LETTER WORK PLAN
2020 SUPPLEMENTAL FACILITY WIDE
PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION
NWIRP CALVERTON, NEW YORK

Introduction

The Navy is conducting a supplemental Facility Wide Site Inspection (SI) to evaluate the presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and soil at Naval Weapons Industrial Reserve Plant (NWIRP) Calverton, New York (Figures 1 and 2). This letter work plan was prepared by Tetra Tech, Inc. under the Naval Facilities Engineering Command Atlantic Comprehensive Long-Term Environmental Action Navy under Contract Number N62470-16-D-9008 Task Order WE05.

In 2019, the SI began at 12 Areas of Concern (AOCs) that were identified in the 2018 draft Preliminary Assessment (PA) for PFAS. Each of these AOCs may have been impacted by PFAS through the discharge of aqueous film-forming foams (AFFF) stored in fire suppression systems, activities associated with training, or responses to aircraft crashes at the facility. At AOCs -01 through -05, AOC-07, and AOC-08, 2019 results for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in three or more downgradient groundwater samples were greater than the calculated United States (U.S.) Environmental Protection Agency (EPA) Regional Screening Level (RSL) of 40 nanograms per liter (ng/L) and the results indicated that releases occurred in these areas. These seven AOCs have been consolidated into areas based on the proximity to one another as presented in the table below and shown on Figure 2.

AOC	Building / Activity	Area Name
01	Building 06-15 (168) – Aircraft Paint Hangar	Aircraft Paint Hangars (Figure 4)
02	Buildings 06-66 (318) – New Aircraft Paint Hangar	
03	Former Building 06-75 – Paint Stripper Building	
04	Former Building 06-79 – Noise Suppression Hush House	Noise Suppression House (Figure 5)
05	Building 06-78 (327) – Aircraft Fuel Storage Terminal	Fuel Storage Terminal (Figure 6)
07	Building 07-04 (283) – Flight Emergency Shelter (Fire House)	Flight Emergency Shelter (Figures 7 and 8)
08	Equipment Training Area	

Supplemental investigation at these four areas will be conducted in 2020 to evaluate the presence or absence of PFAS in soil, to further evaluate groundwater flow, and to evaluate whether releases from these areas are impacting water quality at downgradient AOCs.

The 2019 results for PFOA and PFOS at AOC-06 and AOCs -09 through -12 did not indicate that a release has occurred as a result of previous activities, but further investigation is warranted to determine if further action is required at these areas.

AOC	Name	Rationale
06	Buildings 81-01 (ASTF Building) and 81-02 through 81-05 (Hangars 5, 6, 7, and 8)	In one shallow (water table) groundwater sample located side gradient of the building (AOC06-TW04 on Figure 8), PFOS at a concentration of 70.4 ng/L exceeded the calculated EPA RSL of 40 ng/L. This location may have been impacted by activities conducted in the area of the Flight Emergency Shelter rather than activities related to the AFFF suppression system at the building. Groundwater downgradient from AOC-06 will be evaluated through the investigations at Flight Emergency Shelter area.
09	Jet Fuel Spill Site	AFFF was reportedly used to address a jet fuel spill along the western runway. Impacted soil was excavated and removed from the runway soon after the incident occurred in 1985. Results at AOC-09 were all below the calculated EPA RSL. Further investigation south of the runway is warranted to confirm that a source of PFAS is not present in this area that would impact potential receptors to the south of the facility (Figure 9).
10	F-111 Aircraft Crash Site	Two crashes occurred along the eastern runway but there was no record that AFFF was used to address these crashes. In 2019, groundwater flow appeared to be in a more southernly direction in the area of AOC-10 and to the east in the area of AOC-11 (Figure 3) than previous (1997) studies indicated. Further investigation is warranted to evaluate water quality downgradient of AOCs-10 and -11. In one deep (54 to 59 feet bgs) groundwater sample located upgradient of AOC-10, PFOS at a concentration of 56.9 ng/L exceeded the calculated EPA RSL (AOC10-TW02 on Figure 10). In one deep (42 to 47 feet bgs) groundwater sample located upgradient of AOC-11, PFOA at a concentration of 46.7 ng/L exceeded the calculated EPA RSL (AOC11-TW01 on Figure 10). Groundwater at this location may have been impacted by previous activities conducted at the Noise Suppression House, which is located upgradient of AOCs -10 and -11.
11	EF-111 Aircraft Crash Site	
12	Northeast Pond Disposal Area	This disposal area could have received material containing PFAS but there was no record of this occurring. In one deep (71 to 76 feet bgs) groundwater sample located upgradient of AOC-12, PFOA at a concentration of 43.4 ng/L exceeded the calculated EPA RSL (AOC12-TW03 on Figure 8). Groundwater at this location may have been impacted by previous activities conducted at the Flight Emergency Shelter, which is located upgradient of AOC-12. AOC-12 will be evaluated through the investigation at Flight Emergency Shelter area.

A description and objectives for specific areas throughout the facility and overall for the facility wide groundwater are presented below.

Aircraft Paint Hangars

The two aircraft paint hangars and paint stripper building were each equipped with an AFFF fire suppression system. The fire suppression systems at the two aircraft paint hangars were tested during the 1980-1981 timeframe and AFFF was released within the structures. The two aircraft paint hangar buildings are in place; however, the AFFF was removed prior to the transfer of the property. The paint stripper building was demolished in 1995.

- Evaluate groundwater for PFAS downgradient of 2019 AOC-03 vertical profile borings, and if present, evaluate whether PFAS may be impacting downgradient groundwater at the Noise Suppression House.
- Evaluate groundwater for PFAS downgradient of the former leach field, and if present, evaluate whether PFOA and PFOS are at concentrations greater the calculated EPA RSL.

Noise Suppression House

The noise suppression hush house was equipped with an AFFF fire suppression system. The building and associated fire suppression system was demolished in 1995 but the concrete pad remains in place.

- Evaluate whether PFAS has impacted soils below the concrete pad via cracks and seams, and if present, evaluate whether the concrete pad is limiting the migration of these chemicals into subsurface soils.
- Evaluate whether PFAS has potentially flowed off the concrete pad and into the soil, and if present, evaluate whether PFAS has migrated into subsurface soil.
- Evaluate PFAS in groundwater upgradient of the noise suppression house and if present, evaluate whether these chemicals are site related or impacted by activities conducted at the Aircraft Paint Hangars.
- Evaluate whether PFAS in groundwater from the Noise Suppression House is an upgradient source to groundwater at AOCs -10 and -11.

Fuel Storage Terminal

The fuel storage terminal building is currently still in place. There is an active suppression system, but the AFFF has been replaced with FFFP foam. Associated cess pools and a fuel leaching chamber are located to the north of the building.

- Evaluate subsurface soil downgradient of the former leaching fuel chamber for PFAS, and if present, evaluate whether these chemicals are associated with residual fuel contamination and continuing to migrate to groundwater.
- A drinking water supply well is located upgradient of the fuel storage terminal which the Town tested and no PFAS was detected. Evaluate whether PFAS is present in groundwater at levels above the calculated EPA RSL near the public drinking water supply well and if present, further evaluate whether contamination from the area has migrated towards the public water supply well under pumping conditions.
- Evaluate whether PFAS has migrated further downgradient from the Fuel Storage Terminal and the cess pools, and if present, evaluate whether levels of PFOA and PFOS are above the calculated EPA RSL.

Flight Emergency Shelter

The flight emergency shelter building is currently still in place. It was used for housing fire-fighting and emergency rescue vehicles and personnel. The fire protection system at this building consisted of a wet system and AFFF was reportedly stored in containers inside the building. Equipment training was conducted in this area between 1981 and 1996. AFFF was reportedly discharged on a concrete pad and water was used to dilute and wash away the foam to adjacent grassy areas.

- Evaluate whether surface and subsurface soil is impacted with PFAS when AFFF was reportedly discharged during training exercises and rinsed with water to nearby soil and if present, evaluate whether PFAS in subsurface soil is continuing to migrate to groundwater.
- Evaluate whether PFAS in groundwater from the Flight Emergency Shelter is an upgradient source to groundwater at AOC-12.

AOCs -09 through -11

Two runways bound the industrial area of the former NWIRP. One jet fuel spill occurred during a tire blow out incident on the western runway (AOC-09) and two crashes occurred on the eastern runway (AOCs -10 and -11); however, there was no record that AFFF was used.

- Confirm that PFOA and PFOS in groundwater at AOC-09 is below the calculated EPA RSL.
- Evaluate groundwater flow at AOC-10 and AOC-11 for PFAS, and if present, to determine whether PFOA and PFOS exceed the calculated EPA RSL.

Facility Wide Groundwater

- Evaluate groundwater flow and refine potentiometric maps, specifically in areas along the groundwater divide that has been identified through the central portion of NWIRP Calverton (Figure 3).

To achieve the objectives, this Work Plan includes the installation of shallow temporary wells, installation of vertical profile borings, and piezometers. Groundwater samples will be collected from the temporary wells and vertical profile borings and water levels will be collected from the piezometers. Soil samples will be collected from borings. Soil and groundwater samples will be analyzed for PFAS as indicated on Table 1 by Battelle Analytical Chemistry Services, which is approved under the Department of Defense Environmental Laboratory Accreditation Program and under the New York State Department of Health Environmental Laboratory Approval Program. Proposed locations are presented on Figures 4 through 10.

Soil Borings (Macrocore Collection)

Direct Push Technology (DPT) will be used to collect continuous macrocores to the clay layer to characterize soil lithology. Continuous macrocores will be collected at each piezometer location and as needed in the area of the vertical profile borings at AOCs 09- through -11. Lithology from these soil borings will be used to determine the depth of the water table and clay layer, and actual depths of the groundwater grab samples and screen of the piezometers. Waste soil cuttings will be placed back into the soil boring as practical or containerized as investigation derived waste (IDW).

Soil and Water Table Groundwater Grab Sampling and Analysis

Soil samples will be collected to evaluate the presence or absence of PFAS in the area where releases most likely occurred: Noise Suppression House (Figure 4), the former leaching fuel chamber associated

with the Fuel Storage Terminal (Figure 5), and Flight Emergency Shelter (Figure 6). A groundwater grab sample from the water table will be collected from each soil sampling location at the Fuel Storage Terminal and the Flight Emergency Center to evaluate whether PFAS in soil is migrating to groundwater. At the Noise Suppression House, groundwater grab samples will not be collected at this time while soils under the concrete are evaluated for PFAS.

A soil investigation will not be conducted in the area of the Fuel Storage Terminal building, the Aircraft Paint Hangars, and AOCs -06 and -09 through -12 at this time because additional groundwater data is needed to evaluate where a release might have occurred.

