ456S (3 to 13 ft bgs) (39 to 29 ft msl)

	9/12/12	9/19/13	9/16/14	9/17/15	12/4/17
VOCs					
Acetone	ND	ND	ND	2.1 J	ND
Chloromethane	ND	ND	0.35 J	ND	0.56 J
1,4-Dioxane	--	--	--	--	ND

FTPZ457S (4 to 14 ft bgs) (40 to 30 ft msl)

	2/21/12	12/4/17
VOCs		
Chloromethane	0.56 J	--
1,4-Dioxane	R	ND

FTPZ456I (47 to 52 ft bgs) (-5 to -10 ft msl)

	2/21/12	12/4/17
VOCs		
TCE	ND	0.5 J
1,4- Dioxane	R	0.28 J

FTPZ460I (45 to 50 ft bgs) (-6 to -11 ft msl)

	2/23/12	6/12/12	9/18/12	7/17/13	9/25/13	9/17/14	9/16/15	9/16/15 (Dup)	12/4/17
VOCs									
1,1-DCA	14	21	19	38.5	43 J	42	32	32	23
1,1-DCE	21	35	42	97	80 J	130	93	91	60
1,2-DCA	ND	ND	ND	0.68 J	ND	0.67 J	0.57 J	0.53 J	ND
Carbon disulfide	ND	ND	ND	0.69 J	ND	ND	ND	ND	ND
Cis-1,2-DCE	7.8	9.9	7.7	10.2	7.2 J	4.8	3.9	3.9	3.20 J
PCE	7.7	7.7	9.4	8.6	6.9 J	6.6	5.6	5.1	2.90 J
Toluene	ND	ND	ND	1.1	ND	ND	ND	ND	ND
TCE	440	600	380	360	370 J	260 J	190	160	100
Vinyl Chloride	0.43 J	ND	0.54 J	0.9 J	0.72 J	ND	0.53 J	0.78 J	ND
1,4-Dioxane	R	R	--	ND	--	--	--	--	3.20 J

Legend

- Monitoring Well/Piezometer
- Staff Gauge
- TCE 5 µg/L contour inferred
- February 2017 Groundwater Flow
- Former Concrete Burn Ring
- Property Boundary

0 250 500 1,000 Feet

2016 NYGIS Clearinghouse Aerial Imagery

NOTES:
DCA = dichloroethane
DCE = dichloroethene
DUP = Duplicate sample
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ND = Non Detect
PCE = tetrachloroethene
R = Rejected
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VOC = volatile organic compound
µg/L = micrograms per liter

NAVFAC Naval Facilities Engineering Command

SITE 2 OFF PROPERTY GROUNDWATER ANALYTICAL DETECTIONS NWIRP CALVERTON CALVERTON, NEW YORK

FILE	SCALE
112G08005-WE05	AS NOTED
FIGURE NO. 2	REV
	DATE 3/30/2018

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FT-MW01S	(18.5 to 28.5 ft bgs) (44 to 34 ft msl)
	11/30/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-MW01I	(68-78 ft bgs) (-6 to -16 ft msl)	
		DUP
	11/30/2017	11/30/2017
PFBS	ND	ND
PFOA	ND	ND
PFOS	ND	ND
Total- PFOS/PFOA	ND	ND

FT-MW02S	(10.5-20.5 ft bgs) (43 to 33 ft msl)	
	9/20/2016	11/30/2017
PFBS	--	3.61 J
PFOA	**1500**	**272**
PFOS	**1200**	**108**
Total- PFOS/PFOA	**2700**	**380**

FT-MW02I	(70-80 ft bgs) (-17 to -27 ft msl)	
	9/21/2016	11/30/2017
PFBS	--	ND
PFOA	ND	ND
PFOS	8.9 J	ND
Total- PFOS/PFOA	8.9 J	ND

FT-MW05S	(7.5-17.5 ft bgs) (42 to 32 ft msl)
	11/30/2017
PFBS	1.43 J
PFOA	4.86
PFOS	20.9
Total- PFOS/PFOA	25.76

FT-MW05I	(48-58 ft bgs) (2 to -8 ft msl)
	11/30/2017
PFBS	1.46 J
PFOA	66.3
PFOS	**180**
Total- PFOS/PFOA	**246.3**

FT-MW03S	(23 to 33 ft bgs) (43 to 33 ft msl)
	11/30/2017
PFBS	1.85 J
PFOA	3.35 J
PFOS	3.04 J
Total, PFOS/PFOA	6.39 J

FT-MW09I	28-38 ft bgs (37 to 27 ft msl)	
		DUP
	9/20/2016	11/30/2017	11/30/2017
PFBS	--	1.15 J	1.07 J
PFOA	6.7	4.05	4.29
PFOS	ND	ND	ND
Total- PFOS/PFOA	6.7	4.05	4.29

FT-MW07S	(25-35 ft bgs) (43 to 33 ft msl)
	11/30/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-MW08S	(4-14 ft bgs) (25 to 15 ft		
			DUP
	9/20/2016	11/29/2017	11/29/2017
PFBS	--	1.76 J	1.65 J
PFOA	44	45.6	38.1
PFOS	45	**83.5**	62.3
Total- PFOS/PFOA	**89**	**129.1**	**100.4**

FT-MW08I	(23 to 33 ft bgs) (25 to 15 ft msl)	
	9/20/2016	11/29/2017
PFBS	--	4.63 J
PFOA	**420**	**367**
PFOS	**990**	**818 J**
Total, PFOS/PFOA	**1410**	**1185 J**

FT-MW06S	(17-27 ft bgs) (42 to 32 ft msl)
	11/30/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-MW06I	(65-75 ft bgs) (-5 to -15 ft msl)
	11/30/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-MW10I	(20-30 ft bgs) (35 to 25 ft msl)
	11/30/2017
PFBS	ND
PFOA	2.96 J
PFOS	ND
Total- PFOS/PFOA	2.96 J

FTPZ451S

FTPZ452S

FTPZ453S

FTPZ455S
FTPZ455I

McKay Lake

Western Plume (TCE)

N

Legend

- Monitoring Well/Piezometer
- TCE 5 µg/L contour inferred
- February 2017 Groundwater Flow
- Former Concrete Burn Ring
- Property Boundary

NOTES:
DUP = Duplicate sample
ft bgs = feet below ground surface
ft msl = feet mean sea level
J = Estimated Value
ND = Non Detect
PFBS = perfluorobutane sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctyl Sulfonate
TCE = Trichloroethene
µg/L = micrograms per liter
ng/L = nanogram per liter

Bold values exceed the Environmental Protection Agency (EPA) Health Advisory (HA) of 70 ng/L for drinking water.

PFBS EPA Tapwater Regional Screening Level (RSL) (Target Cancer Risk [TR]= 1E-06 = 400,000 ng/l.

0 150 300 600 Feet

2016 NYGIS Clearinghouse Aerial Imagery

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NAVFAC Naval Facilities Engineering Command

SITE 2 ON PROPERTY GROUNDWATER ANALYTICAL RESULTS PFAS INVESTIGATION SITE 2 - FIRE TRAINING AREA NWIRP CALVERTON, NEW YORK

FILE	SCALE
112G08005-WE05	AS NOTED
FIGURE NO.	REV / DATE
2	3/29/2018

N

FT-SW10	12/1/2017	12/1/2017 DUP
PFBS	ND	ND
PFOA	2.38 J	2.41 J
PFOS	0.531 J	0.898 J
Total PFOA/PFOS	2.91 J	3.308 J

FT-RW01

ng/L	9/21/2016	9/21/2016 DUP	12/22/2016	3/30/2017	6/27/2017	9/27/2017	12/12/2017	12/12/2017 DUP
PFBS	--	--	--	--	--	--	ND	ND
PFOA	ND	ND	ND	ND	ND	ND	ND	ND
PFOS	7.5 J	3.5 J	ND	ND	ND	ND	ND	ND
Total PFOA/PFOS	7.5 J	3.5 J	ND	ND	ND	ND	ND	ND

FT-PZ455S	(25-35 ft bgs) (40 to 30 ft msl)
	12/2/2017
PFBS	ND
PFOA	0.345 J
PFOS	ND
Total- PFOS/PFOA	0.345 J

FT-PZ455I	(68-73 ft bgs) (0 to -5 ft msl)
	12/2/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-PZ453S	(3-13 ft bgs) (42.5 to 32.5 ft msl)
	12/2/2017
PFBS	ND
PFOA	0.693 J
PFOS	ND
Total- PFOS/PFOA	0.693 J

FT-PZ459S	(7-17 ft bgs) (37.5 to 27.5 ft msl)
	12/14/2017
PFBS	ND
PFOA	1.17 J
PFOS	ND
Total- PFOS/PFOA	1.17 J

FT-PZ459I	(41-46 ft bgs) (4 to -1 ft msl)
	12/14/2017
PFBS	ND
PFOA	8.06
PFOS	11.2
Total- PFOS/PFOA	19.26

FT-PZ456S	(3-13 ft bgs) (39 to 29 ft msl)	
	9/21/2016	12/4/2017
PFBS	--	ND
PFOA	ND	ND
PFOS	**120**	ND
Total- PFOS/PFOA	**120**	ND

FT-PZ456I	(47-52 ft bgs) (-5 to -10 ft msl)	
	9/21/2016	12/4/2017
PFBS	--	ND
PFOA	40	13.3
PFOS	ND	ND
Total- PFOS/PFOA	40	13.3

FT-PZ462S	(3-13 ft bgs) (37 to 27 ft msl)
	12/2/2017
PFBS	ND
PFOA	1.55 J
PFOS	ND
Total- PFOS/PFOA	1.55 J

FT-PZ462I	(44-49 ft bgs) (-2 to -7 ft msl)
	12/2/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total- PFOS/PFOA	ND

FT-PZ458S	(3-13 ft bgs) (36.5 to 26.5 ft msl)
	12/14/2017
PFBS	1.33 J
PFOA	10.4
PFOS	4.53
Total- PFOS/PFOA	14.93

FT-PZ458I	(40-45 ft bgs) (-3 to -8 ft msl)
	12/14/2017
PFBS	1.44 J
PFOA	34.9
PFOS	16.8
Total- PFOS/PFOA	51.7

FT-SW13	12/1/2017
PFBS	ND
PFOA	22.6
PFOS	19.6
Total PFOA/PFOS	42.2

FT-SW12	12/1/2017
PFBS	ND
PFOA	21.9
PFOS	30.3
Total PFOA/PFOS	52.2

FT-PZ463S	(2.5-12.5 ft bgs)
	12/14/2017
PFBS	ND
PFOA	1.73 J
PFOS	ND
Total- PFOS/PFOA	1.73 J

FT-PZ463I	(43.5-53.5 ft bgs)
	12/14/2017
PFBS	ND
PFOA	31.9
PFOS	16.5
Total- PFOS/PFOA	48.4

McKay Lake

Donahue Pond

FTMW01S, FTMW01I, FTMW03S, FTMW02S, FTMW02I, FTMW09I, FTMW07S, FTPZ451S, FTPZ452S, FTPZ454S, FTGA 10, FT-SW10, FTPZ453S, FTPZ455S, FTPZ455I, FTPZ462S, FTPZ462I, FTPZ456S, FTPZ456I, FT-RW01, FTGA 12, FT-SW12, FT-SW13, FTGA 13, FTPZ457S, FTPZ458S, FTPZ458I, FTPZ459S, FTPZ459I, FTPZ460I, FTPZ461I, FTPZ463I, FTPZ464S, FTPZ464I

Legend

- Monitoring Well/Piezometer
- Staff Gauge
- Monitoring Well/Piezometer Sampled for PFAS 2017
- Surface Water Sampled for PFAS 2017
- Residential Well Sampled for PFAS 2017
- TCE 5 µg/L contour inferred
- February 2017 Groundwater Flow
- Former Concrete Burn Ring
- Property Boundary

0 250 500 1,000 Feet

2016 NYGIS Clearinghouse Aerial Imagery

NOTES:
DUP = Duplicate sample
ft bgs = feet below ground surface
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ND = Non Detect
PFBS = perfluorobutane sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctyl Sulfonate
TCE = Trichloroethene
µg/L = micrograms per liter
ng/L = nanogram per liter

Bold values exceed the Environmental Protection Agency (EPA) Health Advisory (HA) of 70 ng/L for drinking water.

PFBS EPA Tapwater Regional Screening Level (RSL) (Target Cancer Risk [TR]= 1E-06)= 400,000 ng/l.