DPT will be used to collect continuous macrocores to the depths indicated on Table 2. Soil will be composited from 2-foot depth intervals. The groundwater grab sample will be collected via DPT from 4- or 5-foot screens to 15 feet bgs, the estimated depth of the water table. A peristaltic pump with high-density polyethylene tubing will be used to purge the screen and provide the sample volume. Wells will be purged to reduce or eliminate turbidity as practical. Soil and groundwater samples will be analyzed for PFAS as indicated on Table 1. Sample rationale, details, and nomenclature for the soil and groundwater samples are presented in Table 2.

Vertical Profile Borings (Groundwater Grab Sampling)

Vertical profile borings will be installed via DPT to evaluate the presence of PFAS along the former property boundary at AOCs -09 through -11. The sample nomenclature and estimated depths of the vertical profile boring is summarized on Table 3. Vertical profile boring locations are presented on Figures 9 and 10.

At each vertical profile boring, groundwater grab samples will be collected from temporarily screened well points. The initial groundwater grab samples will be collected at the water table, estimated to occur 5 to 15 feet bgs. Groundwater grab samples will then be collected from 4- or 5-foot screens at 10-foot intervals to the first clay layer (estimated to be at approximately 60 feet bgs). A peristaltic pump with high-density polyethylene tubing will be used to purge the screen and provide the sample volume. Wells will be purged to reduce or eliminate turbidity as practical.

Piezometer Installation and Development

Piezometers will be installed throughout the facility to evaluate groundwater quality and to further evaluate the direction of groundwater flow. Piezometers will be installed at the water table (approximately 5 to 15 feet bgs), an intermediate depth (approximately 20 to 30 feet bgs) and above the first clay layer (approximately 50 to 60 feet bgs). Shallow well screens will be set 2 feet above and 8 feet below the water table. The rationale for the well locations are presented in Table 4. The locations of the piezometers are presented on Figures 4, 5, and 7 through 10.

Piezometers will be constructed with 2 inch diameter polyvinyl chloride (PVC) with a 10-foot length and 0.010-inch factory slotted screen. A No. 1 certified clean sand pack will extend from the bottom of the

boring to approximately two feet above the top of the screen. Two feet of bentonite pellets will be placed above the sand pack and allowed to hydrate. A pre-packed sand pack and bentonite seal can also be used. A cement-bentonite grout will then be tremied into the annular space to near the ground surface. All piezometers will be completed as either a stick-up well or flushmount with protective steel casing. The top of the PVC casing will be secured with a lockable, watertight cap or plug. Soil generated from the installation of piezometers will be containerized in 55-gallon drums and transferred to the staging area for characterization, transportation, and disposal.

The piezometers will be developed by surging and pumping. During development, wellhead parameters will be measured and recorded on a log for each well volume removed. Development will continue until parameter readings do not vary by more than 10 percent or for a maximum of two hours. Turbidity values will be measured during development to achieve a value of less than 10 Nephelometric Turbidity Units (NTUs), if feasible within the development time. Development water will be managed as IDW.

Groundwater Sampling (Piezometers)

Groundwater samples and water levels will be collected from new and existing piezometers throughout the facility. Samples will be collected from the 2019 and 2020 piezometers installed under the PFAS SI program and analyzed for PFAS (Table 1). The list of wells selected for water level collection and sample and analysis for PFAS are presented on Table 5 and Figure 11.

For groundwater sampling, a peristaltic pump with high-density polyethylene tubing will be used for purging and collection activities, in combination with a continuous flow-through cell suitable for taking water quality measurements. Turbidity measurements will be made using a separate field turbidity meter. Depending on the groundwater parameters, two to five screen volumes may be purged.

Quality Control Samples

Quality assurance (QA) and quality control (QC) samples will be collected for groundwater. Duplicate samples will be collected at a rate of 1 per 10 samples. Matrix spike and matrix spike duplicate (MS/MSD) samples (i.e., triple volume) will be collected at a rate of 1 per 20 samples. An equipment blank will be collected once a week that samples are collected with reusable equipment. A field reagent blank, using PFAS-free water supplied by the laboratory, will be collected once per day that groundwater samples are collected and at a rate of one per drinking water sample.

Equipment Decontamination

Decontamination of reusable sampling equipment will consist of washing with a non-phosphate detergent followed by a PFAS-free water rinse. IDW will be captured, containerized and stored at the Site 6A staging area.

Waste Management

IDW will include soil cuttings and water from well development and purging, and equipment decontamination fluids. Waste soil cuttings that could not be placed back in the boring will be containerized in 55-gallon drums or 10-yard roll off container and characterized for off-property disposal. Water from wells and equipment decontamination fluids will be transported to the staging area at Site 6A, treated with granular activated carbon to remove PFAS, and placed in the existing tank or 55-gallons drums. Waste profiling will be performed prior to proper transportation and offsite disposal. It is anticipated that all waste generated will be non-hazardous.

The granular activated carbon will be retained at the Site 6A staging area for use during subsequent events. Effluent samples from the carbon will be collected for every 5,000 gallons of water treated and at the end of each sample event to evaluate remaining capacity of the carbon for treating PFAS. The carbon will be disposed offsite.

REPORTING

Results from the Facility Wide investigation will be presented in a report with recommendations for the path forward.

TABLES

TABLE 1
ANALYTE LIST
2020 PER- AND POLYFLUOROALKYL SUBSTANCE
FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLAN, CALVERTON, NEW YORK

Chemical Name[(1)]	Acronym	CAS Number	Method 537.1 Compound List	New York State Compound List
Perfluorobutanesulfonic acid	PFBS	375-73-5	X	X
Perfluorohexanesulfonic acid	PFHxS	355-46-4	X	X
Perfluoroheptanesulfonic acid	PFHpS	375-92-8		X
Perfluorooctanessulfonic acid	PFOS	1763-23-1	X	X
Perfluorodecanesulfonic acid	PFDS	335-77-3		X
Perfluorobutanoic acid	PFBA	375-22-4		X
Perfluoropentanoic acid	PFPeA	2706-90-3		X
Perfluorohexanoic acid	PFHxA	307-24-4	X	X
Perfluoroheptanoic acid	PFHpA	375-85-9	X	X
Perfluorooctanoic acid	PFOA	335-67-1	X	X
Perfluorononanoic acid	PFNA	375-95-1	X	X
Perfluorodecanoic acid	PFDA	335-76-2	X	X
Perfluoroundecanoic acid	PFUA/ PFUdA	2058-94-8	X	X
Perfluorododecanoic acid	PFDoA	307-55-1	X	X
Perfluorotridecanoic acid	PFTriA/ PFTrDA	72629-94-8	X	X
Perfluorotetradecanoic acid	PFTA/ PFTeDA	376-06-7	X	X
6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2		X
8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4		X
Perfluroroctanesulfonamide	FOSA	754-91-6		X
N-methyl perfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9	X	X
N-ethyl perfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6	X	X
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	X	
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9	X	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1	X	
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	X	

CAS- Chemical Abstract Service Number.

1. Groundwater samples will be analyzed for PFAS by Liquid chromatography with tandem mass spectrometry (LC/MS/MS) compliant with Quality System Manual (QSM) 5.1, Table B-15 (modification of Environmental Protection Agency [EPA] method 537). The list of analytes includes the 21 compounds from the New York State PFAS Target Analyte List and four additional compounds that are included under EPA Method 537.1.

TABLE 2
2020 SOIL SAMPLING AND WATER TABLE TEMPORARY WELL DEPTHS AND NOMENCLATURE
PER - AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

LOCATION	MEDIA	DEPTH INTERVAL (FEET BGS)[1]	RATIONALE					NOMENCLATURE
			Evaluates potential of release to soil beneath concrete	Evaluates potential release to surface soil	Evaluates if impacted soil has been covered due to rework of the surface for economic development	Evaluates if PFAS is associated with residual fuel Contamination	Evaluates potential for PFAS to migrate to groundwater	
Noise Suppression House								
NSH-SS/SB101	Surface Soil	0-2	✓					NSH-SS101-0002
	Subsurface Soil	2-4	✓					NSH-SB101-0204
NSH-SS/SB102	Surface Soil	0-2	✓					NSH-SS102-0002
	Subsurface Soil	2-4	✓					NSH-SB102-0204
NSH-SS/SB103	Surface Soil	0-2	✓					NSH-SS103-0002
	Subsurface Soil	2-4	✓					NSH-SB103-0204
NSH-SS/SB104	Surface Soil	0-2		✓				NSH-SS104-0002
	Subsurface Soil	2-4			✓			NSH-SB104-0204
Fuel Storage Terminal - Leaching Fuel Chamber								
FST-SS/SB/TW03	Subsurface Soil	TBD				✓		FST-SB03-XXXX
	Subsurface Soil	10-12					✓	FST-SB03-1012
	Groundwater Grab	13-18					✓	FST-TW03-1318
FST-SS/SB/TW04	Subsurface Soil	TBD				✓		FST-SS04-XXXX
	Subsurface Soil	10-12					✓	FST-SB04-1012
	Groundwater Grab	13-18					✓	FST-TW04-1318
FST-SS/SB05	Subsurface Soil	TBD				✓		FST-SS05-XXXX
	Subsurface Soil	10-12					✓	FST-SB05-1012
FD-SV11/MW40[2]	Groundwater	19-29					✓	FD-SV11/MW40-YYYYMMDD
FD-SV15[2]	Groundwater	7-27					✓	FD-SV15-YYYYMMDD
Flight Emergency Shelter								
FES-SS/SB/TW03	Surface Soil	0-2		✓				FES-SS03-0002
	Subsurface Soil	2-4			✓			FES-SB03-0204
	Subsurface Soil	13-15					✓	FES-SB03-1315
	Groundwater Grab	15-20					✓	FES-TW03-1520
FES-SS/SB/TW04	Surface Soil	0-2		✓				FES-SS04-0002
	Subsurface Soil	2-4			✓			FES-SB04-0204
	Subsurface Soil	13-15					✓	FES-SB04-1315
	Groundwater Grab	15-20					✓	FES-TW04-1520
FES-SS/SB/TW05	Surface Soil	0-2		✓				FES-SS05-0002
	Subsurface Soil	2-4			✓			FES-SB05-0204
	Subsurface Soil	13-15					✓	FES-SB05-1315
	Groundwater Grab	15-20					✓	FES-TW05-1520
FES-SS/SB/TW06	Surface Soil	0-2		✓				FES-SS06-0002
	Subsurface Soil	2-4			✓			FES-SB06-0204
	Subsurface Soil	13-15					✓	FES-SB06-1315
	Groundwater Grab	15-20					✓	FES-TW06-1520

TABLE 2
2020 SOIL SAMPLING AND WATER TABLE TEMPORARY WELL DEPTHS AND NOMENCLATURE
PER - AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

LOCATION	MEDIA	DEPTH INTERVAL (FEET BGS)[1]	RATIONALE					NOMENCLATURE
			Evaluates potential of release to soil beneath concrete	Evaluates potential release to surface soil	Evaluates if impacted soil has been covered due to rework of the surface for economic development	Evaluates if PFAS is associated with residual fuel Contamination	Evaluates potential for PFAS to migrate to groundwater	
FES-SS/SB/TW07	Surface Soil	0-2		✓				FES-SS07-0002
	Subsurface Soil	2-4			✓			FES-SB07-0204
	Subsurface Soil	13-15					✓	FES-SB07-1315
	Groundwater Grab	15-20					✓	FES-TW07-1520
FES-SS/SB/TW08	Surface Soil	0-2		✓				FES-SS08-0002
	Subsurface Soil	2-4			✓			FES-SB08-0204
	Subsurface Soil	13-15					✓	FES-SB08-1315
	Groundwater Grab	15-20					✓	FES-TW08-1520
FES-SS/SB/TW09	Surface Soil	0-2		✓				FES-SS09-0002
	Subsurface Soil	2-4			✓			FES-SB09-0204
	Subsurface Soil	13-15					✓	FES-SB09-1315
	Groundwater Grab	15-20					✓	FES-TW09-1520
FES-SS/SB/TW10	Surface Soil	0-2		✓				FES-SS10-0002
	Subsurface Soil	2-4			✓			FES-SB10-0204
	Subsurface Soil	13-15					✓	FES-SB10-1315
	Groundwater Grab	15-20					✓	FES-TW10-1520
FES-SS/SB/TW11	Surface Soil	0-2		✓				FES-SS11-0002
	Subsurface Soil	2-4			✓			FES-SB11-0204
	Subsurface Soil	13-15					✓	FES-SB11-1315
	Groundwater Grab	15-20					✓	FES-TW11-1520

BGS - below ground surface.