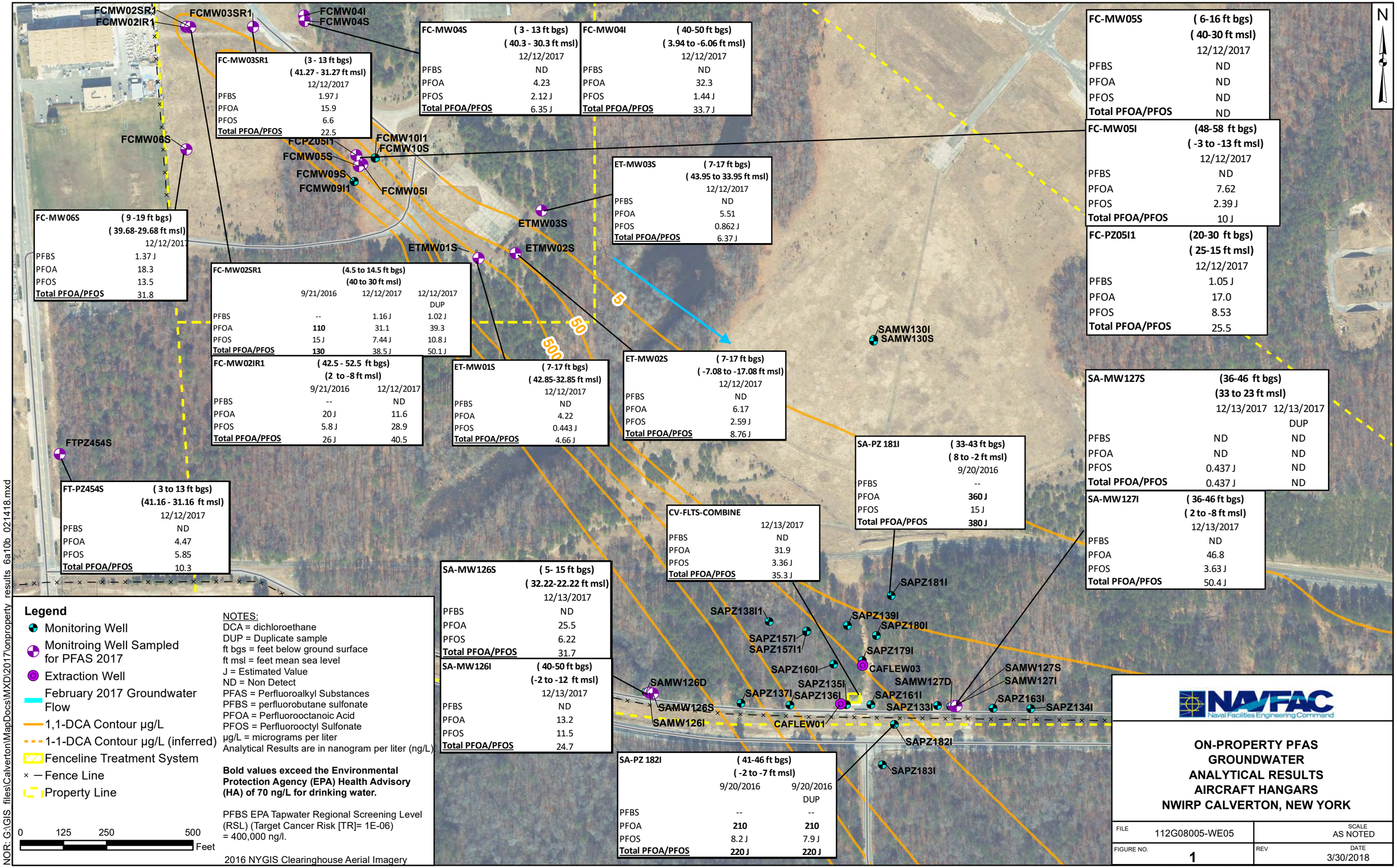
Criteria is currently unavailable for surface water. Results for PFOA and PFOS are compared to values calculated using the June 22, 2017 EPA Online Regional Screening Level calculator. The calculated values are 4,400 ng/L for recreational exposure to surface water.

NAVFAC Naval Facilities Engineering Command

SITE 2 OFF PROPERTY GROUNDWATER ANALYTICAL RESULTS PFAS INVESTIGATION SITE 2 - FIRE TRAINING AREA NWIRP CALVERTON, NEW YORK

FILE	SCALE
112G08005-WE05	AS NOTED
FIGURE NO. 3	REV / DATE 3/30/2018

NOR: G:\GIS_files\Calverton\MapDocs\MXD\2018\Site2\Site2_tag_offproperty_pfas.mxd



FC-MW04S	(3 - 13 ft bgs) (40.3 - 30.3 ft msl)
	12/12/2017
PFBS	ND
PFOA	4.23
PFOS	2.12 J
Total PFOA/PFOS	6.35 J

FC-MW04I	(40-50 ft bgs) (3.94 to -6.06 ft msl)
	12/12/2017
PFBS	ND
PFOA	32.3
PFOS	1.44 J
Total PFOA/PFOS	33.7 J

FC-MW03SR1	(3 - 13 ft bgs) (41.27 - 31.27 ft msl)
	12/12/2017
PFBS	1.97 J
PFOA	15.9
PFOS	6.6
Total PFOA/PFOS	22.5

FC-MW05S	(6-16 ft bgs) (40-30 ft msl)
	12/12/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total PFOA/PFOS	ND

FC-MW05I	(48-58 ft bgs) (-3 to -13 ft msl)
	12/12/2017
PFBS	ND
PFOA	7.62
PFOS	2.39 J
Total PFOA/PFOS	10 J

ET-MW03S	(7-17 ft bgs) (43.95 to 33.95 ft msl)
	12/12/2017
PFBS	ND
PFOA	5.51
PFOS	0.862 J
Total PFOA/PFOS	6.37 J

FC-PZ05I1	(20-30 ft bgs) (25-15 ft msl)
	12/12/2017
PFBS	1.05 J
PFOA	17.0
PFOS	8.53
Total PFOA/PFOS	25.5

FC-MW06S	(9 -19 ft bgs) (39.68-29.68 ft msl)
	12/12/2017
PFBS	1.37 J
PFOA	18.3
PFOS	13.5
Total PFOA/PFOS	31.8

FC-MW02SR1	(4.5 to 14.5 ft bgs) (40 to 30 ft msl)		
	9/21/2016	12/12/2017	12/12/2017 DUP
PFBS	--	1.16 J	1.02 J
PFOA	**110**	31.1	39.3
PFOS	15 J	7.44 J	10.8 J
Total PFOA/PFOS	**130**	38.5 J	50.1 J

FC-MW02IR1	(42.5 - 52.5 ft bgs) (2 to -8 ft msl)	
	9/21/2016	12/12/2017
PFBS	--	ND
PFOA	20 J	11.6
PFOS	5.8 J	28.9
Total PFOA/PFOS	26 J	40.5

ET-MW01S	(7-17 ft bgs) (42.85-32.85 ft msl)
	12/12/2017
PFBS	ND
PFOA	4.22
PFOS	0.443 J
Total PFOA/PFOS	4.66 J

ET-MW02S	(7-17 ft bgs) (-7.08 to -17.08 ft msl)
	12/12/2017
PFBS	ND
PFOA	6.17
PFOS	2.59 J
Total PFOA/PFOS	8.76 J

SA-PZ 181I	(33-43 ft bgs) (8 to -2 ft msl)
	9/20/2016
PFBS	--
PFOA	**360 J**
PFOS	15 J
Total PFOA/PFOS	**380 J**

SA-MW127S	(36-46 ft bgs) (33 to 23 ft msl)		
	12/13/2017	12/13/2017 DUP	
PFBS	ND	ND	
PFOA	ND	ND	
PFOS	0.437 J	ND	
Total PFOA/PFOS	0.437 J	ND	

SA-MW127I	(36-46 ft bgs) (2 to -8 ft msl)
	12/13/2017
PFBS	ND
PFOA	46.8
PFOS	3.63 J
Total PFOA/PFOS	50.4 J

CV-FLTS-COMBINE	
	12/13/2017
PFBS	ND
PFOA	31.9
PFOS	3.36 J
Total PFOA/PFOS	35.3 J

SA-MW126S	(5- 15 ft bgs) (32.22-22.22 ft msl)
	12/13/2017
PFBS	ND
PFOA	25.5
PFOS	6.22
Total PFOA/PFOS	31.7

SA-MW126I	(40-50 ft bgs) (-2 to -12 ft msl)
	12/13/2017
PFBS	ND
PFOA	13.2
PFOS	11.5
Total PFOA/PFOS	24.7

SA-PZ 182I	(41-46 ft bgs) (-2 to -7 ft msl)	
	9/20/2016	9/20/2016 DUP
PFBS	--	--
PFOA	**210**	**210**
PFOS	8.2 J	7.9 J
Total PFOA/PFOS	**220 J**	**220 J**

Legend

- Monitoring Well
- Monitroing Well Sampled for PFAS 2017
- Extraction Well
- February 2017 Groundwater Flow
- 1,1-DCA Contour µg/L
- 1-1-DCA Contour µg/L (inferred)
- Fenceline Treatment System
- Fence Line
- Property Line

0 125 250 500 Feet

NOTES:
DCA = dichloroethane
DUP = Duplicate sample
ft bgs = feet below ground surface
ft msl = feet mean sea level
J = Estimated Value
ND = Non Detect
PFAS = Perfluoroalkyl Substances
PFBS = perfluorobutane sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctyl Sulfonate
µg/L = micrograms per liter
Analytical Results are in nanogram per liter (ng/L).

Bold values exceed the Environmental Protection Agency (EPA) Health Advisory (HA) of 70 ng/L for drinking water.

PFBS EPA Tapwater Regional Screening Level (RSL) (Target Cancer Risk [TR]= 1E-06) = 400,000 ng/l.

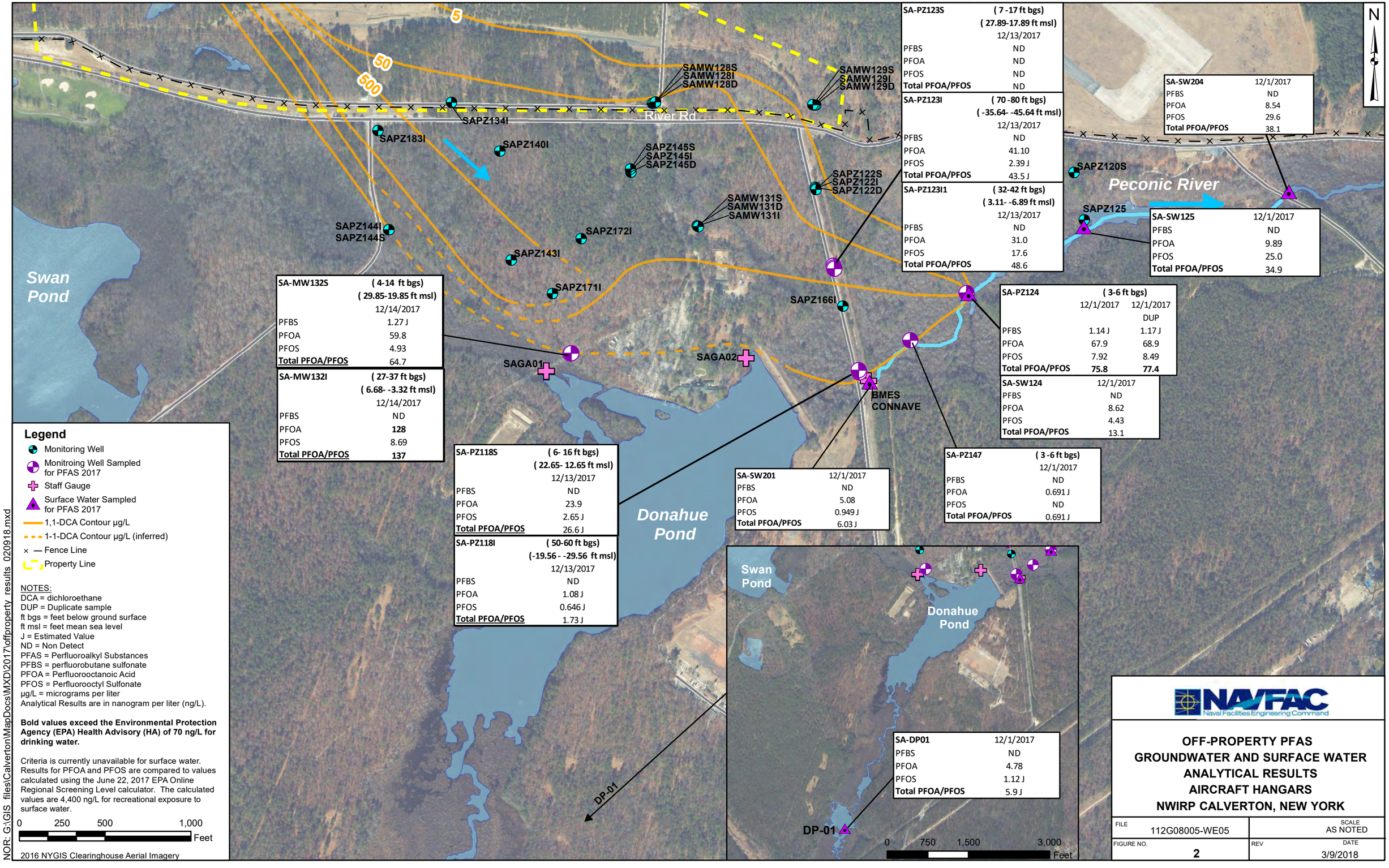
2016 NYGIS Clearinghouse Aerial Imagery

NAVFAC Naval Facilities Engineering Command

ON-PROPERTY PFAS GROUNDWATER ANALYTICAL RESULTS AIRCRAFT HANGARS NWIRP CALVERTON, NEW YORK

FILE	112G08005-WE05	SCALE	AS NOTED
FIGURE NO.	1	REV / DATE	3/30/2018

NOR: G:\GIS files\Calverton\MapDocs\MXD\2017\onproperty results 6a10b 021418.mxd



SA-PZ123S	(7 -17 ft bgs) (27.89-17.89 ft msl)
	12/13/2017
PFBS	ND
PFOA	ND
PFOS	ND
Total PFOA/PFOS	ND

SA-PZ123I	(70 -80 ft bgs) (-35.64- -45.64 ft msl)
	12/13/2017
PFBS	ND
PFOA	41.10
PFOS	2.39 J
Total PFOA/PFOS	43.5 J

SA-PZ123I1	(32-42 ft bgs) (3.11- -6.89 ft msl)
	12/13/2017
PFBS	ND
PFOA	31.0
PFOS	17.6
Total PFOA/PFOS	48.6

SA-SW204	12/1/2017
PFBS	ND
PFOA	8.54
PFOS	29.6
Total PFOA/PFOS	38.1

SA-SW125	12/1/2017
PFBS	ND
PFOA	9.89
PFOS	25.0
Total PFOA/PFOS	34.9

SA-MW132S	(4-14 ft bgs) (29.85-19.85 ft msl)
	12/14/2017
PFBS	1.27 J
PFOA	59.8
PFOS	4.93
Total PFOA/PFOS	64.7

SA-MW132I	(27-37 ft bgs) (6.68- -3.32 ft msl)
	12/14/2017
PFBS	ND
PFOA	**128**
PFOS	8.69
Total PFOA/PFOS	**137**

SA-PZ124	(3-6 ft bgs) 12/1/2017	12/1/2017 DUP
PFBS	1.14 J	1.17 J
PFOA	67.9	68.9
PFOS	7.92	8.49
Total PFOA/PFOS	**75.8**	**77.4**

SA-SW124	12/1/2017
PFBS	ND
PFOA	8.62
PFOS	4.43
Total PFOA/PFOS	13.1

SA-PZ118S	(6- 16 ft bgs) (22.65- 12.65 ft msl)
	12/13/2017
PFBS	ND
PFOA	23.9
PFOS	2.65 J
Total PFOA/PFOS	26.6 J

SA-PZ118I	(50-60 ft bgs) (-19.56 - -29.56 ft msl)
	12/13/2017
PFBS	ND
PFOA	1.08 J
PFOS	0.646 J
Total PFOA/PFOS	1.73 J

SA-SW201	12/1/2017
PFBS	ND
PFOA	5.08
PFOS	0.949 J
Total PFOA/PFOS	6.03 J

SA-PZ147	(3 -6 ft bgs) 12/1/2017
PFBS	ND
PFOA	0.691 J
PFOS	ND
Total PFOA/PFOS	0.691 J

SA-DP01	12/1/2017
PFBS	ND
PFOA	4.78
PFOS	1.12 J
Total PFOA/PFOS	5.9 J

Legend

- Monitoring Well
- Monitroing Well Sampled for PFAS 2017
- Staff Gauge
- Surface Water Sampled for PFAS 2017
- 1,1-DCA Contour µg/L
- 1-1-DCA Contour µg/L (inferred)
- Fence Line
- Property Line

NOTES:
DCA = dichloroethane
DUP = Duplicate sample
ft bgs = feet below ground surface
ft msl = feet mean sea level
J = Estimated Value
ND = Non Detect
PFAS = Perfluoroalkyl Substances
PFBS = perfluorobutane sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctyl Sulfonate
µg/L = micrograms per liter
Analytical Results are in nanogram per liter (ng/L).

Bold values exceed the Environmental Protection Agency (EPA) Health Advisory (HA) of 70 ng/L for drinking water.

Criteria is currently unavailable for surface water. Results for PFOA and PFOS are compared to values calculated using the June 22, 2017 EPA Online Regional Screening Level calculator. The calculated values are 4,400 ng/L for recreational exposure to surface water.

2016 NYGIS Clearinghouse Aerial Imagery

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NAVFAC Naval Facilities Engineering Command

OFF-PROPERTY PFAS GROUNDWATER AND SURFACE WATER ANALYTICAL RESULTS AIRCRAFT HANGARS NWIRP CALVERTON, NEW YORK

FILE	SCALE
112G08005-WE05	AS NOTED
FIGURE NO. 2	REV / DATE 3/9/2018

Site 2
Fire Training Area

Swan Pond

McKay lake

Donahue Pond

Grumman Blvd

River Rd

Connecticut Ave

Peconic River

FC-MW04S 36.09
FC-MW03SR1 36.2
FC-MW02SR1 36.34
FC-MW06S 36.42
FC-MW10S 35.86
FC-MW05S 35.89
FC-MW09S 35.96
FT-MW01S 37.78
FT-MW03S 37.79
FT-MW02S 37.63
FT-MW09I 37.52
FT-MW05S 37.3
FT-MW08S 36.92
FT-MW10I 37.79
FT-MW06S 37.43
FT-MW07S 37.55
FT-PZ455I 37.24
FT-PZ454S 36.5
FTSG10
FT-PZ453S 37.08
FT-PZ462S 35.88
FTGA13
FTGA12
FT-PZ457S 33.54
FT-PZ456S 34.92
FT-PZ458I 32.92
FT-PZ458S 34.03
FT-PZ459I 32.96
FT-PZ459S 32.83
SAGA11
SA-MW130S 33.28
SA-PZ160I 32.8
SA-PZ139I 32.7
SA-PZ157I 33.12
SA-PZ181I 32.7
SA-PZ157II 33.12
SA-PZ180I 32.7
SA-PZ138II 33.19
SA-PZ179I 32.69
SA-PZ133I 32.04
SA-MW127I 31.51
SA-PZ163I 32.26
SA-MW126S 33.73
SA-PZ137I 34.23
SA-PZ136I 32.17
SA-PZ135I 30.037
SA-PZ183I 32.44
Groundwater Treatment Building
SA-PZ182I 32.39
SA-PZ140I 31.89
SA-MW128S 29.86
SA-MW129S 28.12
SA-PZ145S 29.98
SA-PZ120S 25.37
SA-PZ122S 27.73
SA-PZ142I 31.26
SA-PZ144S 31.81
SA-MW131S 28.97
SA-PZ172I 29.83
SA-PZ143I 31.06
SA-PZ123S 27.07
SA-PZ171I 30.42
SA-PZ166I 26.09
SA-MW185S 27.34
SA-MW186S 28.41
SA-PZ118S 25.67
SA-MW132S 30.36
PRSC #2 ES
PRSC #1 WS
SA-MW184S 28.55
BM ES Conn Ave HDWL
FT-PZ461I 30.48
FT-PZ460I 31.93

37 36 35 34 33 32 31 30 29 28 27 26

Legend

- Groundwater Elevation Contour (Feet NAVD88)
- Groundwater Elevation Contour (Inferred) (Feet NAVD88)
- Groundwater Flow
- Monitoring Well/Piezometer
- Staff Gauge
- Water
- Fence Line

DRAFT

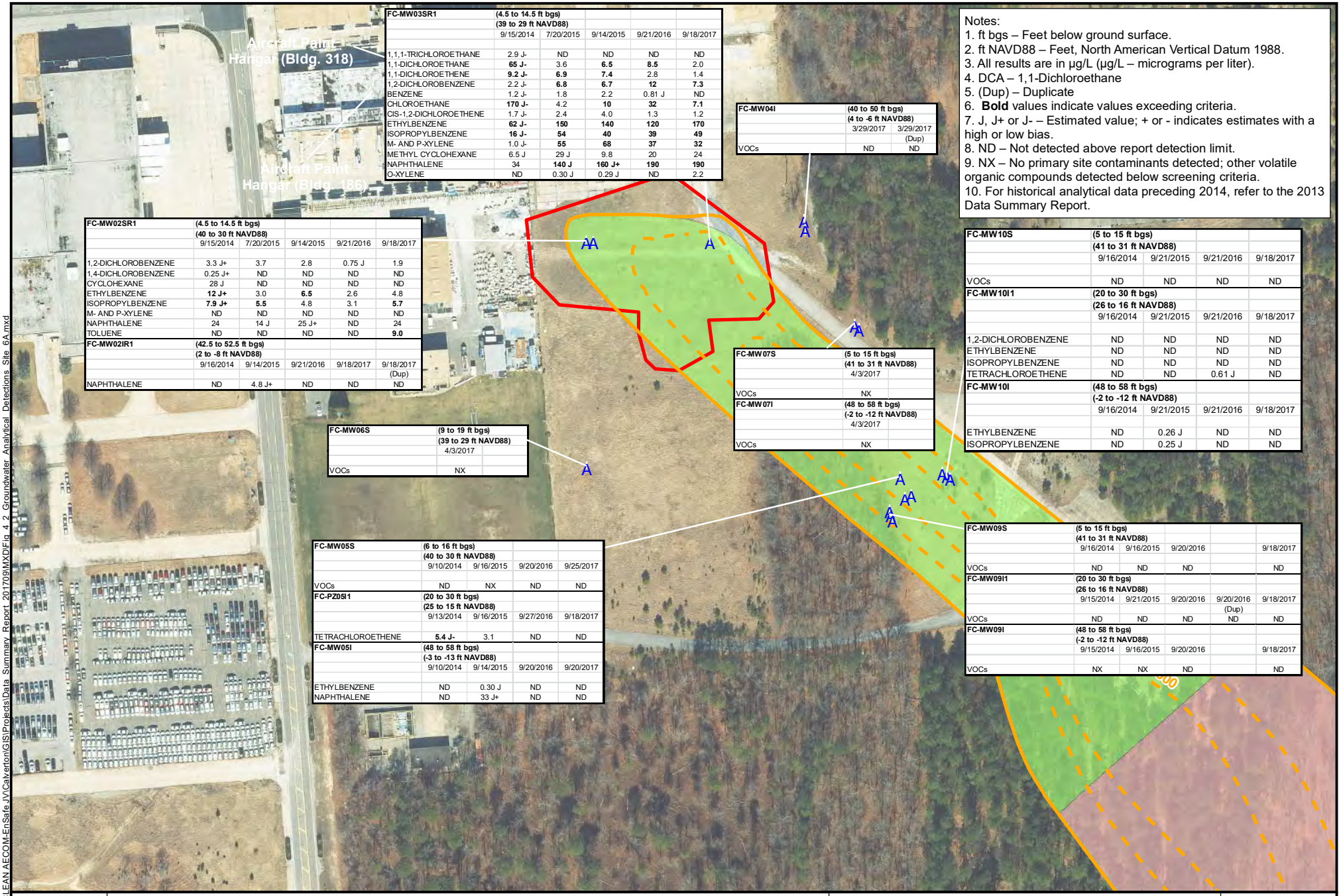
400 200 0
Feet

Orthoimage from NYS Orthos Online, 2016.