PFAS - per- and polyfluoroakyl substances.

✓ - Rationale selected for sample.

Blank cell - not selected for sample.

TBD - Depth is to be determined. The subsurface soil sample will be collected from the depth interval corresponding to residual fuel contamination from the fuel leaching chamber, which would be indicated by an elevated PID reading or visual observation of staining. In absence of evidence of contamination, a soil sample will be collected at a depth of 4 to 6 feet bgs. Results will be used to evaluate whether PFAS associated with residual fuel contamination.

XXXX - Top and bottom of the depth interval.

YYYYMMDD - Four digit year and two digit month and day that the sample is collected.

1. Depths may be changed based on actual depths of the water table observed in the field.

2. Existing monitoring wells SV11/MW40 and SV15 will be utilized to collect a shallow groundwater sample rather than installing a temporary well at FST-SB05 to evaluate whether surface soil is a continuing source to groundwater.

TABLE 3
2020 VERTICAL PROFILE BORINGS
GROUNDWATER GRAB SAMPLE DETAILS AND NOMENCLATURE
PER- AND POLYFLUOROALKYL SUBSTANCES FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

		Sample Depth (feet bgs)[1]			
Location	**Sample ID**	**10-15**	**25 - 30**	**40 - 45**	**55 - 60**
AOC-09					
AOC09-TW15	AOC09-TW15-XXXX	X	X	X	X
AOC09-TW16	AOC09-TW16-XXXX	X	X	X	X
AOC09-TW17	AOC09-TW17-XXXX	X	X	X	X
AOC09-TW18	AOC09-TW18-XXXX	X	X	X	X
AOC-10					
AOC10-TW13	AOC10-TW13-XXXX	X	X	X	X
AOC10-TW14	AOC10-TW14-XXXX	X	X	X	X
AOC10-TW15	AOC10-TW15-XXXX	X	X	X	X
AOC10-TW16	AOC10-TW16-XXXX	X	X	X	X
AOC10-TW17	AOC10-TW17-XXXX	X	X	X	X
AOC10-TW18	AOC10-TW18-XXXX	X	X	X	X
AOC10-TW19	AOC10-TW19-XXXX	X	X	X	X
AOC10-TW20	AOC10-TW20-XXXX	X	X	X	X
AOC10-TW21	AOC10-TW21-XXXX	X	X	X	X
AOC10-TW22	AOC10-TW22-XXXX	X	X	X	X
AOC10-TW23	AOC10-TW23-XXXX	X	X	X	X
AOC10-TW24	AOC10-TW24-XXXX	X	X	X	X
AOC10-TW25	AOC10-TW25-XXXX	X	X	X	X
AOC10-TW26	AOC10-TW26-XXXX	X	X	X	X
AOC10-TW27	AOC10-TW27-XXXX	X	X	X	X
AOC-11					
AOC11-TW28	AOC11-TW28-XXXX	X	X	X	X
AOC11-TW29	AOC11-TW29-XXXX	X	X	X	X
AOC11-TW30	AOC11-TW30-XXXX	X	X	X	X
AOC11-TW31	AOC11-TW31-XXXX	X	X	X	X
AOC11-TW32	AOC11-TW32-XXXX	X	X	X	X
AOC11-TW33	AOC11-TW33-XXXX	X	X	X	X
AOC11-TW34	AOC11-TW34-XXXX	X	X	X	X
AOC11-TW35	AOC11-TW35-XXXX	X	X	X	X
AOC11-TW36	AOC11-TW36-XXXX	X	X	X	X

XXXX - Depth of sample. Example - If groundwater was collected at AOC11-TW36 at a depth of 25 feet to 30 feet bgs, then the Sample ID would be AOC11-TW36-2530.

bgs - below ground surface.

TW - temporary well.

1. Grab samples will be collected beginning at the water table (approximately 10 to 25 feet bgs) then at every 10 feet until the first clay layer is reached (approximately 60 feet bgs). Actual depths will be confirmed in the field by observing lithology from continuous macrocores.

TABLE 4
2020 PROPOSED PIEZOMETER LOCATIONS,
DEPTHS, AND RATIONALE
PER- AND POLYFLUOROALKYL FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

LOCATION	SCREEN DEPTH INTERVAL (FEET BGS)[1]	RATIONALE[2]							
		Evaluates downgradient groundwater			Evaluates potential source to:				
		from Site or AOC	former leach field	from cess pools / former fuel leaching chamber	AOCs -10 and -11	AOC-12	Evaluates side gradient groundwater	Evaluates upgradient groundwater	Evaluates groundwater quality in the area of the public drinking water supply well
Aircraft Paint Hangars									
APH-PZ101S	8-18	✓							
APH-PZ101I	27-37	✓							
APH-PZ101D	45-55	✓							
APH-PZ102S	8-18	✓	✓						
APH-PZ102I	27-37	✓	✓						
APH-PZ102D	45-55	✓	✓						
Noise Suppression House									
NSH-PZ102S	8-18							✓	
NSH-PZ102I	23-33							✓	
NSH-PZ102D	43-53							✓	
NSH-PZ103S	8-18							✓	
NSH-PZ103I	23-33							✓	
NSH-PZ103D	43-53							✓	
NSH-PZ104S	6-16				✓		✓		
NSH-PZ104I	21-31				✓		✓		
NSH-PZ104D	41-51				✓		✓		
NSH-PZ105S	11-21	✓							
NSH-PZ105I	26-36	✓							
NSH-PZ105D	46-56	✓							
NSH-PZ106S	18-28	✓			✓				
NSH-PZ106I	33-43	✓			✓				
NSH-PZ106D	58-68	✓			✓				
NSH-PZ107S	8-18				✓		✓		
NSH-PZ107I	23-33				✓		✓		
NSH-PZ107D	43-53				✓		✓		
NSH-PZ108S	14-24	✓			✓				
NSH-PZ108I	29-39	✓			✓				
NSH-PZ108D	49-59	✓			✓				
Fuel Storage Terminal									
FST-PZ02I1[3]	26-36			✓					
FST-PZ07I1[3]	30-40			✓					
FST-PZ103S	14-24	✓							
FST-PZ103I	29-39	✓							
FST-PZ103D	52-62	✓							
FST-PZ104S	15-25	✓							
FST-PZ104I	30-40	✓							
FST-PZ104D	53-63	✓							
FST-PZ105S	15-25								✓

TABLE 4
2020 PROPOSED PIEZOMETER LOCATIONS,
DEPTHS, AND RATIONALE
PER- AND POLYFLUOROALKYL FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

LOCATION	SCREEN DEPTH INTERVAL (FEET BGS)[1]	RATIONALE[2]							
		Evaluates downgradient groundwater			Evaluates potential source to:				
		from Site or AOC	former leach field	from cess pools / former fuel leaching chamber	AOCs -10 and -11	AOC-12	Evaluates side gradient groundwater	Evaluates upgradient groundwater	Evaluates groundwater quality in the area of the public drinking water supply well
FST-PZ105I	30-40								✓
FST-PZ105D	53-63								✓
FST-PZ106S	11-21								✓
FST-PZ106I	26-36								✓
FST-PZ106D	49-59								✓
Flight Emergency Shelter									
FES-PZ101S	16-26	✓							
FES-PZ101I	31-41	✓							
FES-PZ101D	55-65	✓							
FES-PZ102S	16-26	✓							
FES-PZ102I	31-41	✓							
FES-PZ102D	55-65	✓							
FES-PZ103S	16-26	✓							
FES-PZ103I	31-41	✓							
FES-PZ103D	55-65	✓				✓			
FES-PZ104S	30-40	✓				✓			
FES-PZ104I	42-52	✓				✓			
FES-PZ104D	54-64	✓				✓			
FES-PZ105S	30-40	✓				✓			
FES-PZ105I	42-52	✓				✓			
FES-PZ105D	54-64	✓				✓			
FES-PZ106S	16-26	✓				✓			
FES-PZ106I	31-41	✓				✓			
FES-PZ106D	55-65	✓				✓			
FES-PZ107S	16-26	✓				✓			
FES-PZ107I	31-41	✓				✓			
FES-PZ107D	55-65	✓				✓			
AOC-09 - Jet Fuel Spill / Western Runway									
AOC09-PZ06S	18-28	✓							
AOC09-PZ06I	40-50	✓							
AOC09-PZ06D	61-71	✓							
AOCs-10 and -11 - Aircraft Crashes / Eastern Runway									
AOC11-PZ02S	23-33	✓							
AOC11-PZ03S	23-33	✓							

AOC - Area of Concern. BGS - below ground surface.

✓ - Rationale selected for sample.

Blank cell - not selected for sample.

YYYYMMDD - Four digit year and two digit month and day that the sample is collected.

1. The screen depth was estimated based on lithology collected from a 2019 soil boring in proximity to the 2020 proposed piezometer location. Continuous macrocores will be collected in the field at each location. Screen intervals may be revised based on the actual depth of th water table and clay layer at each location.