Groundwater Contours September 2017
Site 6A and Southern Area
NWIRP Calverton
Calverton, New York

Figure 4-1
Date: 4/12/2018
Project #: 60264489

File: \\USCHL1FP001\Data\Projects\Govt\Projects\NavyCLEAN AECOM-EnSafe JV\Calverton\GIS\Projects\Data_Summary_Report_201709\MXD\Fig_4_1_Groundwater_Contours_201709_Site_6A_Southern_Area.mxd



FC-MW03SR1	(4.5 to 14.5 ft bgs)				
	(39 to 29 ft NAVD88)				
	9/15/2014	7/20/2015	9/14/2015	9/21/2016	9/18/2017
1,1,1-TRICHLOROETHANE	2.9 J-	ND	ND	ND	ND
1,1-DICHLOROETHANE	**65 J-**	3.6	**6.5**	**8.5**	2.0
1,1-DICHLOROETHENE	**9.2 J-**	**6.9**	**7.4**	2.8	1.4
1,2-DICHLOROBENZENE	2.2 J-	**6.8**	**6.7**	**12**	**7.3**
BENZENE	1.2 J-	1.8	2.2	0.81 J	ND
CHLOROETHANE	**170 J-**	4.2	**10**	**32**	**7.1**
CIS-1,2-DICHLOROETHENE	1.7 J-	2.4	4.0	1.3	1.2
ETHYLBENZENE	**62 J-**	**150**	**140**	**120**	**170**
ISOPROPYLBENZENE	**16 J-**	**54**	**40**	**39**	**49**
M- AND P-XYLENE	1.0 J-	**55**	**68**	**37**	**32**
METHYL CYCLOHEXANE	6.5 J	29 J	9.8	20	24
NAPHTHALENE	34	**140 J**	**160 J+**	**190**	**190**
O-XYLENE	ND	0.30 J	0.29 J	ND	2.2

FC-MW04I	(40 to 50 ft bgs)		
	(4 to -6 ft NAVD88)		
	3/29/2017	3/29/2017 (Dup)	
VOCs	ND	ND	

Notes:
1. ft bgs – Feet below ground surface.
2. ft NAVD88 – Feet, North American Vertical Datum 1988.
3. All results are in µg/L (µg/L – micrograms per liter).
4. DCA – 1,1-Dichloroethane
5. (Dup) – Duplicate
6. **Bold** values indicate values exceeding criteria.
7. J, J+ or J- – Estimated value; + or - indicates estimates with a high or low bias.
8. ND – Not detected above report detection limit.
9. NX – No primary site contaminants detected; other volatile organic compounds detected below screening criteria.
10. For historical analytical data preceding 2014, refer to the 2013 Data Summary Report.

FC-MW02SR1	(4.5 to 14.5 ft bgs)				
	(40 to 30 ft NAVD88)				
	9/15/2014	7/20/2015	9/14/2015	9/21/2016	9/18/2017
1,2-DICHLOROBENZENE	3.3 J+	3.7	2.8	0.75 J	1.9
1,4-DICHLOROBENZENE	0.25 J+	ND	ND	ND	ND
CYCLOHEXANE	28 J	ND	ND	ND	ND
ETHYLBENZENE	**12 J+**	3.0	**6.5**	2.6	4.8
ISOPROPYLBENZENE	**7.9 J+**	**5.5**	4.8	3.1	**5.7**
M- AND P-XYLENE	ND	ND	ND	ND	ND
NAPHTHALENE	24	14 J	25 J+	ND	24
TOLUENE	ND	ND	ND	ND	**9.0**
FC-MW02IR1	**(42.5 to 52.5 ft bgs)**				
	(2 to -8 ft NAVD88)				
	9/16/2014	9/14/2015	9/21/2016	9/18/2017	9/18/2017 (Dup)
NAPHTHALENE	ND	4.8 J+	ND	ND	ND

FC-MW07S	(5 to 15 ft bgs)
	(41 to 31 ft NAVD88)
	4/3/2017
VOCs	NX
FC-MW07I	**(48 to 58 ft bgs)**
	(-2 to -12 ft NAVD88)
	4/3/2017
VOCs	NX

FC-MW06S	(9 to 19 ft bgs)
	(39 to 29 ft NAVD88)
	4/3/2017
VOCs	NX

FC-MW10S	(5 to 15 ft bgs)			
	(41 to 31 ft NAVD88)			
	9/16/2014	9/21/2015	9/21/2016	9/18/2017
VOCs	ND	ND	ND	ND
FC-MW10I1	**(20 to 30 ft bgs)**			
	(26 to 16 ft NAVD88)			
	9/16/2014	9/21/2015	9/21/2016	9/18/2017
1,2-DICHLOROBENZENE	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND
ISOPROPYLBENZENE	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	0.61 J	ND
FC-MW10I	**(48 to 58 ft bgs)**			
	(-2 to -12 ft NAVD88)			
	9/16/2014	9/21/2015	9/21/2016	9/18/2017
ETHYLBENZENE	ND	0.26 J	ND	ND
ISOPROPYLBENZENE	ND	0.25 J	ND	ND

FC-MW05S	(6 to 16 ft bgs)			
	(40 to 30 ft NAVD88)			
	9/10/2014	9/16/2015	9/20/2016	9/25/2017
VOCs	ND	NX	ND	ND
FC-PZ05I1	**(20 to 30 ft bgs)**			
	(25 to 15 ft NAVD88)			
	9/13/2014	9/16/2015	9/27/2016	9/18/2017
TETRACHLOROETHENE	**5.4 J-**	3.1	ND	ND
FC-MW05I	**(48 to 58 ft bgs)**			
	(-3 to -13 ft NAVD88)			
	9/10/2014	9/14/2015	9/20/2016	9/20/2017
ETHYLBENZENE	ND	0.30 J	ND	ND
NAPHTHALENE	ND	33 J+	ND	ND

FC-MW09S	(5 to 15 ft bgs)				
	(41 to 31 ft NAVD88)				
	9/16/2014	9/16/2015	9/20/2016		9/18/2017
VOCs	ND	ND	ND		ND
FC-MW09I1	**(20 to 30 ft bgs)**				
	(26 to 16 ft NAVD88)				
	9/15/2014	9/21/2015	9/20/2016	9/20/2016 (Dup)	9/18/2017
VOCs	ND	ND	ND	ND	ND
FC-MW09I	**(48 to 58 ft bgs)**				
	(-2 to -12 ft NAVD88)				
	9/15/2014	9/16/2015	9/20/2016		9/18/2017
VOCs	NX	NX	ND		ND

Legend

A Monitoring Well/Piezometer
1,1 - DCA Contour ug/L
1,1 - DCA Contour ug/L (Inferred)
Excavation Area 2009/2010
Fence Line Area
Source Area

DRAFT

200 100 0
Feet

Orthoimage from NYS Orthos Online, 2016.

Groundwater Analytical Detections Site 6A - Fuel Calibration Area NWIRP Calverton Calverton, New York

Figure 4-2
Date: 4/7/2018
Project #: 60264489

File: P:\Gov\Projects\NavyCLEAN AECOM-EnSafe JV\Calverton\GIS\Projects\Data Summary Report_201709\MXD\Fig_4_2_Groundwater_Analytical_Detections_Site_6A.mxd

Notes:
1. ft bgs – Feet below ground surface.
2. ft NAVD88 – Feet, North American Vertical Datum 1988.
3. All results are in µg/L (µg/L – micrograms per liter).
4. DCA – 1,1-Dichloroethane
5. (Dup) – Duplicate
6. **Bold** values indicate values exceeding criteria.
7. J, J+ or J- – Estimated value; + or - indicates estimates with a high or low bias.
8. -- - Not analyzed
9. ND – Not detected above report detection limit.
10. NX – No primary site contaminants detected; other volatile organic compounds detected below screening criteria.
11. For historical analytical data preceding 2014, refer to the 2013 Data Summary Report.
12. R - Rejected value not reported

SA-PZ139I	(42.5 to 47.5 ft bgs)					
	(-3 to -8 ft NAVD88)					
	9/12/2014	9/15/2015	5/11/2016	9/22/2016	4/26/2017	9/20/2017
1,1,1-TRICHLOROETHANE	ND	**20**	ND	ND	ND	ND
1,1-DICHLOROETHANE	1.1	**120**	0.89 J	0.80 J	ND	0.74 J
1,1-DICHLOROETHENE	ND	**7.9**	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	1.1 J+	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	0.99 J	ND	ND	ND	ND
BENZENE	ND	0.32 J	ND	ND	ND	ND
CHLOROETHANE	ND	**29**	ND	ND	ND	ND

SA-PZ181I	(33 to 43 ft bgs)							
	(8 to -2 ft NAVD88)							
	7/17/2015	7/17/2015 (Dup)	9/17/2015	5/12/2016	9/20/2016	9/20/2016	4/28/2017	9/20/2017
1,1-DICHLOROETHANE	1.1	1.0	0.84 J	ND	--	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	ND	--	0.96 J-	ND	ND

SA-PZ149I	(32 to 37 ft bgs)						
	(10 to 5 ft NAVD88)						
	9/12/2014	9/15/2015	5/12/2016	5/12/2016 (Dup)	9/22/2016	4/26/2017	9/20/2017
1,1,1-TRICHLOROETHANE	**5.1**	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	**24**	0.30 J	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	1.8	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.41 J	ND	ND	ND	ND	ND	ND
CHLOROETHANE	**8.6**	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	**7.5**	**41**	**11**	**11**	1.9 J	0.69 J	0.68 J

SA-PZ180I	(33 to 43 ft bgs)						
	(8 to -2 ft NAVD88)						
	7/17/2015	9/22/2015	5/12/2016	9/27/2016	4/28/2017	4/28/2017 (Dup)	9/20/2017
1,1,1-TRICHLOROETHANE	**5.8**	ND	**5.9**	ND	ND	ND	ND
1,1-DICHLOROETHANE	**38**	**20**	**54**	**19**	2.7 J+	2.4 J+	ND
1,1-DICHLOROETHENE	2.3	1.3	3.3	1.2 J	ND	ND	ND
1,2-DICHLOROBENZENE	0.31 J	ND	0.41 J	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	0.56 J	ND	ND	ND	ND
CHLOROETHANE	**10**	**5.9**	**11**	**6.0 J**	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	1.0	1.6 J+	1.8 J+	1.6

SA-PZ138I	(37 to 42 ft bgs)						
	(0 to -5 ft NAVD88)						
	9/12/2014	9/12/2014 (Dup)	9/23/2015	5/12/2016	9/27/2016	4/26/2017	9/20/2017
1,1,1-TRICHLOROETHANE	**13**	**13**	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	**62**	**58**	0.54 J	ND	ND	ND	0.78 J
1,1-DICHLOROETHENE	4.0	3.8	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.47 J	0.54 J	ND	ND	ND	ND	ND
CHLOROETHANE	**17**	**16**	ND	ND	ND	ND	ND
TETRACHLOROETHENE	**8.5**	**8.4**	ND	0.33 J	ND	ND	ND

SA-PZ179I	(36 to 46 ft bgs)					
	(4 to -6 ft NAVD88)					
	7/20/2015	9/21/2015	5/12/2016	9/27/2016	4/28/2017	9/20/2017
1,1,1-TRICHLOROETHANE	**21**	**14**	ND	ND	ND	ND
1,1-DICHLOROETHANE	**130**	**79**	2.8	ND	ND	ND
1,1-DICHLOROETHENE	**8.4**	**5.5**	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.99 J	0.84 J	ND	ND	ND	ND
1,3-DICHLOROBENZENE	0.29 J	ND	ND	ND	ND	ND
BENZENE	0.35 J	0.28 J	ND	ND	ND	ND
CHLOROETHANE	**28**	**28**	ND	ND	ND	ND
ISOPROPYLBENZENE	0.28 J	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	**83**	**19**	1.2	ND

SA-PZ157I	(33 to 38 ft bgs)						
	(4 to -1 ft NAVD88)						
	9/12/2014	9/21/2015	5/11/2016	9/27/2016		4/26/2017	9/20/2017
1,4-DIOXANE	--	ND	--	--		--	--
1,1,1-TRICHLOROETHANE	2.7	ND	ND	ND		ND	ND
1,1-DICHLOROETHANE	**13**	ND	1.4	ND		ND	ND
1,1-DICHLOROETHENE	1.1	ND	ND	ND		ND	ND
1,2-DICHLOROBENZENE	0.35 J	ND	ND	ND		ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND		ND	0.27 J
CHLOROETHANE	**5.5**	ND	ND	ND		ND	ND
TETRACHLOROETHENE	ND	**8.2**	**11**	1.1		ND	ND
SA-PZ157I	**(41 to 46 ft bgs)**						
	(-4 to -9 ft NAVD88)						
	9/13/2014	9/21/2015	5/11/2016	9/27/2016	9/27/2016 (Dup)	4/26/2017	9/20/2017
1,1-DICHLOROETHANE	ND	0.65 J	0.36 J	ND	ND	0.43 J	0.36 J
TETRACHLOROETHENE	ND	ND	0.45 J	ND	ND	ND	ND