2. All piezometers will be used to evaluate groundwater flow.

3. Well will supplement the existing Site 7 - Former Fuel Depot shallow and deep wells at FD-MW02 and FD-MW07.

TABLE 5
2020 PIEZOMETERS SELECTED FOR
GROUNDWATER FLOW EVALATUATION AND SAMPLING AND ANALYSIS
PER- AND POLYFLUOROALKYL SUBSTANCES
FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

WELL LOCATION	TOP OF CASING ELEVATION (FEET MSL)	TOTAL DEPTH (FEET BGS)	TOTAL DEPTH (FEET MSL)	WATER LEVEL	SAMPLE	NOMENCLATURE
Aircraft Paint Hangars						
AOC01-PZ01S	47.83	20	27.83	✓	✓	AOC01-PZ01S-YYYYMMDD
AOC01-PZ01I	47.77	35	12.77	✓	✓	AOC01-PZ01I-YYYYMMDD
AOC01-PZ01D	47.77	68	-20.23	✓	✓	AOC01-PZ01D-YYYYMMDD
AOC01-PZ02S	45.38	20	25.38	✓	✓	AOC01-PZ02S-YYYYMMDD
AOC01-PZ02I	45.38	35	10.38	✓	✓	AOC01-PZ02I-YYYYMMDD
AOC01-PZ02D	45.35	68	-22.65	✓	✓	AOC01-PZ02D-YYYYMMDD
AOC01-PZ03S	49.01	20	29.01	✓	✓	AOC01-PZ03S-YYYYMMDD
AOC01-PZ03I	49.06	35	14.06	✓	✓	AOC01-PZ03I-YYYYMMDD
AOC01-PZ03D	48.94	68	-19.06	✓	✓	AOC01-PZ03D-YYYYMMDD
AOC02-PZ01S	45.71	18	27.71	✓	✓	AOC02-PZ01S-YYYYMMDD
AOC02-PZ01I	45.87	33	12.87	✓	✓	AOC02-PZ01I-YYYYMMDD
AOC02-PZ01D	45.84	51	-5.16	✓	✓	AOC02-PZ01D-YYYYMMDD
AOC02-PZ02S	48.47	18	30.47	✓	✓	AOC02-PZ02S-YYYYMMDD
AOC02-PZ02I	48.50	33	15.50	✓	✓	AOC02-PZ02I-YYYYMMDD
AOC02-PZ02D	48.53	51	-2.47	✓	✓	AOC02-PZ02D-YYYYMMDD
AOC02-PZ03S	49.82	18	31.82	✓	✓	AOC02-PZ03S-YYYYMMDD
AOC02-PZ03I	49.96	33	16.96	✓	✓	AOC02-PZ03I-YYYYMMDD
AOC02-PZ03D	49.97	51	-1.03	✓	✓	AOC02-PZ03D-YYYYMMDD
APH-PZ101S	NS	TBD	TBD	✓	✓	APH-PZ101S-YYYYMMDD
APH-PZ101I	NS	TBD	TBD	✓	✓	APH-PZ101I-YYYYMMDD
APH-PZ101D	NS	TBD	TBD	✓	✓	APH-PZ101D-YYYYMMDD
APH-PZ102S	NS	TBD	TBD	✓	✓	APH-PZ102S-YYYYMMDD
APH-PZ102I	NS	TBD	TBD	✓	✓	APH-PZ102I-YYYYMMDD
APH-PZ102D	NS	TBD	TBD	✓	✓	APH-PZ102D-YYYYMMDD
Noise Suppression Hush House						
AOC04-PZ01S	48.87	16	32.87	✓	✓	AOC04-PZ01S-YYYYMMDD
AOC04-PZ01I	49.06	31	18.06	✓	✓	AOC04-PZ01I-YYYYMMDD
AOC04-PZ01D	48.98	51	-2.02	✓	✓	AOC04-PZ01D-YYYYMMDD
NSH-PZ102S	NS	TBD	TBD	✓	✓	NSH-PZ102S-YYYYMMDD
NSH-PZ102I	NS	TBD	TBD	✓	✓	NSH-PZ102I-YYYYMMDD
NSH-PZ102D	NS	TBD	TBD	✓	✓	NSH-PZ102D-YYYYMMDD
NSH-PZ103S	NS	TBD	TBD	✓	✓	NSH-PZ103S-YYYYMMDD
NSH-PZ103I	NS	TBD	TBD	✓	✓	NSH-PZ103I-YYYYMMDD
NSH-PZ103D	NS	TBD	TBD	✓	✓	NSH-PZ103D-YYYYMMDD
NSH-PZ104S	NS	TBD	TBD	✓	✓	NSH-PZ104S-YYYYMMDD
NSH-PZ104I	NS	TBD	TBD	✓	✓	NSH-PZ104I-YYYYMMDD
NSH-PZ104D	NS	TBD	TBD	✓	✓	NSH-PZ104D-YYYYMMDD
NSH-PZ105S	NS	TBD	TBD	✓	✓	NSH-PZ105S-YYYYMMDD
NSH-PZ105I	NS	TBD	TBD	✓	✓	NSH-PZ105I-YYYYMMDD
NSH-PZ105D	NS	TBD	TBD	✓	✓	NSH-PZ105D-YYYYMMDD
NSH-PZ106S	NS	TBD	TBD	✓	✓	NSH-PZ106S-YYYYMMDD
NSH-PZ106I	NS	TBD	TBD	✓	✓	NSH-PZ106I-YYYYMMDD
NSH-PZ106D	NS	TBD	TBD	✓	✓	NSH-PZ106D-YYYYMMDD
NSH-PZ107S	NS	TBD	TBD	✓	✓	NSH-PZ107S-YYYYMMDD
NSH-PZ107I	NS	TBD	TBD	✓	✓	NSH-PZ107I-YYYYMMDD
NSH-PZ107D	NS	TBD	TBD	✓	✓	NSH-PZ107D-YYYYMMDD
NSH-PZ108S	NS	TBD	TBD	✓	✓	NSH-PZ108S-YYYYMMDD
NSH-PZ108I	NS	TBD	TBD	✓	✓	NSH-PZ108I-YYYYMMDD
NSH-PZ108D	NS	TBD	TBD	✓	✓	NSH-PZ108D-YYYYMMDD
Aircraft Fuel Storage Terminal						
AOC05-PZ01S	51.62	21	30.62	✓	✓	AOC05-PZ01S-YYYYMMDD
AOC05-PZ01I	51.65	36	15.65	✓	✓	AOC05-PZ01I-YYYYMMDD
AOC05-PZ01D	51.71	59	-7.29	✓	✓	AOC05-PZ01D-YYYYMMDD
FST-PZ02I1	NS	TBD	TBD	✓	✓	FST-PZ02I1-YYYYMMDD
FST-PZ103S	NS	TBD	TBD	✓	✓	FST-PZ103S-YYYYMMDD
FST-PZ103I	NS	TBD	TBD	✓	✓	FST-PZ103I-YYYYMMDD
FST-PZ103D	NS	TBD	TBD	✓	✓	FST-PZ103D-YYYYMMDD
FST-PZ104S	NS	TBD	TBD	✓	✓	FST-PZ104S-YYYYMMDD
FST-PZ104I	NS	TBD	TBD	✓	✓	FST-PZ104I-YYYYMMDD
FST-PZ104D	NS	TBD	TBD	✓	✓	FST-PZ104D-YYYYMMDD
FST-PZ105S	NS	TBD	TBD	✓	✓	FST-PZ105S-YYYYMMDD
FST-PZ105I	NS	TBD	TBD	✓	✓	FST-PZ105I-YYYYMMDD
FST-PZ105D	NS	TBD	TBD	✓	✓	FST-PZ105D-YYYYMMDD
FST-PZ106S	NS	TBD	TBD	✓	✓	FST-PZ106S-YYYYMMDD
FST-PZ106I	NS	TBD	TBD	✓	✓	FST-PZ106I-YYYYMMDD
FST-PZ106D	NS	TBD	TBD	✓	✓	FST-PZ106D-YYYYMMDD
FST-PZ07I1	NS	TBD	TBD	✓	✓	FST-PZ07I1-YYYYMMDD
Flight Emergency Shelter						
AOC06-PZ01S	54.04	25	29.04	✓	✓	AOC06-PZ01S-YYYYMMDD
AOC06-PZ01I	54.10	40	14.10	✓	✓	AOC06-PZ01I-YYYYMMDD
AOC06-PZ01D	53.97	59	-5.03	✓	✓	AOC06-PZ01D-YYYYMMDD
AOC07-PZ01S	55.12	25	30.12	✓	✓	AOC07-PZ01S-YYYYMMDD
AOC07-PZ01I	55.08	40	15.08	✓	✓	AOC07-PZ01I-YYYYMMDD
AOC07-PZ01D	54.92	62	-7.08	✓	✓	AOC07-PZ01D-YYYYMMDD
AOC08-PZ01S	55.77	23	32.77	✓	✓	AOC08-PZ01S-YYYYMMDD
AOC08-PZ01I	55.79	38	17.79	✓	✓	AOC08-PZ01I-YYYYMMDD
AOC08-PZ01D	55.70	64	-8.30	✓	✓	AOC08-PZ01D-YYYYMMDD
FES-PZ101S	NS	TBD	TBD	✓	✓	FES-PZ101S-YYYYMMDD
FES-PZ101I	NS	TBD	TBD	✓	✓	FES-PZ101I-YYYYMMDD
FES-PZ101D	NS	TBD	TBD	✓	✓	FES-PZ101D-YYYYMMDD

TABLE 5
2020 PIEZOMETERS SELECTED FOR
GROUNDWATER FLOW EVALATUATION AND SAMPLING AND ANALYSIS
PER- AND POLYFLUOROALKYL SUBSTANCES
FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

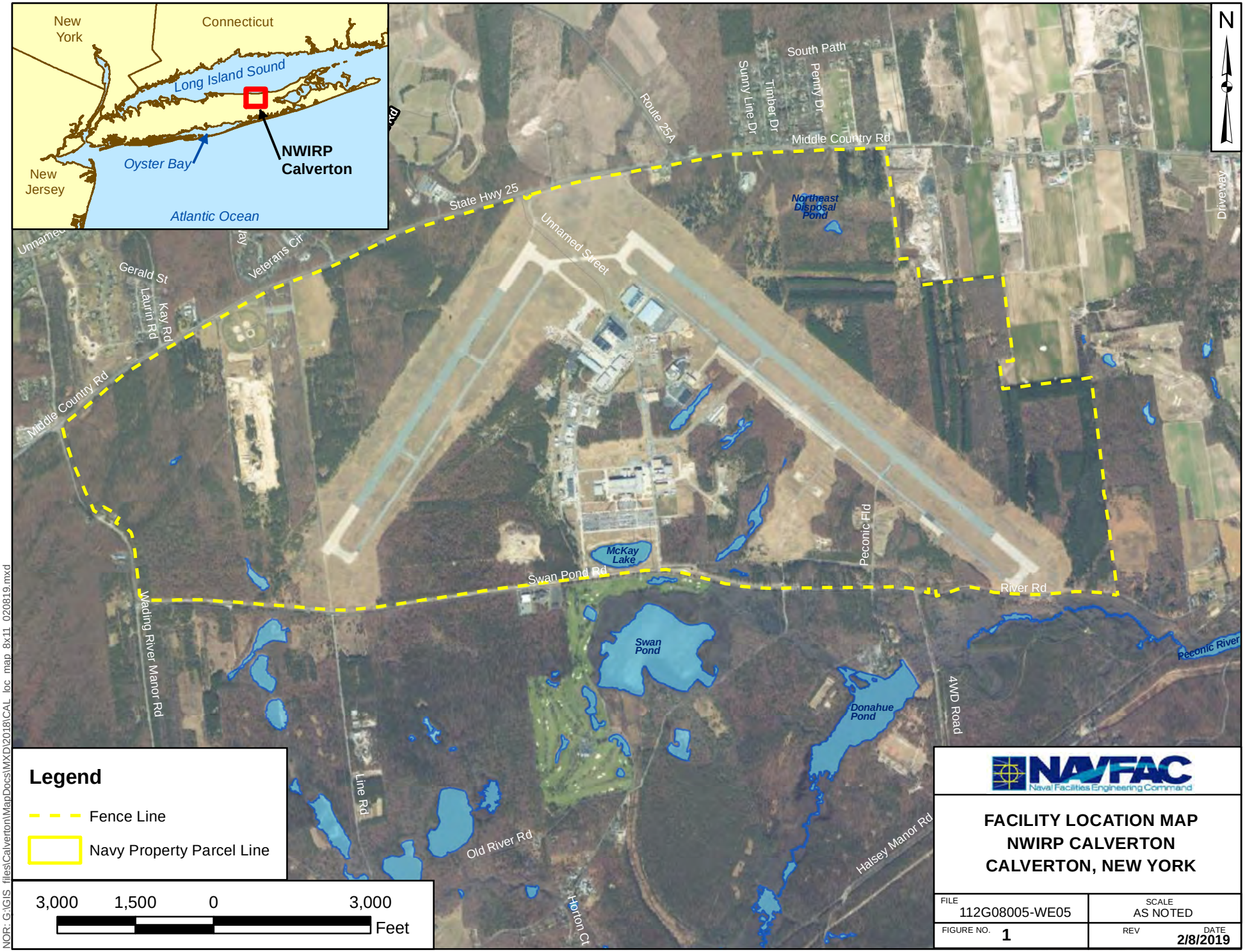
WELL LOCATION	TOP OF CASING ELEVATION (FEET MSL)	TOTAL DEPTH (FEET BGS)	TOTAL DEPTH (FEET MSL)	WATER LEVEL	SAMPLE	NOMENCLATURE
FES-PZ102S	NS	TBD	TBD	✓	✓	FES-PZ102S-YYYYMMDD
FES-PZ102I	NS	TBD	TBD	✓	✓	FES-PZ102I-YYYYMMDD
FES-PZ102D	NS	TBD	TBD	✓	✓	FES-PZ102D-YYYYMMDD
FES-PZ103S	NS	TBD	TBD	✓	✓	FES-PZ103S-YYYYMMDD
FES-PZ103I	NS	TBD	TBD	✓	✓	FES-PZ103I-YYYYMMDD
FES-PZ103D	NS	TBD	TBD	✓	✓	FES-PZ103D-YYYYMMDD
FES-PZ104S	NS	TBD	TBD	✓	✓	FES-PZ104S-YYYYMMDD
FES-PZ104I	NS	TBD	TBD	✓	✓	FES-PZ104I-YYYYMMDD
FES-PZ104D	NS	TBD	TBD	✓	✓	FES-PZ104D-YYYYMMDD
FES-PZ105S	NS	TBD	TBD	✓	✓	FES-PZ105S-YYYYMMDD
FES-PZ105I	NS	TBD	TBD	✓	✓	FES-PZ105I-YYYYMMDD
FES-PZ105D	NS	TBD	TBD	✓	✓	FES-PZ105D-YYYYMMDD
FES-PZ106S	NS	TBD	TBD	✓	✓	FES-PZ106S-YYYYMMDD
FES-PZ106I	NS	TBD	TBD	✓	✓	FES-PZ106I-YYYYMMDD
FES-PZ106D	NS	TBD	TBD	✓	✓	FES-PZ106D-YYYYMMDD
FES-PZ107S	NS	TBD	TBD	✓	✓	FES-PZ107S-YYYYMMDD
FES-PZ107I	NS	TBD	TBD	✓	✓	FES-PZ107I-YYYYMMDD
FES-PZ107D	NS	TBD	TBD	✓	✓	FES-PZ107D-YYYYMMDD
AOC09 - Jet Fuel Spill Site						
AOC09-PZ01S	72.06	42	30.06	✓	✓	AOC09-PZ01S-YYYYMMDD
AOC09-PZ01I	72.09	53	19.09	✓	✓	AOC09-PZ01I-YYYYMMDD
AOC09-PZ01D	71.79	64	7.79	✓	✓	AOC09-PZ01D-YYYYMMDD
AOC09-PZ02S	60.20	25	35.20	✓	✓	AOC09-PZ02S-YYYYMMDD
AOC09-PZ03S	81.80	47	34.80	✓	✓	AOC09-PZ03S-YYYYMMDD
AOC09-PZ04S	64.95	28	36.95	✓	✓	AOC09-PZ04S-YYYYMMDD
AOC09-PZ05S	48.82	13	35.82	✓	✓	AOC09-PZ05S-YYYYMMDD
AOC09-PZ06S	NS	TBD	TBD	✓	✓	AOC09-PZ06S-YYYYMMDD
AOC09-PZ06I	NS	TBD	TBD	✓	✓	AOC09-PZ06I-YYYYMMDD
AOC09-PZ06D	NS	TBD	TBD	✓	✓	AOC09-PZ06D-YYYYMMDD
AOC10 - F-111 Aircraft Crash Site						
AOC10-PZ01S	58.08	33	25.08	✓	✓	AOC10-PZ01S-YYYYMMDD
AOC10-PZ01I	58.14	48	10.14	✓	✓	AOC10-PZ01I-YYYYMMDD
AOC10-PZ01D	58.26	69	-10.74	✓	✓	AOC10-PZ01D-YYYYMMDD
AOC10-PZ02S	51.43	33	18.43	✓	✓	AOC10-PZ02S-YYYYMMDD
AOC10-PZ02I	51.40	48	3.40	✓	✓	AOC10-PZ02I-YYYYMMDD
AOC10-PZ02D	51.43	69	-17.57	✓	✓	AOC10-PZ02D-YYYYMMDD
AOC11 - EF-111 Aircraft Crash Site						
AOC11-PZ01S	61.79	33	28.79	✓	✓	AOC11-PZ01S-YYYYMMDD
AOC11-PZ01I	61.86	44	17.86	✓	✓	AOC11-PZ01I-YYYYMMDD
AOC11-PZ01D	61.57	56	5.57	✓	✓	AOC11-PZ01D-YYYYMMDD
AOC11-PZ02S	NS	TBD	TBD	✓	✓	AOC11-PZ02S-YYYYMMDD
AOC11-PZ03S	NS	TBD	TBD	✓	✓	AOC11-PZ03S-YYYYMMDD
AOC12 - Northeast Pond Disposal Area						
AOC12-PZ01S	46.95	22	24.95	✓	✓	AOC12-PZ01S-YYYYMMDD
AOC12-PZ01I	46.86	42	4.86	✓	✓	AOC12-PZ01I-YYYYMMDD
AOC12-PZ01D	46.91	70	-23.09	✓	✓	AOC12-PZ01D-YYYYMMDD
Site 2 - Fire Training Area						
FT-MW01S	62.98	29	34.48	✓		
FT-MW01I	62.62	78	-15.38	✓		
FT-MW02S	54.45	21	33.95	✓		
FT-MW02I	54.31	80	-25.69	✓		
FT-MW03S	65.68	32	34.18	✓		
FT-MW07S	69.17	35	34.17	✓		
FT-MW08S	46.40	14	32.40	✓		
FT-MW08I	46.65	33	13.65	✓		
FT-PZ455I	67.65	75	-7.73	✓		
FT-PZ456I	44.32	54	-9.99	✓		
FT-PZ458I	38.56	47	-8.29	✓		
FT-PZ459I	44.92	48	-3.39	✓		
FT-PZ462I	42.17	51	-8.63	✓		
FT-PZ451S	48.84	17	31.56	✓		
FT-PZ452S	49.33	16	33.16	✓		
FT-PZ453S	45.53	16	30.02	✓		
FT-PZ454S	46.01	15	31.16	✓		
FT-PZ455S	67.97	38	30.26	✓		
FT-PZ455I	67.65	75	-7.73	✓		
FT-PZ456S	44.24	15	29.18	✓		
FT-PZ456I	44.32	54	-9.99	✓		
FT-PZ457S	44.50	16	28.32	✓		
FT-PZ458S	39.52	16	23.41	✓		
FT-PZ458I	38.56	47	-8.29	✓		
FT-PZ459S	44.71	19	25.33	✓		
FT-PZ459I	44.92	48	-3.39	✓		
FT-PZ462S	41.76	15	27.05	✓		
FT-PZ462I	42.17	51	-8.63	✓		
FT-GA10	41.08	NA	TBD	✓		
FT-GA13	37.14	NA	TBD	✓		
Site 6A - Southern Area						
FC-MW02SR1	46.33	15	31.83	✓		
FC-MW02IR1	46.40	53	-6.10	✓		
FC-MW03SR1	45.83	15	31.33	✓		

TABLE 5
2020 PIEZOMETERS SELECTED FOR
GROUNDWATER FLOW EVALATUATION AND SAMPLING AND ANALYSIS
PER- AND POLYFLUOROALKYL SUBSTANCES
FACILITY WIDE SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK