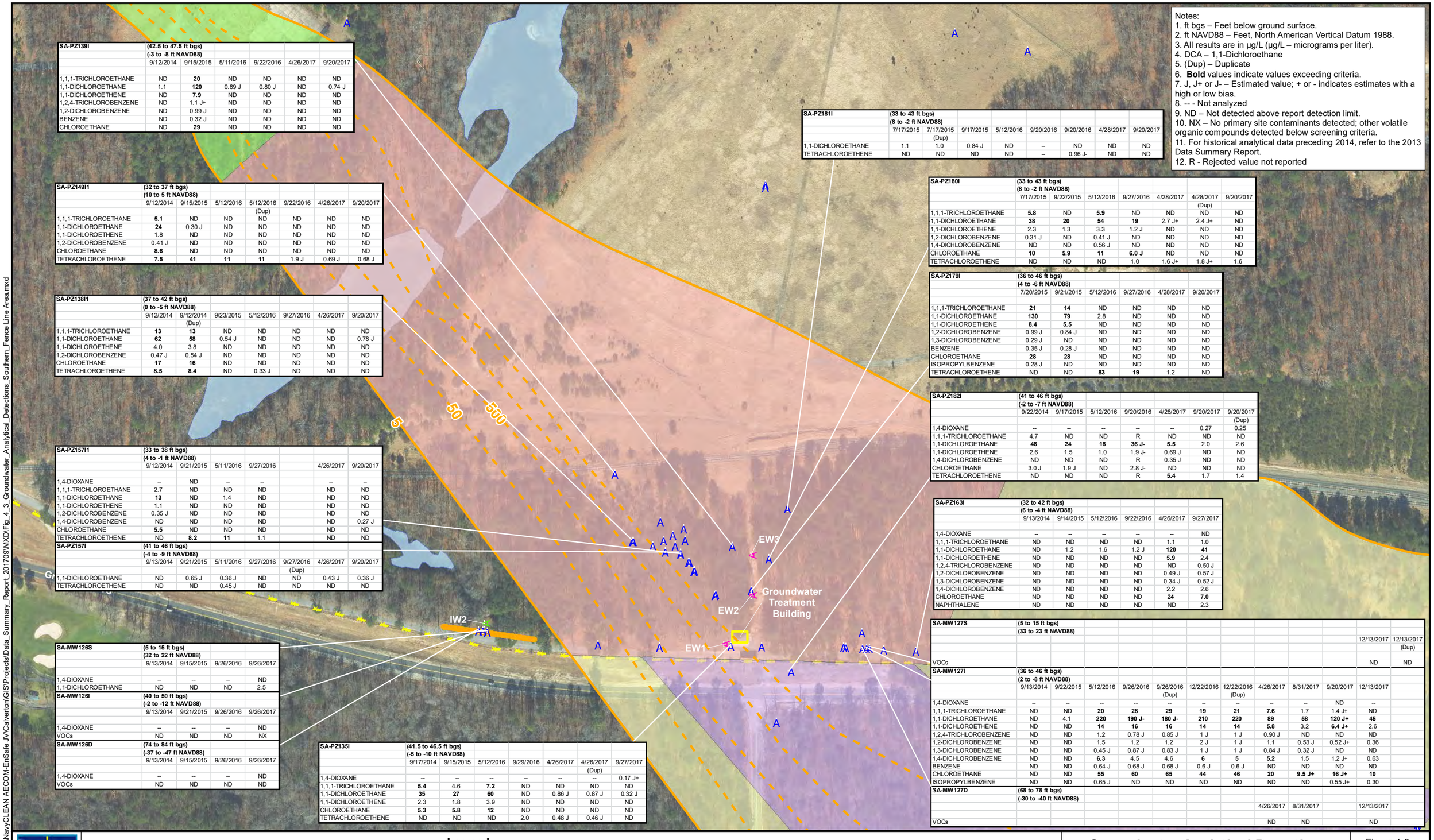
SA-PZ182I	(41 to 46 ft bgs)						
	(-2 to -7 ft NAVD88)						
	9/22/2014	9/17/2015	5/12/2016	9/20/2016	4/26/2017	9/20/2017	9/20/2017 (Dup)
1,4-DIOXANE	--	--	--	--	--	0.27	0.25
1,1,1-TRICHLOROETHANE	4.7	ND	ND	R	ND	ND	ND
1,1-DICHLOROETHANE	**48**	**24**	**18**	**36 J-**	**5.5**	2.0	2.6
1,1-DICHLOROETHENE	2.6	1.5	1.0	1.9 J-	0.69 J	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	R	0.35 J	ND	ND
CHLOROETHANE	3.0 J	1.9 J	ND	2.8 J-	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	R	**5.4**	1.7	1.4

SA-PZ163I	(32 to 42 ft bgs)					
	(6 to -4 ft NAVD88)					
	9/13/2014	9/14/2015	5/12/2016	9/22/2016	4/26/2017	9/27/2017
1,4-DIOXANE	--	--	--	--	--	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	1.1	1.0
1,1-DICHLOROETHANE	ND	1.2	1.6	1.2 J	**120**	**41**
1,1-DICHLOROETHENE	ND	ND	ND	ND	**5.9**	2.4
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND	ND	0.50 J
1,2-DICHLOROBENZENE	ND	ND	ND	ND	0.49 J	0.57 J
1,3-DICHLOROBENZENE	ND	ND	ND	ND	0.34 J	0.52 J
1,4-DICHLOROBENZENE	ND	ND	ND	ND	2.2	2.6
CHLOROETHANE	ND	ND	ND	ND	**24**	**7.0**
NAPHTHALENE	ND	ND	ND	ND	ND	2.3

SA-MW126S	(5 to 15 ft bgs)				
	(32 to 22 ft NAVD88)				
	9/13/2014	9/15/2015	9/26/2016	9/26/2017	
1,4-DIOXANE	--	--	--	ND	
1,1-DICHLOROETHANE	ND	ND	ND	2.5	
SA-MW126I	**(40 to 50 ft bgs)**				
	(-2 to -12 ft NAVD88)				
	9/13/2014	9/21/2015	9/26/2016	9/26/2017	
1,4-DIOXANE	--	--	--	ND	
VOCs	ND	ND	ND	NX	
SA-MW126D	**(74 to 84 ft bgs)**				
	(-37 to -47 ft NAVD88)				
	9/13/2014	9/15/2015	9/26/2016	9/26/2017	
1,4-DIOXANE	--	--	--	ND	
VOCs	ND	ND	ND	ND	

SA-PZ135I	(41.5 to 46.5 ft bgs)						
	(-5 to -10 ft NAVD88)						
	9/17/2014	9/15/2015	5/12/2016	9/29/2016	4/26/2017	4/26/2017 (Dup)	9/27/2017
1,4-DIOXANE	--	--	--	--	--	--	0.17 J+
1,1,1-TRICHLOROETHANE	**5.4**	4.6	**7.2**	ND	ND	ND	ND
1,1-DICHLOROETHANE	**35**	**27**	**60**	ND	0.86 J	0.87 J	0.32 J
1,1-DICHLOROETHENE	2.3	1.8	3.9	ND	ND	ND	ND
CHLOROETHANE	**5.3**	**5.8**	**12**	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	2.0	0.48 J	0.46 J	ND

SA-MW127S	(5 to 15 ft bgs)										
	(33 to 23 ft NAVD88)										
										12/13/2017	12/13/2017 (Dup)
VOCs										ND	ND
SA-MW127I	**(36 to 46 ft bgs)**										
	(2 to -8 ft NAVD88)										
	9/13/2014	9/22/2015	5/12/2016	9/26/2016	9/26/2016 (Dup)	12/22/2016	12/22/2016 (Dup)	4/26/2017	8/31/2017	9/20/2017	12/13/2017
1,4-DIOXANE	--	--	--	--	--	--	--	--	--	ND	--
1,1,1-TRICHLOROETHANE	ND	ND	**20**	**28**	**29**	**19**	**21**	**7.6**	1.7	1.4 J+	ND
1,1-DICHLOROETHANE	ND	4.1	**220**	**190 J-**	**180 J-**	**210**	**220**	**89**	**58**	**120 J+**	**45**
1,1-DICHLOROETHENE	ND	ND	**14**	**16**	**16**	**14**	**14**	**5.8**	3.2	**6.4 J+**	2.6
1,2,4-TRICHLOROBENZENE	ND	ND	1.2	0.78 J	0.85 J	1 J	1 J	0.90 J	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	1.5	1.2	1.2	2 J	1 J	1.1	0.53 J	0.52 J+	0.36
1,3-DICHLOROBENZENE	ND	ND	0.45 J	0.87 J	0.83 J	1 J	1 J	0.84 J	0.32 J	ND	ND
1,4-DICHLOROBENZENE	ND	ND	**6.3**	4.5	4.6	**6**	**5**	**5.2**	1.5	1.2 J+	0.63
BENZENE	ND	ND	0.64 J	0.68 J	0.68 J	0.6 J	0.6 J	ND	ND	ND	ND
CHLOROETHANE	ND	ND	**55**	**60**	**65**	**44**	**46**	**20**	**9.5 J+**	**16 J+**	**10**
ISOPROPYLBENZENE	ND	ND	0.65 J	ND	ND	ND	ND	ND	ND	0.55 J+	0.30
SA-MW127D	**(68 to 78 ft bgs)**										
	(-30 to -40 ft NAVD88)										
								4/26/2017	8/31/2017		12/13/2017
VOCs								ND	ND		ND



Legend

- Extraction Well
- Injection Well
- Monitoring Well/Piezometer
- Fence Line Area
- Offsite High Concentration Area
- Offsite Low Concentration Area
- Source Area
- Water
- 1,1 - DCA Contour ug/L
- 1,1 - DCA Contour ug/L (Inferred)
- Fence Line
- Infiltration Gallery

DRAFT

200 100 0 Feet

Orthoimage from NYS Orthos Online, 2016.

Groundwater Analytical Detections Southern/Fence Line Area NWIRP Calverton Calverton, New York

Figure 4-3

Date: 4/7/2018

Project #: 60264489

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Notes:
1. ft bgs – Feet below ground surface.
2. ft NAVD88 – Feet, North American Vertical Datum 1988.
3. All results are in µg/L (µg/L – micrograms per liter).
4. DCA – 1,1-Dichloroethane
5. (Dup) – Duplicate
6. **Bold** values indicate values exceeding criteria.
7. J, J+ or J- – Estimated value; + or - indicates estimates with a high or low bias.
8. ND – Not detected above report detection limit.
9. For historical analytical data preceding 2014, refer to the 2013 Data Summary Report.

SA-PZ140I	(44.5 to 49.5 ft bgs) (-1 to -6 ft NAVD88)			
	9/15/2014	9/15/2015	9/22/2016	9/21/2017
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND
1,1-DICHLOROETHANE	**6.0 J-**	3.7	2.3	4.8
1,1-DICHLOROETHENE	0.46 J-	0.24 J	ND	0.41 J
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	0.24 J
NAPHTHALENE	ND	ND	1.5	ND

SA-PZ142I	(40.5 to 45.5 ft bgs) (4 to -1 ft NAVD88)				
	9/15/2014	9/15/2015	9/22/2016	9/22/2016 (Dup)	9/21/2017
1,1,1-TRICHLOROETHANE	**13 J-**	**5.9**	ND	ND	**32 J+**
1,1-DICHLOROETHANE	**100 J-**	**60**	**72**	**71**	**320 J+**
1,1-DICHLOROETHENE	**8.6 J-**	4.1	4.3	4.1	**14 J+**
1,2,4-TRICHLOROBENZENE	1.2 J	1.3 J+	1.3	1.4	1.9 J+
1,2-DICHLOROBENZENE	ND	ND	ND	ND	0.77 J+
1,3-DICHLOROBENZENE	ND	ND	ND	ND	0.34 J+
1,4-DICHLOROBENZENE	ND	ND	ND	1.0	1.7 J+
CHLOROETHANE	**8.0 J-**	**9.1**	**20**	**19**	**28 J+**

SA-PZ143I	(41 to 46 ft bgs) (3 to -2 ft NAVD88)			
	9/17/2014	9/15/2015	9/22/2016	9/21/2017
1,4-DIOXANE	--	ND	--	--
1,1,1-TRICHLOROETHANE	**48**	**39**	**46**	**8.6**
1,1-DICHLOROETHANE	**410**	**340**	**280**	**130**
1,1-DICHLOROETHENE	**34**	**28**	**26**	**6.2**
1,2,4-TRICHLOROBENZENE	1.2	1.6 J+	2.5	1.0
1,2-DICHLOROBENZENE	0.65 J	0.93 J	1.3	0.36 J
1,3-DICHLOROBENZENE	ND	ND	2.6	ND
1,4-DICHLOROBENZENE	ND	ND	2.7	0.81 J
BENZENE	0.46 J	0.49 J	0.62 J	ND
CHLOROETHANE	**31**	**39**	**42**	**8.5**