WELL LOCATION	TOP OF CASING ELEVATION (FEET MSL)	TOTAL DEPTH (FEET BGS)	TOTAL DEPTH (FEET MSL)	WATER LEVEL	SAMPLE	NOMENCLATURE
FC-MW05S	48.03	16	32.03	✓		
FC-PZ05I1	47.85	30	17.85	✓		
FC-MW05I	47.35	58	-10.65	✓		
FC-MW06S	50.66	19	31.66	✓		
SA-MW126S	39.79	15	24.79	✓		
SA-MW126I	39.97	50	-10.03	✓		
SA-MW126D	40.04	84	-43.96	✓		
SA-MW127S	40.57	15	25.57	✓		
SA-MW127I	40.79	46	-5.21	✓		
SA-MW127D	40.57	78	-37.43	✓		
SA-MW128S	40.54	17	23.54	✓		
SA-MW128I	40.96	40	0.96	✓		
SA-MW128D	40.64	68	-27.36	✓		
SA-MW129S	51.92	30	22.42	✓		
SA-MW129I	52.16	60	-7.84	✓		
SA-MW129D	52.19	90	-37.81	✓		
SA-MW130S	48.60	19	29.60	✓		
SA-MW130I	48.33	50	-1.67	✓		
SA-PZ135I	38.75	47	-8.25	✓		
SA-PZ138I1	39.80	42	-2.20	✓		
SA-PZ149I1	44.73	37	7.73	✓		
SA-PZ157I1	39.76	38	1.76	✓		
SA-PZ157I	39.51	46	-6.49	✓		
SA-PZ180I	43.27	43	0.27	✓		
SA-PZ193I	52.79	40	12.79	✓		
SA-PZ194I	49.80	50	-0.20	✓		
Site 7 - Former Fuel Depot						
FD-MW02S	57.49	23	34.49	✓	✓	FD-MW02S-YYYYMMDD
FD-MW02I	57.32	51	6.32	✓	✓	FD-MW02I-YYYYMMDD
FD-MW04S	59.70	24	35.70	✓		
FD-MW07S	55.71	21	34.71	✓	✓	FD-MW07S-YYYYMMDD
FD-MW07I	54.87	NA	NA	✓	✓	FD-MW07I-YYYYMMDD
FD-MW10S	56.83	NA	NA	✓		
FD-MW11S	52.24	25	27.24	✓		
FD-MW11I	55.52	50	5.52	✓		
FD-MW12S	55.53	25	30.53	✓		
FD-MW15S	59.63	25	34.63	✓		
FD-MW16S	56.50	25	31.50	✓		
FD-MW17S	56.40	25	31.40	✓		
FD-MW18S	56.75	25	31.75	✓		
FD-MW19S	56.61	25	31.61	✓		
FD-MW20S	58.36	27	31.36	✓		
FD-SV12 / MW40S	57.70	30	27.70	✓		

BGS - below ground surface.
MSL - mean sea level.
NS - Not Surveyed.
NA - Not Available.
YYYYMMDD - Year, month, and day the sample was collected.
TBD -To be determined. Well depths for the proposed 2020 piezometers on Table 4 are estimated based on lithology recorded during the 2019 Site Inspection. Continuous macrocores will be collected at each 2020 piezometer and final depth will be determined in the field.
✓ - selected for water level and / or sample collection.
Blank - not selected.

FIGURES


New York
Connecticut
Long Island Sound
NWIRP Calverton
Oyster Bay
New Jersey
Atlantic Ocean
N
South Path
Sunny Line Dr
Timber Dr
Penny Dr
Route 25A
Middle Country Rd
State Hwy 25
Unnamed Street
Northeast Disposal Pond
Driveway
Gerald St
Laurin Rd
Kay Rd
Veterans Cir
Middle Country Rd
McKay Lake
Swan Pond Rd
Peconic Rd
River Rd
Wading River Manor Rd
Swan Pond
Peconic River
Donahue Pond
4WD Road
Line Rd
Old River Rd
Halsey Manor Rd
Horton Ct
Legend
Fence Line
Navy Property Parcel Line
3,000 1,500 0 3,000
Feet
NAVFAC
Naval Facilities Engineering Command
FACILITY LOCATION MAP
NWIRP CALVERTON
CALVERTON, NEW YORK
FILE 112G08005-WE05
SCALE AS NOTED
FIGURE NO. 1
REV
DATE 2/8/2019
NOR: G:\GIS files\Calverton\MapDocs\MXD\2018\CAL loc map 8x11 020819.mxd

N

Garfield Dr
Cavalga
John Jay Rd
Route 25A
South Path
Timber Dr
Penny Dr
Old Stone Rd
Unnamed Street
Fresh Pond Ave
Middle Country Rd
Triangle Ln
Karlin Dr
Jakes Ln
Riley Ave
Driveway
Unnamed Street
Edwards Ave
Princeton Blvd
Calverton Dr
Middle Country Rd

AOC-12
Northeast Disposal Pond
Flight Emergency Shelter
AOC-08
AOC-09
AOC-07
AOC-06
Aircraft Paint Hangars
AOC-11
Fuel Storage Terminal
Jan Way
Burman Blvd
Scott Ave
AOC-05
AOC-03
AOC-01
AOC-10
AOC-02
AOC-04
Runway 5-23
Runway 32-14
McKay Lake
Peconic Field
Swan Pond Rd
Site 2
Noise Suppression House
Connecticut Ave
River Rd
Peconic River
Nugent Dr
4WD Road
Mill Rd
Interstate 495
Hill Rise
Line Rd
Swan Pond
Donahue Pond

Legend

- Area of Concern
- Separate Remedial Investigation In Process
- Area Boundary
- Current Navy Property (2018)
- Fence Line

Aerial photographs provided by the NYS GIS Clearinghouse, 2016.

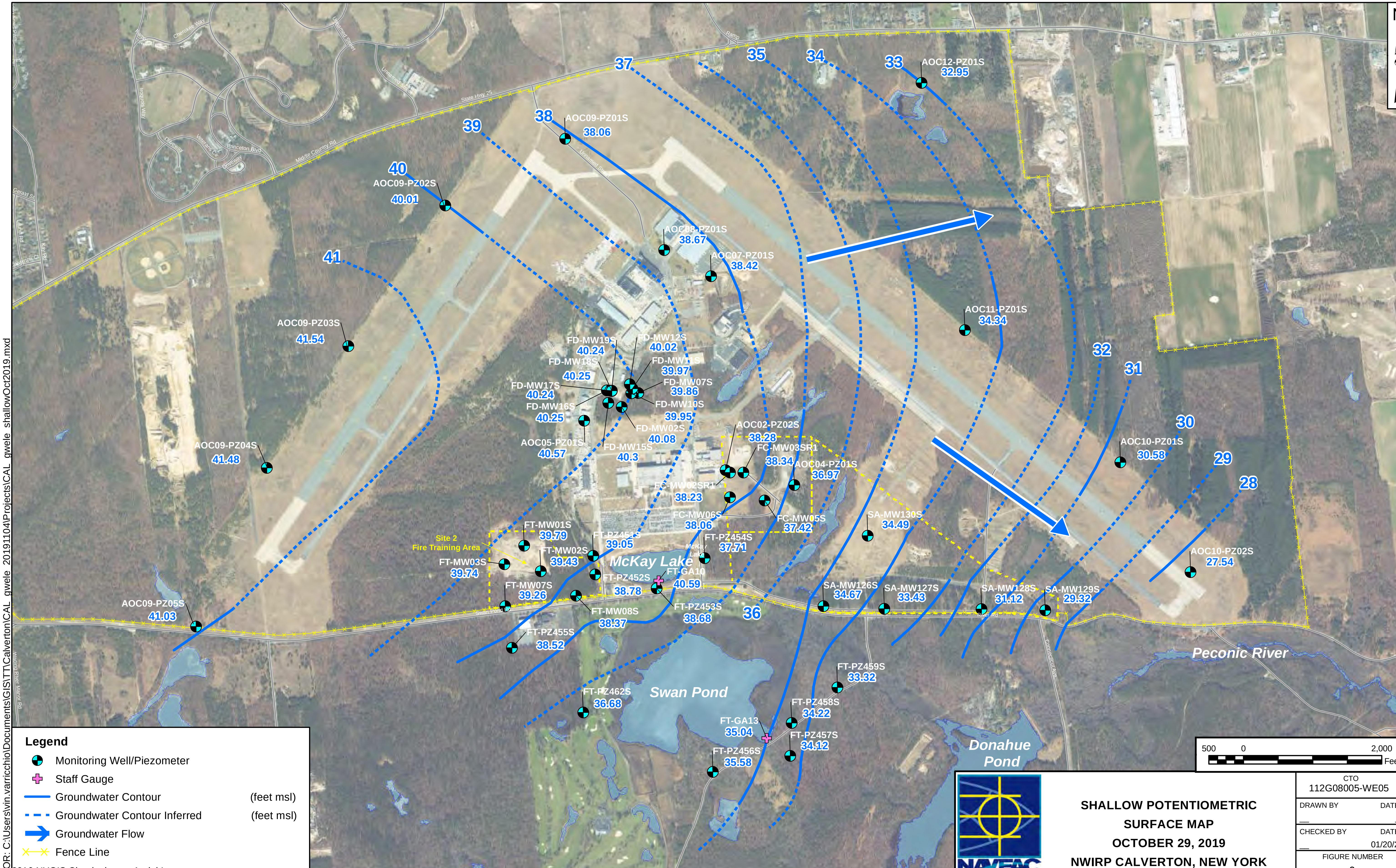
0 1,000 2,000 4,000 Feet

NOR: G:\GIS_files\Calverton\MapDocs\MXD\2017_PA\SAP\AOCLayout042320.mxd

NAVFAC

AREA OF CONCERN (AOC) AND BOUNDARY LOCATION MAP NWIRP CALVERTON, NEW YORK

CTO	112G08005-WE05
DRAWN BY	DATE 05/04/20
CHECKED BY	DATE 05/04/20
FIGURE NUMBER	2



Legend

- Monitoring Well/Piezometer
- Staff Gauge
- Groundwater Contour (feet msl)
- Groundwater Contour Inferred (feet msl)
- Groundwater Flow
- Fence Line