SA-PZ145I	(30 to 35 ft bgs) (8 to 3 ft NAVD88)				
	9/17/2014	9/16/2015		9/27/2016	9/21/2017
1,1,1-TRICHLOROETHANE	0.99 J	ND		ND	ND
1,1-DICHLOROETHANE	**32**	**24**		**15**	**8.7**
1,1-DICHLOROETHENE	3.2	2.6		1.9	1.4
1,2,4-TRICHLOROBENZENE	0.72 J	0.92 J+		0.53 J	0.54 J
1,4-DICHLOROBENZENE	0.76 J	ND		ND	0.42 J

SA-PZ145D	(50 to 55 ft bgs) (-12 to -17 ft NAVD88)					
	9/17/2014	9/16/2015	9/16/2015 (Dup)	9/27/2016	9/21/2017	9/21/2017 (Dup)
1,1-DICHLOROETHANE	**19**	**13**	**13**	**15**	**19**	**19**
1,1-DICHLOROETHENE	1.4	0.97 J	1.0	0.97 J	0.92 J	1.2
1,2,4-TRICHLOROBENZENE	0.43 J	0.59 J+	0.76 J+	ND	ND	ND

Legend

- Extraction Well
- Injection Well
- Monitoring Well/Piezometer
- Fence Line Area
- Offsite High Concentration Area
- Offsite Low Concentration Area
- Peconic River Area
- Water
- 1,1 - DCA Contour ug/L
- 1,1 - DCA Contour ug/L (Inferred)
- Fence Line
- Infiltration Gallery

DRAFT

300 0 150 Feet

Orthoimage from NYS Orthos Online, 2016.

Groundwater Analytical Detections Southern/ Offsite High Concentration Area NWIRP Calverton Calverton, New York

Figure 4-4

Date: 4/7/2018

Project #: 60264489

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Notes:
1. ft bgs – Feet below ground surface.
2. ft NAVD88 – Feet, North American Vertical Datum 1988.
3. All results are in µg/L (µg/L – micrograms per liter).
4. DCA – 1,1-Dichloroethane
5. (Dup) – Duplicate
6. **Bold** values indicate values exceeding criteria.
7. J, J+ or J- – Estimated value; + or - indicates estimates with a high or low bias.
8. ND – Not detected above report detection limit.
9. NA – Not analyzed
10. For historical analytical data preceding 2014, refer to the 2013 Data Summary Report.

SA-PZ134I	(39 to 44 ft bgs) (-2 to -7 ft NAVD88)			
	9/13/2014	9/14/2015	9/22/2016	9/27/2017
1,4-DIOXANE	--	--	--	0.12 J+
1,1-DICHLOROETHANE	ND	ND	ND	**27**
1,1-DICHLOROETHENE	ND	ND	ND	2.0
1,2-DICHLOROBENZENE	ND	ND	ND	0.22 J
1,4-DICHLOROBENZENE	ND	ND	ND	0.91 J
CHLOROETHANE	ND	ND	ND	4.6
NAPHTHALENE	ND	1.6 J+	ND	ND

SA-MW128I	(30 to 40 ft bgs) (9 to -1 ft NAVD88)				
	9/16/2014	9/14/2015	9/26/2016	9/27/2017	9/27/2017 (Dup)
1,4-DIOXANE	--	--	--	0.20 J	0.12 J
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	2.7	2.0	1.4 J+	1.2	1.0
1,1-DICHLOROETHENE	0.40 J	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	0.44 J	ND	ND	ND	ND
SA-MW128D	**(58 to 68 ft bgs) (-20 to -30 ft NAVD88)**				
	9/16/2014	9/15/2015	9/26/2016	9/27/2017	
1,4-DIOXANE	--	--	--	0.27	
1,1-DICHLOROETHANE	3.3	1.4	ND	0.62 J	
1,1-DICHLOROETHENE	0.22 J	ND	ND	ND	
NAPHTHALENE	ND	3.6 J+	ND	ND	

SA-MW129S	(19.5 to 29.5 ft bgs) (30 to 20 ft NAVD88)				
	9/22/2014	9/24/2015	9/28/2016	9/20/2017	9/21/2017
1,4-DIOXANE	--	--	--	--	ND
VOCs	ND	ND	ND	ND	--
SA-MW129I	**(50 to 60 ft bgs) (0 to -10 ft NAVD88)**				
	9/19/2014	9/24/2015	9/22/2016	9/20/2017	
1,4-DIOXANE	--	--	--	0.55	
1,1-DICHLOROETHANE	ND	ND	ND	**7.6**	
1,1-DICHLOROETHENE	ND	ND	ND	0.60 J	
SA-MW129D	**(80 to 90 ft bgs) (-30 to -40 ft NAVD88)**				
	9/19/2014	9/24/2015	9/22/2016	9/20/2017	
1,4-DIOXANE	--	--	--	0.096 J	
1,1-DICHLOROETHANE	0.68 J	0.95 J	0.86 J	ND	
1,1-DICHLOROETHENE	0.63 J	ND	ND	ND	

SA-PZ172I	(43.5 to 48.5 ft bgs) (1 to -4 ft NAVD88)			
	9/15/2014	9/15/2015	9/22/2016	9/21/2017
1,1,1-TRICHLOROETHANE	**16 J+**	ND	ND	4.2
1,1-DICHLOROETHANE	**110 J+**	**71**	**53**	**75**
1,1-DICHLOROETHENE	**8.9 J+**	4.2	3.7	3.5
1,2,4-TRICHLOROBENZENE	1.8 J+	1.7 J+	1.2	1.2
1,2-DICHLOROBENZENE	0.40 J+	ND	ND	0.35 J
1,3-DICHLOROBENZENE	R	ND	ND	ND
1,4-DICHLOROBENZENE	1.1 J+	ND	ND	1.3
CHLOROETHANE	**6.8 J+**	**5.5**	2.8	**9.0**

SA-PZ144I	(45 to 50 ft bgs) (-6 to -11 ft NAVD88)			
	9/16/2014	9/17/2015	9/27/2016	9/25/2017
1,1-DICHLOROETHANE	2.8	2.4	1.9 J	2.1 J+
1,1-DICHLOROETHENE	0.46 J	0.33 J	ND	1.1 J+
1,4-DICHLOROBENZENE	0.39 J	ND	ND	0.27 J+

SA-PZ171I	(41.5 to 46.5 ft bgs) (2 to -3 ft NAVD88)			
	9/15/2014	9/15/2015	9/22/2016	9/21/2017
1,1,1-TRICHLOROETHANE	**45 J-**	**25**	**53**	**65**
1,1-DICHLOROETHANE	**150 J-**	**220**	**330**	**570**
1,1-DICHLOROETHENE	**29 J-**	**18**	**32**	**32**
1,2,4-TRICHLOROBENZENE	2.5 J	2.2 J+	1.6	2.0
1,2-DICHLOROBENZENE	0.96 J-	0.62 J	0.94 J	1.6
1,3-DICHLOROBENZENE	0.47 J-	ND	ND	0.70 J
1,4-DICHLOROBENZENE	2.1 J-	ND	ND	2.9
BENZENE	0.48 J-	0.29 J	0.72 J	ND
CHLOROETHANE	**27 J-**	**15**	**38**	**39**
ISOPROPYLBENZENE	ND	ND	ND	1.0
NAPHTHALENE	0.31 J	ND	ND	ND

SA-MW132S	(4 to 14 ft bgs) (30 to 20 ft NAVD88)				
		9/18/2014	9/16/2015	9/28/2016	9/21/2017
1,1,1-TRICHLOROETHANE		2.7	**32**	ND	ND
1,1-DICHLOROETHANE		**29**	**250**	**8.0**	**7.3**
1,1-DICHLOROETHENE		2.3	**23**	1.2	1.4
BENZENE		ND	0.39 J	ND	ND
CHLOROETHANE		1.6 J	**22**	ND	ND
SA-MW132I	**(27 to 37 ft bgs) (7 to -3 ft NAVD88)**				
	5/20/2014	9/18/2014	9/16/2015	9/28/2016	9/21/2017
1,1,1-TRICHLOROETHANE	**100**	**83**	**46**	ND	ND
1,1-DICHLOROETHANE	**660**	**500**	**400**	2.8	2.3
1,1-DICHLOROETHENE	**60**	**60**	**46**	1.1	0.92 J
1,2,4-TRICHLOROBENZENE	0.84 J	0.94 J	1.1 J+	ND	ND
1,2-DICHLOROBENZENE	0.38 J	0.54 J	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
BENZENE	1.1	1.1	1.0	ND	ND
CHLOROETHANE	**33 J**	**28**	**24**	ND	ND
ISOPROPYLBENZENE	ND	0.43 J	0.27 J	ND	ND
NAPHTHALENE	ND	ND	ND	ND	ND

SA-MW184S	(7 to 17 ft bgs) (34 to 24 ft NAVD88)	
	4/27/2017	9/21/2017
1,1-DICHLOROETHANE	0.71 J+	1.2
1,1-DICHLOROETHENE	ND	0.77 J
SA-MW184I	**(37 to 47 ft bgs) (4 to -6 ft NAVD88)**	
	4/27/2017	9/21/2017
1,1-DICHLOROETHANE	**6.1 J+**	**5.9**
1,1-DICHLOROETHENE	4.4 J+	3.6
CIS-1,2-DICHLOROETHENE	4.6 J+	4.1
TRICHLOROETHENE	**27 J+**	**34**

SA-MW186S	(9.5 to 19.5 ft bgs) (33 to 23 ft NAVD88)		
	4/27/2017	9/21/2017	9/21/2017 (Dup)
VOCs	NX	NX	NX

SA-MW185S	(10 to 20 ft bgs) (30 to 20 ft NAVD88)	
	4/27/2017	9/21/2017
VOCs	ND	ND
SA-MW185I	**(32 to 42 ft bgs) (8 to -2 ft NAVD88)**	
	4/27/2017	9/21/2017
1,1-DICHLOROETHANE	0.87 J+	ND

SA-PZ122I	(39 to 49 ft bgs) (2 to -8 ft NAVD88)			
	9/19/2014	9/22/2015	9/27/2016	9/25/2017
1,4-DIOXANE	--	--	--	ND
VOCs	ND	ND	ND	ND
SA-PZ122D	**(122 to 132 ft bgs) (-81 to -91 ft NAVD88)**			
	9/19/2014	9/22/2015	9/28/2016	9/25/2017
1,4-DIOXANE	--	--	--	1.0 J+
1,1-DICHLOROETHANE	1.4	1.2	1.3 J	1.5 J+

SA-PZ123S	(7 to 17 ft bgs) (27 to 17 ft NAVD88)				
	9/22/2014	9/22/2015	9/27/2016		9/25/2017
1,4-DIOXANE	--	--	--		ND
VOCs	NX	ND	ND		NX
SA-PZ123I1	**(32 to 42 ft bgs) (3 to -7 ft NAVD88)**				
	9/22/2014	9/22/2015	9/27/2016	9/27/2016 (Dup)	9/25/2017
1,4-DIOXANE	--	--	--	--	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	**16**	**10**	**6.1**	**6.0**	0.57 J+
1,1-DICHLOROETHENE	2.0	0.93 J	0.57 J	0.57 J	ND
SA-PZ123I	**(70 to 80 ft bgs) (-35 to -45 ft NAVD88)**				
	9/22/2014	9/22/2015	9/27/2016		9/25/2017
1,4-DIOXANE	--	--	--		3.4 J+
1,1,1-TRICHLOROETHANE	2.1	ND	ND		ND
1,1-DICHLOROETHANE	**63**	**71**	**50**		**36**
1,1-DICHLOROETHENE	**7.9**	**7.1**	4.8 J		2.7
1,2,4-TRICHLOROBENZENE	ND	0.39 J	ND		0.38 J
1,4-DICHLOROBENZENE	ND	ND	ND		0.42 J
CHLOROETHANE	R	1.2 J	ND		2.4

SA-MW131I	(30 to 40 ft bgs) (6 to -4 ft NAVD88)					
	9/18/2014		9/16/2015	9/28/2016	9/28/2016 (Dup)	9/26/2017
1,1-DICHLOROETHANE	**6.9**		2.9	0.79 J	0.91 J	ND
1,1-DICHLOROETHENE	1.1		0.65 J	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND		0.50 J+	ND	ND	ND
SA-MW131D	**(60 to 70 ft bgs) (-24 to -34 ft NAVD88)**					
	9/18/2014	9/18/2014 (Dup)	9/16/2015	9/28/2016		9/26/2017
1,4-DIOXANE	--	--	1.9 J	--		--
1,1-DICHLOROETHANE	**32**	**32**	**35**	**32**		**36**
1,1-DICHLOROETHENE	3.0	2.8	2.7	2.2		1.3
CHLOROETHANE	R	R	ND	0.71 J		ND

Groundwater Treatment Building
EW1
EW2
EW3
IW2
IW2
50
500
River Rd
Connecticut Ave
Donahue Pond

Legend

- Extraction Well
- Injection Well
- Monitoring Well/Piezometer
- Fence Line Area
- Offsite High Concentration Area
- Offsite Low Concentration Area
- Peconic River Area
- Water
- 1,1 - DCA Contour ug/L
- 1,1 - DCA Contour ug/L (Inferred)
- Fence Line
- Infiltration Gallery

DRAFT

300 150 0 Feet

Orthoimage from NYS Orthos Online, 2016.