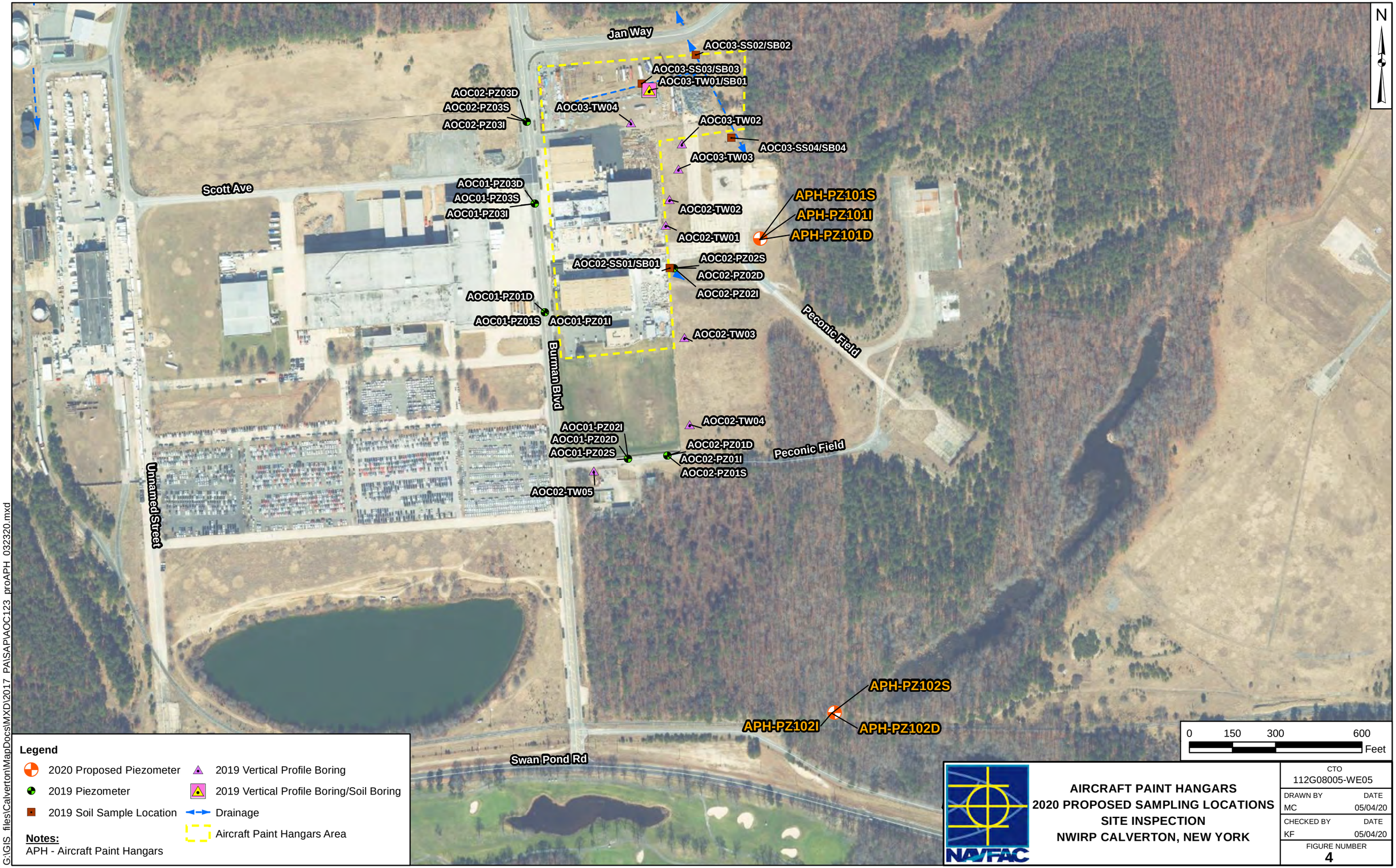
2016 NYGIS Clearinghouse Aerial Imagery

NOR: C:\Users\vin.varricchio\Documents\GIS\TT\Calverton\CAL_gwele_20191104\Projects\CAL_gwele_shallowOct2019.mxd

NAVFAC

SHALLOW POTENTIOMETRIC SURFACE MAP
OCTOBER 29, 2019
NWIRP CALVERTON, NEW YORK

CTO 112G08005-WE05	
DRAWN BY __	DATE __
CHECKED BY __	DATE 01/20/20
FIGURE NUMBER 3	



Legend

- 2020 Proposed Piezometer
- 2019 Piezometer
- 2019 Soil Sample Location
- 2019 Vertical Profile Boring
- 2019 Vertical Profile Boring/Soil Boring
- Drainage
- Aircraft Paint Hangars Area

Notes:
APH - Aircraft Paint Hangars

AIRCRAFT PAINT HANGARS
2020 PROPOSED SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	
112G08005-WE05	
DRAWN BY	DATE
MC	05/04/20
CHECKED BY	DATE
KF	05/04/20
FIGURE NUMBER	
4	

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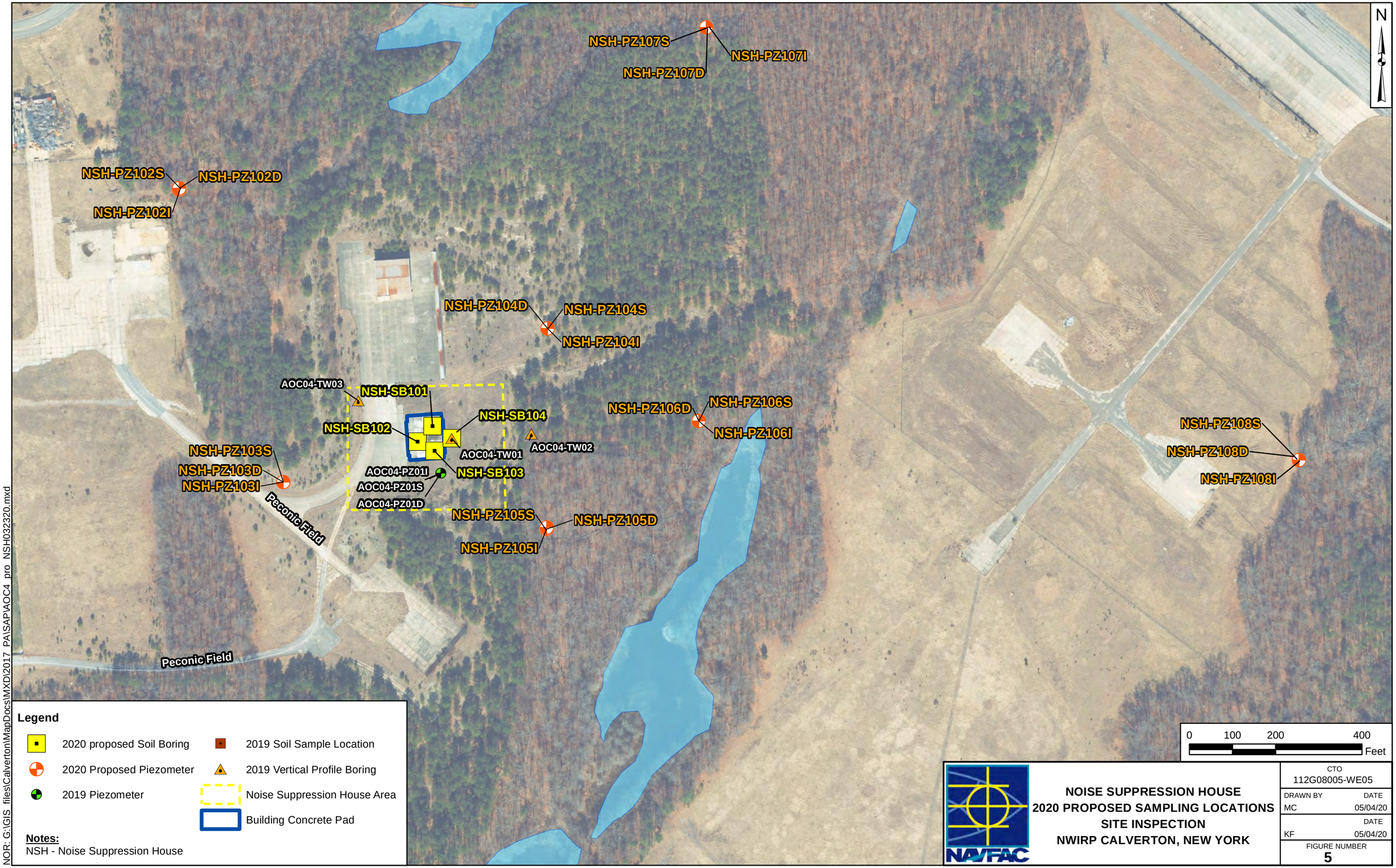

Legend

- 2020 proposed Soil Boring
- 2020 Proposed Piezometer
- 2019 Piezometer
- 2019 Soil Sample Location
- 2019 Vertical Profile Boring
- Noise Suppression House Area
- Building Concrete Pad

Notes:
NSH - Noise Suppression House

NOR: G:\GIS files\Calverton\MapDocs\MXD\2017 PA\SAP\AOC4 pro NSH032320.mxd

NOISE SUPPRESSION HOUSE
2020 PROPOSED SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	
112G08005-WE05	
DRAWN BY	DATE
MC	05/04/20
	DATE
KF	05/04/20
FIGURE NUMBER	
5	

Legend

- 2020 Proposed Piezometer
- 2020 Proposed Temporary Well
- 2020 Proposed Soil Sample Location
- Site 7 Monitoring Well
- 2019 Piezometer
- 2019 Soil Boring (continuous macrocore)
- 2019 Vertical Profile Boring
- 2019 Soil Sample Location
- Cesspool
- Leach Fuel Chamber
- Public Water Supply Well
- Drainage
- Building Outline
- Fuel Storage Terminal Area

Notes:
FST - Fuel Storage Terminal

FST-TW03
FST-SB03
FST-TW04
FST-SB04
AOC05-TW06
SV11/MW40
FST-SB05
AOC05-TW05
FDSV15
AOC05-TW04
AOC05-TW03
FDMW07I
FDMW07S
FST-PZ07I1
FDMW02I
FDMW02S
FST-PZ02I1
Aboveground Fuel Storage Tanks
AOC05-TW02
06-78 (327)
AOC05-PZ01D
AOC05-PZ01S/SB01
AOC05-PZ01I
AOC05-TW01
AOC05-SS02/SB02
FST-PZ106D
FST-PZ106S
FST-PZ106I
FST-PZ105S
FST-PZ105I
FST-PZ105D
RWD 12-1
FST-PZ104D
FST-PZ104S
FST-PZ104I
FST-PZ103S
FST-PZ103D
FST-PZ103I

N

0 50 100 200 Feet

NOR: G:\GIS_files\CalvertonIMapDocs\MXD\2017_PA\SAP\AOC5_pro_SAP061020.mxd

FUEL STORAGE TERMINAL
2020 PROPOSED SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	112G08005-WE05
DRAWN BY	KB
DATE	06/23/20
CHECKED BY	KF
DATE	06/23/20
FIGURE NUMBER	6

Legend

- 2020 Proposed Temporary Well
- 2020 Proposed Soil Sample Location
- 2019 Piezometer
- 2019 Soil Sample Location
- Cesspool
- Storm Drain
- Drainage
- Flight Emergency Shelter Area

Notes:
FES - Flight Emergency Shelter

FES-SB11
FES-TW11
FES-TW09
FES-SB09
AOC08-PZ01S
AOC08-PZ01I
AOC08-PZ01D
AOC08-SB02
AOC08-SS02
FES-SB10
FES-TW10
FES-TW07
FES-SB07
AOC08-SB03
AOC08-SS03
FES-SB08
FES-TW08
FES-TW06
FES-SB06
FES-TW04
FES-SB04
AOC07-PZ01S
AOC07-PZ01I
AOC07-PZ01D
FES-TW03
FES-SB03
AOC07-SB02
AOC07-SS02
FES-SB05
FES-TW05
Burman Blvd

N

0 75 150 300 Feet

NAVFAC

FLIGHT EMERGENCY SHELTER
2020 PROPOSED SOIL AND GROUNDWATER GRAB SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	112G08005-WE05
DRAWN BY	MC
DATE	05/04/20
CHECKED BY	KF
DATE	05/04/20
FIGURE NUMBER	7

NOR: G:\GIS_files\CalvertonMapDocs\MXD\2017_PA\SAPAOC78_PropSamples031720.mxd

Legend

- 2020 Proposed Piezometer
- 2019 Piezometer
- 2019 Vertical Profile Boring
- 2019 Soil Sample Location
- 2019 Vertical Profile Boring/Soil Boring
- Cesspool
- Storm Drain
- Drainage
- Flight Emergency Shelter Area