Groundwater Analytical Detections Southern/ Offsite Low Concentration Area NWIRP Calverton Calverton, New York

Figure 4-5

Date: 4/7/2018

Project #: 60264489

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Notes:
1. ft bgs – Feet below ground surface.
2. ft NAVD88 – Feet, North American Vertical Datum 1988.
3. Surface water and groundwater results are in µg/L (µg/L – micrograms per liter).
4. DCA – 1,1-Dichloroethane
5. (Dup) – Duplicate
6. **Bold** values indicate values exceeding criteria.
7. J – Estimated value
8. ND – Not detected above report detection limit.
9. NX – No primary site contaminants detected; other volatile organic compounds detected below screening criteria.
10. For historical analytical data preceding 2014, refer to the 2013 Data Summary Report.
11. R - Rejected value not reported

River Rd

Connecticut Ave

Peconic River

50

SA-SW125												
	5/20/2014	9/12/2014	4/24/2015	4/24/2015 (Dup)	9/18/2015		5/11/2016	9/26/2016	9/26/2016 (Dup)	4/27/2017	4/27/2017 (Dup)	9/26/2017
VOCs	NX	ND	ND	ND	NX		NX	ND	ND	NX	NX	ND
SA-PZ125	**(3 to 6 ft bgs)**											
	5/20/2014	9/12/2014	4/24/2015	4/24/2015 (Dup)	9/18/2015	9/18/2015 (Dup)	5/11/2016	9/26/2016	9/26/2016 (Dup)	4/27/2017	4/27/2017 (Dup)	9/26/2017
VOCs	ND	ND	ND	ND	ND	NX	NX	ND	ND	NX	NX	NX

SA-SW204								
	5/20/2014	9/12/2014	4/24/2015	9/18/2015	5/11/2016	9/26/2016	4/27/2017	9/26/2017
1,1-DICHLOROETHANE	ND	0.67 J	ND	0.52 J	0.47 J	ND	ND	0.73 J+

SA-PZ147	(3 to 6 ft bgs)							
	5/20/2014	9/12/2014	4/24/2015	9/18/2015	5/11/2016	9/26/2016	4/27/2017	9/26/2017
1,1-DICHLOROETHANE	**53**	ND	43 J	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	6.8	ND	6.4 J	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	0.60 J	ND	0.47 J	ND	ND	ND	ND	ND

SA-PZ166I	(60 to 80 ft bgs) (-30 to -50 ft NAVD88)			
	9/19/2014	9/17/2015	9/22/2016	9/25/2017
1,4-DIOXANE	--	--	--	3.4 J+
1,1-DICHLOROETHANE	4.8	7.1	33	30
1,1-DICHLOROETHENE	1.0	1.2	4.6	3.2
1,4-DICHLOROBENZENE	ND	ND	ND	0.27 J
CHLOROETHANE	R	ND	0.87 J	ND

SA-PZ148	(3 to 6 ft bgs)							
	5/20/2014	9/12/2014	4/24/2015	9/18/2015	5/11/2016	9/26/2016	4/27/2017	9/26/2017
VOCs	NX	ND	ND	ND	NX	ND	ND	ND

SA-PZ118S	(6 to 16 ft bgs) (23 to 13 ft NAVD88)					
	9/19/2014	9/17/2015	9/22/2016		9/25/2017	9/25/2017 (Dup)
1,4-DIOXANE	--	--	--		6.3 J	10 J
1,1,1-TRICHLOROETHANE	ND	ND	ND		0.57 J	0.30 J
1,1-DICHLOROETHANE	17	6.2	0.90 J		**61**	**62**
1,1-DICHLOROETHENE	4.8	1.5	ND		6.0	7.8
1,2,4-TRICHLOROBENZENE	ND	ND	ND		0.45 J	0.46 J
1,4-DICHLOROBENZENE	ND	ND	ND		0.46 J	0.51 J
CHLOROETHANE	R	ND	ND		3.1 J	4.4 J
VINYL CHLORIDE	ND	ND	ND		0.26 J	ND
SA-PZ118I	**(50 to 60 ft bgs) (-21 to -31 ft NAVD88)**					
	9/19/2014	9/17/2015	9/22/2016	9/22/2016 (Dup)	9/25/2017	
1,4-DIOXANE	--	--	--	--	ND	
VOCs	ND	ND	ND	ND	ND	

SA-SW124													
	5/20/2014	5/20/2014 (Dup)	9/12/2014	9/12/2014 (Dup)	4/24/2015	9/18/2015	9/18/2015 (Dup)	5/11/2016	9/26/2016	4/27/2017	9/26/2017	9/26/2017 (Dup)
1,1-DICHLOROETHANE	ND	0.59 J	2.8	2.8	0.60 J	2.8	3.0	0.87 J	2.2 J-	0.47 J	3.0 J+	3.1 J+
1,1-DICHLOROETHENE	ND	ND	0.35 J	0.38 J	ND	0.34 J	0.40 J	ND	R	ND	ND	ND
SA-PZ124	**(3 to 6 ft bgs)**											
	5/20/2014	5/20/2014 (Dup)	9/12/2014	9/12/2014 (Dup)	4/24/2015	9/18/2015		5/11/2016	9/26/2016	4/27/2017	9/26/2017	9/26/2017 (Dup)
1,1,1-TRICHLOROETHANE	1.7	1.8	1.3	1.4	0.83 J	ND		ND	R	ND	ND	ND
1,1-DICHLOROETHANE	**62**	**65**	44	44	50 J	27		18	14 J-	6.4	14	17
1,1-DICHLOROETHENE	6.2	6.5	4.6	4.8	4.9 J	2.8		2.0	1.6 J	0.88 J	2.0 J	0.91 J
1,2,4-TRICHLOROBENZENE	0.85 J	0.78 J	0.62 J	0.61 J	0.70 J	ND		ND	R	0.56 J	0.57 J	0.46 J
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND		ND	R	ND	0.16 J	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	0.52 J	ND		0.36 J	R	0.33 J	0.33 J	0.34 J
CHLOROETHANE	ND	ND	ND	ND	2.1 J	ND		2.1	2.2 J	ND	2.2	ND

SA-SW201									
	5/20/2014	9/12/2014	4/24/2015	9/18/2015	5/11/2016	5/11/2016 (Dup)	9/26/2016	4/27/2017	9/26/2017
1,1-DICHLOROETHANE	ND	ND	ND	1.0	1.0	1.2	ND	0.75 J	ND

Legend

- A Monitoring Well/Piezometer
- # Surface Water Sampling Location
- 1,1 - DCA Contour ug/L
- 1,1 - DCA Contour ug/L (Inferred)
- Fence Line
- Offsite Low Concentration Area
- Peconic River Area
- Water

DRAFT

200 100 0 Feet

Orthoimage from NYS Orthos Online, 2016.

Analytical Detections Southern/Peconic River Area NWIRP Calverton Calverton, New York

Figure 4-6

Date: 4/7/2018

Project #: 60264489

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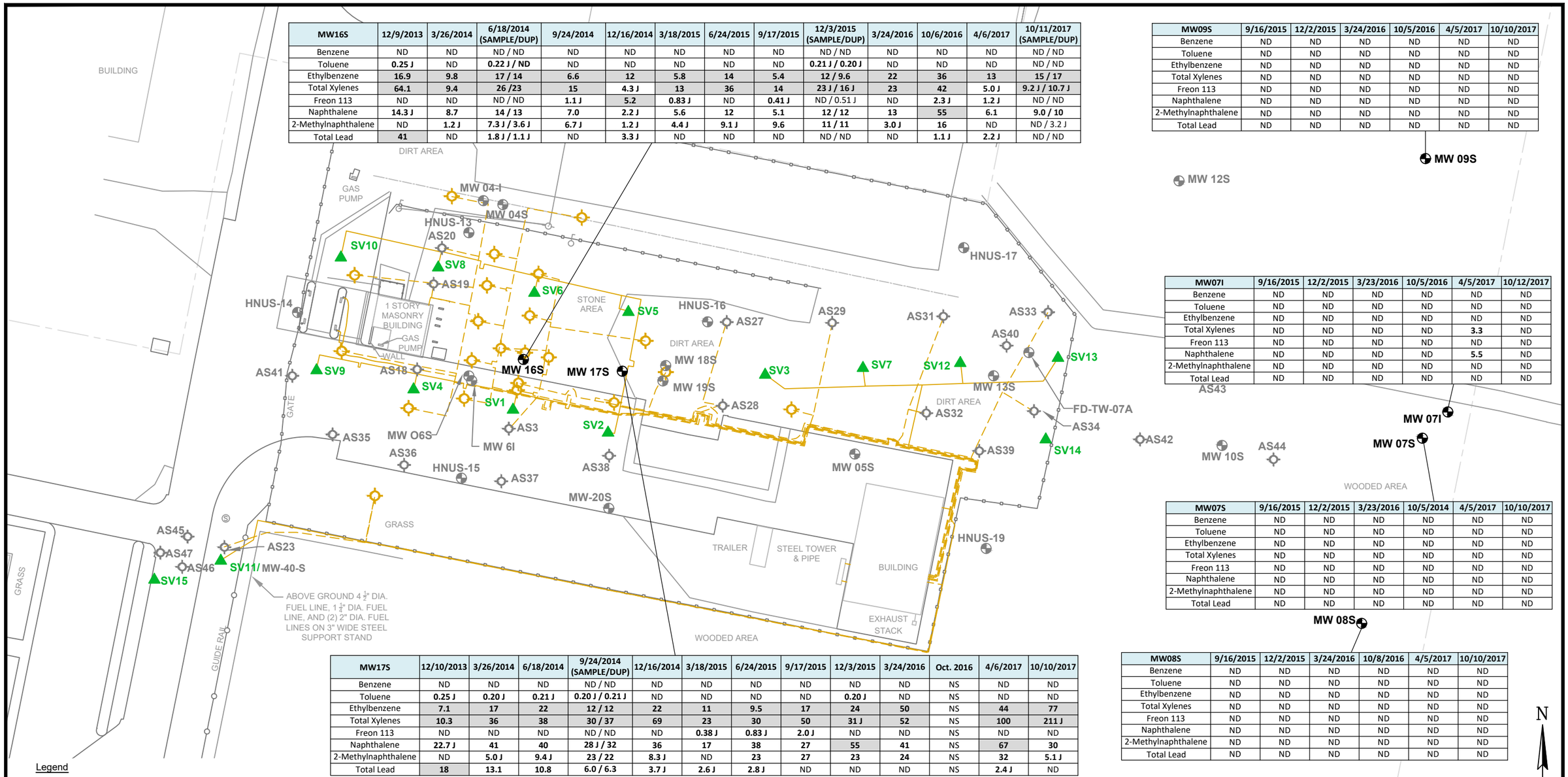