Notes:
FES - Flight Emergency Shelter

N

AOC12-SB01
AOC12-PZ01S
AOC12-PZ01I
AOC12-PZ01D
AOC12-TW02
AOC12-TW01
AOC12-TW03
FES-PZ107I
FES-PZ107S
FES-PZ107D
FES-PZ104S
FES-PZ104I
FES-PZ104D
FES-PZ105S
FES-PZ105I
FES-PZ105D
FES-PZ106S
FES-PZ106I
FES-PZ106D
Unnamed Street
FES-PZ101S
FES-PZ101I
FES-PZ101D
AOC08-TW01
AOC08-PZ01S
AOC08-SB02
AOC08-PZ01I
AOC08-SS02
AOC08-PZ01D
FES-PZ102S
FES-PZ102I
FES-PZ102D
AOC08-SB03
AOC08-SS03
AOC08-TW02
AOC08-TW03
AOC07-SB01
AOC07-PZ01S
AOC07-PZ01I
AOC07-PZ01D
AOC07-TW01
AOC07-TW03
AOC07-TW02
AOC07-SB02
AOC07-SS02
FES-PZ103S
FES-PZ103I
FES-PZ103D
AOC06-TW01
AOC06-PZ01D
AOC06-PZ01S
AOC06-PZ01I
AOC06-TW02/SB01
AOC06-SS03/SB03
AOC06-TW04
Burman Blvd
AOC06-TW03
AOC06-SS02/SB02
Scott Ave
Jan Way

0 200 400 800 Feet

NOR: G:\GIS files\Calverton\MapDocs\MXD\2017 PA\SAP\AOC78 proFES 032320.mxd

NAVFAC

FLIGHT EMERGENCY SHELTER
2020 PROPOSED PIEZOMETERS AND SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	
112G08005-WE05	
DRAWN BY	DATE
MC	05/04/20
CHECKED BY	DATE
KF	05/04/20
FIGURE NUMBER	
8	

Legend

- 2020 Piezometer
- 2020 Vertical Profile Boring
- 2019 Piezometer
- 2019 Soil Sample Location
- 2019 Vertical Profile Boring
- 2019 Vertical Profile Boring/Soil Boring
- Drainage
- Fence Line
- Area of Concern

AOC09-TW02
AOC09-PZ01D
AOC09-PZ01I
AOC09-PZ01S
AOC09-TW03
AOC09-TW04
AOC09-PZ02S
AOC09-TW01
AOC09-SB01
AOC09-SB03
AOC09-SS02
AOC09-SB02
AOC09-PZ03S
AOC09-PZ04S
AOC09-TW17
AOC09-TW18
AOC09-PZ05S
AOC09-TW15
AOC09-TW16
AOC09-TW05
AOC09-TW06
AOC09-TW07/SB07
AOC09-PZ06S
AOC09-PZ06I
AOC09-PZ06D
AOC09-TW08
AOC09-TW09
AOC-09-TW10
AOC-09-TW11
AOC-09-TW12
AOC-09-TW13
AOC-09-TW14

Calverton Dr
Princeton Blvd
Kay Rd
Calverton Ct
Wading River Manor Rd
Scott Ave
Burman Blvd
Jan Way
Swan Pond Rd
Unnamed Street
Peconic Field
Peconic Field

N

0 400 800 1,600 Feet

NAVFAC

AREA OF CONCERN 09
2020 PROPOSED SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO	112G08005-WE05
DRAWN BY	MC
DATE	05/04/20
CHECKED BY	KF
DATE	05/04/20
FIGURE NUMBER	9

NOR: G:\GIS_files\Calverton\MapDocs\MXD\2017_PA\SAP\AOC09_041920.mxd

N

Runway 32-14

AOC11-TW36
AOC11-PZ02S
AOC11-TW35
AOC11-TW34
AOC11-TW33
AOC11-TW32
AOC11-TW31
AOC11-TW30
AOC11-TW29
AOC11-TW28
A0C11-PZ03S
AOC11-PZ01S
AOC11-PZ01I
AOC11-PZ01D
AOC11-SB01
AOC11-TW02
AOC11-TW03
AOC11-TW04
AOC11-TW05
AOC11-TW06
AOC11-TW07
AOC-11
AOC11-TW01
AOC-10
AOC10-TW01
AOC10-PZ01S
AOC10-PZ01I
AOC10-PZ01D
AOC10-SB01
AOC10-TW03
AOC10-TW04
AOC10-TW05
AOC10-TW06
AOC10-TW07
AOC10-TW08
AOC10-TW02
AOC10-PZ02D
AOC10-PZ02S
AOC10-PZ02I
AOC10-SB27
AOC10-TW27
AOC10-TW26
AOC10-TW25
AOC10-TW24
AOC10-TW23
AOC10-TW22
AOC10-SB22
AOC10-TW13
AOC10-SB13
AOC10-TW15
AOC10-TW19
AOC10-TW21
AOC10-TW14
AOC10-TW16
AOC10-TW17
AOC10-TW18
AOC10-TW20

900 0 900
Feet

Legend

- 2020 Proposed Piezometer
- 2020 proposed Vertical Boring
- 2020 Proposed Soil Boring (continuous macrocore)
- 2019 Piezometer
- 2019 Vertical Profile Boring
- 2019 Soil Boring (continuous macrocore)
- Drainage
- Area of Concern

Aerial photographs provided by the NYS GIS Clearinghouse 2016

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AREAS OF CONCERN - 10 AND 11
PROPOSED 2020 VERTICAL PROFILE BORINGS AND PIEZOMETER LOCATIONS
NWIRP CALVERTON, NEW YORK

CTO
112G08005-WE05
DRAWN BY: CT — DATE: 05/04/20
CHECKED BY: KF — DATE: 05/04/20
FIGURE NUMBER: 10

NOR: G:\GIS files\Calverton\MapDocs\MXD\2017 PA\SAP\AOC10 Proposed 2020 Locations 042720.mxd

N

AOC12-PZ01D
AOC12-PZ01I
AOC12-PZ01S

AOC09-PZ01D
AOC09-PZ01I
AOC09-PZ01S

FES-PZ107I
FES-PZ107S
FES-PZ107D

FES-PZ104D
FES-PZ104S
FES-PZ104I

AOC09-PZ02S

FES-PZ105D
FES-PZ101I
FES-PZ101S
FES-PZ105I
FES-PZ105S
FES-PZ101D

AOC11-PZ02S

FES-PZ106D
FES-PZ106S
FES-PZ106I

AOC08-PZ01D
AOC08-PZ01I
AOC08-PZ01S

FES-PZ102I
FES-PZ102S
FES-PZ102D

AOC07-PZ01I
FES-PZ103S
AOC06-PZ01I
AOC07-PZ01D
FES-PZ103I
AOC07-PZ01S
AOC06-PZ01D
FES-PZ103D
AOC06-PZ01S

AOC11-PZ01D
AOC11-PZ01I
AOC11-PZ01S

AOC09-PZ03S

FDMW15S
FDMW12S
FDMW19S
FDMW11I
FDMW16S
FDMW11S
FD-SV11/MW40S
FST-PZ07I1
FDMW07S
AOC05-PZ01I
FD-SV15
FDMW07I
AOC05-PZ01D
AOC05-PZ01S
FST-PZ02I1
FST-PZ106D
FDMW02I
FST-PZ106I
FDMW02S
FST-PZ106S

AOC02-PZ03D
AOC02-PZ03S
AOC02-PZ03I
AOC02-PZ02S
AOC02-PZ02I
AOC02-PZ02D

NSH-PZ02D
NSH-PZ02I
NSH-PZ02S
NSH-PZ07D
NSH-PZ07S
NSH-PZ07I
NSH-PZ04D
NSH-PZ04I
NSH-PZ04S
APH-PZ101D
APH-PZ101I
APH-PZ101S
NSH-PZ03I
NSH-PZ03S
NSH-PZ03D
NSH-PZ06S
NSH-PZ06D
NSH-PZ06I
AOC04-PZ01I
AOC04-PZ01D
AOC04-PZ01S
NSH-PZ08S
NSH-PZ08D
NSH-PZ08I
NSH-PZ05I
NSH-PZ05D
NSH-PZ05S
FC-PZ05I1
FC-MW05I
FC-MW05S
SA-PZ194I1
SA-MW130S
SA-MW130I
SA-PZ193I1

AOC10-PZ01D
AOC10-PZ01I
AOC10-PZ01S

AOC10-PZ02D
AOC10-PZ02I
AOC10-PZ02S

FST-PZ105I
FST-PZ105D
FST-PZ105S

AOC01-PZ03D
AOC01-PZ03S
AOC01-PZ03I

AOC09-PZ04S

FST-PZ104I
FST-PZ104D
FST-PZ104S

AOC01-PZ01I
AOC01-PZ01D
AOC01-PZ01S

FC-MW06S

FC-MW02IR1
FC-MW02SR1

AOC01-PZ02I
AOC01-PZ02D
AOC01-PZ02S

FC-MW03SR1

FST-PZ103I
FST-PZ103D
FST-PZ103S

FT-MW01I
FT-MW01S

AOC02-PZ01S
AOC02-PZ01D
AOC02-PZ01I

FT-PZ451S

FT-MW03S

FT-MW02I

McKay Lake

FT-PZ454S

APH-PZ102D

SA-PZ149I1

FT-MW02S

FT-PZ452S

FTGA10

APH-PZ102I
APH-PZ102S

SA-MW126S

SA-PZ-180I

FT-MW07S

FT-MW08I

SA-MW126I

SA-MW128S
SA-MW128I
SA-MW128D

SA-MW129S
SA-MW129D
SA-MW129I

FT-MW08S

FT-PZ453

SA-MW126D

SA-MW127D
SA-MW127I
SA-MW127S

AOC09-PZ05S

AOC09-PZ06D
AOC09-PZ06S
AOC09-PZ06I

SA-PZ135I

FT-PZ-455I
FT-PZ-455S

Peconic River

Swan Pond

FT-PZ-459I
FT-PZ-459S

FT-PZ-462I
FT-PZ-462S

FT-PZ-458I
FT-PZ-458S

FTGA13

FT-PZ-457S

Donahue Pond

FT-PZ-456I
FT-PZ-456S

Legend

- Proposed Sampling
- Monitoring Well/Piezometer
- Staff Gauge

Aerial photographs provided by the NYS GIS Clearinghouse, 2016.

1,250 0 1,250 Feet

NAVFAC

PROPOSED SAMPLING LOCATIONS
SITE INSPECTION
NWIRP CALVERTON, NEW YORK

CTO 112G08005-WE05
DRAWN BY — DATE —
CHECKED BY — DATE 05/04/20
FIGURE NUMBER 11

NOR: G:\GIS_files\Calverton\MapDocs\MXD\2020\PFAS\Site2_SamplingLocs.mxd