MW16S	12/9/2013	3/26/2014	6/18/2014 (SAMPLE/DUP)	9/24/2014	12/16/2014	3/18/2015	6/24/2015	9/17/2015	12/3/2015 (SAMPLE/DUP)	3/24/2016	10/6/2016	4/6/2017	10/11/2017 (SAMPLE/DUP)
Benzene	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND
Toluene	**0.25 J**	ND	**0.22 J / ND**	ND	ND	ND	ND	ND	**0.21 J / 0.20 J**	ND	ND	ND	ND / ND
Ethylbenzene	**16.9**	**9.8**	**17 / 14**	**6.6**	**12**	**5.8**	**14**	**5.4**	**12 / 9.6**	**22**	**36**	**13**	**15 / 17**
Total Xylenes	**64.1**	**9.4**	**26 /23**	**15**	**4.3 J**	**13**	**36**	**14**	**23 J / 16 J**	**23**	**42**	**5.0 J**	**9.2 J / 10.7 J**
Freon 113	ND	ND	ND / ND	**1.1 J**	**5.2**	**0.83 J**	ND	**0.41 J**	ND / 0.51 J	ND	**2.3 J**	**1.2 J**	ND / ND
Naphthalene	**14.3 J**	**8.7**	**14 / 13**	**7.0**	**2.2 J**	**5.6**	**12**	**5.1**	**12 / 12**	**13**	**55**	**6.1**	**9.0 / 10**
2-Methylnaphthalene	ND	**1.2 J**	**7.3 J / 3.6 J**	**6.7 J**	**1.2 J**	**4.4 J**	**9.1 J**	**9.6**	**11 / 11**	**3.0 J**	**16**	ND	ND / 3.2 J
Total Lead	**41**	ND	**1.8 J / 1.1 J**	ND	**3.3 J**	ND	ND	ND	ND / ND	ND	**1.1 J**	**2.2 J**	ND / ND

MW09S	9/16/2015	12/2/2015	3/24/2016	10/5/2016	4/5/2017	10/10/2017
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
Total Lead	ND	ND	ND	ND	ND	ND

MW07I	9/16/2015	12/2/2015	3/23/2016	10/5/2016	4/5/2017	10/12/2017
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	**3.3**	ND
Freon 113	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	**5.5**	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
Total Lead	ND	ND	ND	ND	ND	ND

MW07S	9/16/2015	12/2/2015	3/23/2016	10/5/2014	4/5/2017	10/10/2017
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
Total Lead	ND	ND	ND	ND	ND	ND

MW08S	9/16/2015	12/2/2015	3/24/2016	10/8/2016	4/5/2017	10/10/2017
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND
Freon 113	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND
Total Lead	ND	ND	ND	ND	ND	ND

MW17S	12/10/2013	3/26/2014	6/18/2014	9/24/2014 (SAMPLE/DUP)	12/16/2014	3/18/2015	6/24/2015	9/17/2015	12/3/2015	3/24/2016	Oct. 2016	4/6/2017	10/10/2017
Benzene	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	NS	ND	ND
Toluene	**0.25 J**	**0.20 J**	**0.21 J**	**0.20 J / 0.21 J**	ND	ND	ND	ND	**0.20 J**	ND	NS	ND	ND
Ethylbenzene	**7.1**	**17**	**22**	**12 / 12**	**22**	**11**	**9.5**	**17**	**24**	**50**	NS	**44**	**77**
Total Xylenes	**10.3**	**36**	**38**	**30 / 37**	**69**	**23**	**30**	**50**	**31 J**	**52**	NS	**100**	**211 J**
Freon 113	ND	ND	ND	ND / ND	ND	**0.38 J**	**0.83 J**	**2.0 J**	ND	ND	NS	ND	ND
Naphthalene	**22.7 J**	**41**	**40**	**28 J / 32**	**36**	**17**	**38**	**27**	**55**	**41**	NS	**67**	**30**
2-Methylnaphthalene	ND	**5.0 J**	**9.4 J**	**23 / 22**	**8.3 J**	ND	**23**	**27**	**23**	**24**	NS	**32**	**5.1 J**
Total Lead	**18**	**13.1**	**10.8**	**6.0 / 6.3**	**3.7 J**	**2.6 J**	**2.8 J**	ND	ND	ND	NS	**2.4 J**	ND

Legend

- Monitoring Well (Gray Not Currently Sampled)
- Air Sparge Well - Not Active As Of December 2011
- Air Sparge Well - Not Active As Of November 2013
- Vapor Extraction Well - Not Active As Of November 2013
- Former AS Piping
- Former SVE Piping

Notes:

DUP - Duplicate Sample

NS - Not sampled due to the presence of LNAPL

ND - Not detected above laboratory detection limit (DL).

J - Estimated value

All values presented in micrograms per liter (ug/L).

Bold values indicate detections. Shading indicates detections in exceedance of the 2013 Proposed Closeout Goal.

2013 Proposed Closeout Goals (ug/L)	
Benzene	5
Toluene	5
Ethylbenzene	5
Total Xylenes	5
Freon 113	5
Naphthalene	50
2-Methylnaphthalene	50
Total Lead	15

Note: Piping layout is shown here for general purposes only. See mechanical and process drawings for detailed piping layout. Piping was removed in August 2015.

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180 Gordon Dr. Suite 110
Exton, PA 19341

SCALE IN FEET
0 50

File: CV-2017.dwg
Date: 11/2/2017

FIGURE 4
GROUNDWATER CONCENTRATION MAP
MONITORING WELLS - OCT 2017 SEMI-ANNUAL
DECEMBER 2013 - OCTOBER 2017

NWIRP CALVERTON -
FORMER FUEL DEPOT - SITE 7
CALVERTON, NEW YORK

SV4	12/12/2013	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015 (SAMPLE/DUP)	9/17/2015	12/3/2015	3/23/2016	10/6/2016 (SAMPLE/DUP)	4/6/2017	10/11/2017
Benzene	ND	ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND /ND	ND	ND	ND	ND / ND	ND	ND
Ethylbenzene	ND	1.9	1.7 J	4.6 J	5.2	8.2	8.7 / 8.8	11	6.9	4.9 J	12 / 12	6.1	7.6
Total Xylenes	5.0	2.5	1.6 J	11	14	29	43 / 43	83	41	25	103 / 99	46	76
Freon 113	ND	ND	0.45 J	2.6 J	0.41 J	0.77 J	1.6 J / 1.4 J	1.0 J	0.44 J	ND	5.8 / 6.4	0.84 J	2.10 J
Naphthalene	17.4 J	7.0	7.1	14	11	7.4	9.3 / 11	12	5.3	ND	10 J / 5.9 J	19	16
2-Methylnaphthalene	ND	6.7 J	4.3 J	11	4.3 J	5.9 J	7.7 J / 7.5 J	11	6.6 J	ND	4.6 J / 4.2J	ND	9.7
Total Lead	2.5	ND	1.1 J	ND	0.906 J	ND	ND / ND	ND	ND	ND	5.0 J / ND	3.6 J	ND

SV13	12/11/2013	3/26/2014	6/18/2014	9/24/2014	12/16/2014 (SAMPLE/DUP	3/17/2015	6/24/2015	9/16/2015	12/2/2015	3/23/2016	10/5/2016	4/5/2017 (SAMPLE/DUP)	10/11/2017
Benzene	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND
Toluene	ND	1.4	0.89 J	1.1 J	0.25 J / 0.21 J	1.0 J	0.72 J	0.30 J	ND	0.33 J	ND	ND / ND	ND
Ethylbenzene	0.40 J	8.7	8.5	9.2	6.2 / 6.2	15	7.9	6.1	1.8 J	12	3.2 J	3.9 J / 4.4 J	12
Total Xylenes	2.7 J	23	18	25	13 / 13	28	18	17	2.7 J	22	4.2 J	11 / 12	56
Freon 113	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND
Naphthalene	ND	4.4	6.6	7.0	4.0 J / 4.8 J	7.5	6.6	4.9 J	ND	ND	0.70 J	5.0 J / 5.8	15
2-Methylnaphthalene	ND	ND	1.0 J	9.7	ND / ND	ND	ND	ND	ND	ND	ND	1.2 J / 15 J	ND
Total Lead	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND	ND	ND / ND	ND

SV2	12/12/2013 (SAMPLE/DUP)	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015 (SAMPLE/DUP)	6/24/2015	9/17/2015	12/3/2015	3/24/2016 (SAMPLE/DUP)	10/6/2016	4/6/2017	10/10/2017
Benzene	ND / ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	ND	ND
Toluene	1.4 / 1.4	0.77 J	1.0 J	1.6 J	1.2 J	0.98 J / 0.88 J	1.4 J	1.4 J	ND	ND / 0.38 J	ND	ND	ND
Ethylbenzene	98.9 / 102	140	130	140	160	160 / 170	210	220	310	210 / 170	390	98	120
Total Xylenes	645 J / 626	275	392	726	838	921 / 866	1282	1630	1443	510 J / 339 J	1,949	356	785
Freon 113	ND / ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	3.4 J / 3.5 J	ND	ND	ND
Naphthalene	28.2 J / 29.6 J	24	26	37	33	33 / 37	36	51	71	38 / 41	66	23	33
2-Methylnaphthalene	20.2 / 20.4	42	58	83	70	60 / 62	56	69	ND	40 / 45	52	ND	21
Total Lead	26 / 33	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND / ND	ND	3.0 J	ND

SV15	12/12/2013	3/27/2014	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015	9/17/2015	12/2/2015	3/23/2016	10/5/2016	4/6/2017	10/11/2017
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	0.77 J	0.63 J	0.39 J	0.40 J	ND	ND	ND	ND	ND	0.62 J	ND	1.4 J	2.6 J
Naphthalene	ND	1.2	ND	ND	0.63 J	ND	ND	0.27 J	ND	ND	ND	ND	0.67
2-Methylnaphthalene	9.8	9.0 J	ND	1.4	4.0 J	ND	ND	ND	ND	3.4 J	ND	ND	ND
Total Lead	1.1 J	ND	1.7 J	ND	ND	15.4	ND	ND	ND	ND	ND	ND	ND

SV11/MW40S	12/12/2013	3/27/2014 (SAMPLE/DUP	6/18/2014	9/24/2014	12/16/2014	3/18/2015	6/24/2015	9/17/2015 (SAMPLE/DUP)	12/2/2015	3/23/2016	10/5/2016	4/6/2017	10/11/2017
Benzene	ND	ND / ND	ND	ND	ND	ND	ND	ND / ND	ND	ND	ND	ND	ND
Toluene	3.2 J	0.64 J / 0.48 J	0.28 J	0.78 J	ND	ND	0.27 J	0.47 J / 0.33 J	0.21 J	0.24 J	ND	ND	ND
Ethylbenzene	1.8 J	1.2 / 0.86 J	0.27 J	0.54 J	0.21 J	0.27 J	0.20 J	0.93 J / 0.68 J	0.36 J	0.24 J	0.50 J	ND	ND
Total Xylenes	9.1 J	8.5 / 6.8	1.4 J	5.9 J	2.0 J	1.2 J	1.7 J	10.4 J / 7.5 J	2.8 J	1.4 J	2.2 J	0.24 J	1.77 J
Freon 113	137	52 J / 36 J	31	32	15	8.8	11	38 J / 28 J	15	11	3.9 J	4.2 J	2.6 J
Naphthalene	23.6 J	9.1 / 7.9	ND	6.9	2.6 J	ND	ND	9.6 / 7.3	ND	ND	4.3 J	ND	2.7 J
2-Methylnaphthalene	ND	2.6 J / 2.5 J	ND	ND	ND	ND	ND	3.7 J / 3.6 J	1.1 J	ND	ND	ND	ND
Total Lead	9.5	ND / ND	ND	ND	ND	ND	ND	ND /ND	ND	ND	ND	ND	ND

Legend

- Monitoring Well (Gray Not Currently Sampled)
- Air Sparge Well - Not Active As Of December 2011
- Air Sparge Well - Not Active As Of November 2013
- Vapor Extraction Well - Not Active As Of November 2013
- Former AS Piping
- Former SVE Piping

Notes:

DUP - Duplicate Sample
ND - Not detected above laboratory detection limit (DL).
J - Estimated value
All values presented in micrograms per liter (ug/L).
Bold values indicate detections. Shading indicates detections in exceedance of the 2013 Proposed Closeout Goal.

2013 Proposed Closeout Goals (ug/L)	
Benzene	5
Toluene	5
Ethylbenzene	5
Total Xylenes	5
Freon 113	5
Naphthalene	50
2-Methylnaphthalene	50
Total Lead	15

Note: Piping layout is shown here for general purposes only. See mechanical and process drawings for detailed piping layout. Piping was removed in August 2015.

KGS
180 Gordon Dr. Suite 110
Exton, PA 19341

SCALE IN FEET
0 50

File: CV-2017.dwg
Date: 11/2/2017

FIGURE 5
GROUNDWATER CONCENTRATION MAP
SVE WELLS - OCT 2017 SEMI-ANNUAL
DECEMBER 2013 - OCTOBER 2017

NWIRP CALVERTON -
FORMER FUEL DEPOT - SITE 7
CALVERTON, NEW YORK