

**LETTER WORK PLAN
AREA OF CONCERN 13, F-14 CRASH
PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK**

Introduction

The Navy is conducting a Site Inspection (SI) at Area of Concern 13, F-14 crash, to evaluate the presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and surface water 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.

The F-14 crash was initially identified in the 2018 Preliminary Assessment (PA) for PFAS. In 1970, an F-14 crashed in the southeast buffer of the NWIRP, just south of the Long Island Railroad, and north of the Long Island Expressway on the approach to Runway 32-14. The aircraft burned at the crash site but it was unknown if aqueous film forming foam containing PFAS was used to address the crash. In 2019 and 2020, the Navy conducted further evaluation of this crash by going door-to-door with surveys at properties in the neighborhood to the east and interviewing individuals that were near the area when the crash occurred. As a result, the Navy was able to locate the F-14 crash site (AOC-13) and is conducting an SI for PFAS. The objectives of the SI are as follows.

Groundwater Sampling

- (1) Test groundwater that is migrating from AOC-13 for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorobutanesulfonic acid (PFBS) and, if present, evaluate whether concentrations exceed the Department of Defense (DoD) screening level.¹

¹ An October 15, 2019, DoD Memorandum, Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program, provides direction to use toxicity criteria from the USEPA Regional Screening Level (RSL) Calculator (April 6, 2018) to calculate RSLs for PFOA, PFOS, and PFBS in groundwater. The calculated screening levels are used to determine if further investigation is warranted or if a site can proceed to site closeout. Therefore, the DoD-recommended groundwater screening levels calculated using an HI of 0.1 for PFOA, PFOS, and PFBS are 0.040 micrograms per liter (µg/L) (or parts per billion [ppb]), 0.040 µg/L, and 40 µg/L, respectively.

- (2) Test upgradient groundwater for PFOA, PFOS, and PFBS and, if present, evaluate the potential for an upgradient source.
- (3) Verify groundwater water flow towards the north, north east.

Surface Water Sampling

- (1) Test surface water for PFOA, PFOS, and PFBS in the Peconic River upstream and downstream from AOC-13, and if present, evaluate whether a potential release is contributing to the levels of these compounds in the river.

To achieve the objectives, this Work Plan includes the installation of vertical profile borings and piezometers. Groundwater grab samples will be collected from the vertical profile borings, water levels will be collected from the piezometers, and surface water samples will be collected from the Peconic River. Surface water 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 Figure 2.

Soil Borings (Macrocore Collection)

Direct Push Technology (DPT) will be used to collect macrocores to 60 feet bgs at AOC13-TW01 and ACO13-TW03. Macrocores will be collected to the water table at each piezometer location to determine the depth of the groundwater. Lithology from these soil borings will be used to determine 1) the depth of the water table and actual depths of the groundwater grab samples; 2) the screen depth for each of the piezometers. Waste soil cuttings will be placed back into the soil boring as practical or containerized as investigation derived waste (IDW).

Vertical Profile Borings (Groundwater Grab Sampling)

Vertical profile borings will be installed via DPT to collect groundwater grab samples for PFAS analysis at AOC-13. The sample nomenclature and estimated depths of the vertical profile boring is summarized on Table 2. Vertical profile boring locations are presented on Figure 2.

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 at a depth of 5 to 15 feet bgs. Groundwater grab samples will then be collected from 4- or 5-foot screens at 10-foot intervals to 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, Development, and Water Level Collection

Piezometers will be installed at four locations to evaluate the direction of groundwater flow, which is anticipated to the north, northeast towards the Peconic River. Piezometers will be installed at the water table (approximately 5 to 15 feet bgs). The shallow well screens will be set 2 feet above and 8 feet below the water table. The elevation of the piezometers will be surveyed and a round of water levels will be collected from each location to confirm the direction of groundwater flow to the north, north east of the crash site. The well locations and approximate depth are presented in Table 3. The locations of the piezometers are presented on Figure 2.

Piezometers will be constructed with 1 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.

Surface Water Sampling

The Peconic River is easterly flowing and located north of the crash site. Past flow net studies (conducted south of the former NWIRP) indicated that groundwater north of the Peconic River flows to the south and groundwater south of the Peconic River flows to the north with the ultimate discharge to the Peconic River. Surface water samples will be collected upstream and downstream from AOC-13 at the Peconic River to evaluate whether PFAS are potentially

impacting water quality. Surface water samples will be collected at one accessible upstream location and one accessible downstream location. Sample details and nomenclature for the surface water samples are presented in Table 2.

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.

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 AOC-13 investigation will be presented in an SI report with recommendations for the path forward.

This page intentionally left blank

TABLES

This page intentionally left blank

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
Perfluorooctanesulfonic 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
Perfluorooctanesulfonamide	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
AREA OF CONCERN 13
GROUNDWATER GRAB SAMPLE AND SURFACE WATER SAMPLE DETAILS AND NOMENCLATURE
PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK
PAGE 1 OF 1

		Sample Depth (feet bgs) ¹			
Location	Sample ID	10-15	25 - 30	40 - 45	55 - 60
Vertical Profile Boring					
AOC13-TW01	AOC13-TW01-XXXX	X	X	X	X
AOC13-TW02	AOC13-TW02-XXXX	X	X	X	X
AOC13-TW03	AOC13-TW03-XXXX	X	X	X	X
AOC13-TW04	AOC13-TW04-XXXX	X	X	X	X
AOC13-TW05	AOC13-TW05-XXXX	X	X	X	X
AOC13-TW06	AOC13-TW06-XXXX	X	X	X	X
AOC13-TW07	AOC13-TW07-XXXX	X	X	X	X
Surface Water Sample Location					
AOC13-SW01	AOC13-SW01-2020MMDD	NA			
AOC13-SW02	AOC13-SW02-2020MMDD	NA			

XXXX - Depth of sample. Example - If groundwater was collected at AOC13-TW01 at a depth of 25 feet to 30 feet bgs, then the Sample ID would be AOC13-TW01-2530.

bgs - below ground surface.

NA - not applicable.

1. Grab samples will be collected beginning at the water table (approximately 5 to 15 feet bgs) then at every 10 feet to 60 feet bgs. Actual depths will be confirmed in the field by observing lithology from macrocores.

TABLE 3
AREA OF CONCERN 13
PROPOSED PIEZOMETER LOCATIONS AND DEPTHS
PER- AND POLYFLUOROALKYL SITE INSPECTION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK
PAGE 1 OF 1

LOCATION	SCREEN DEPTH INTERVAL (FEET BGS)⁽¹⁾
AOC13-PZ01S	5-15
AOC13-PZ02S	5-15
AOC13-PZ03S	5-15
AOC13-PZ04S	5-15

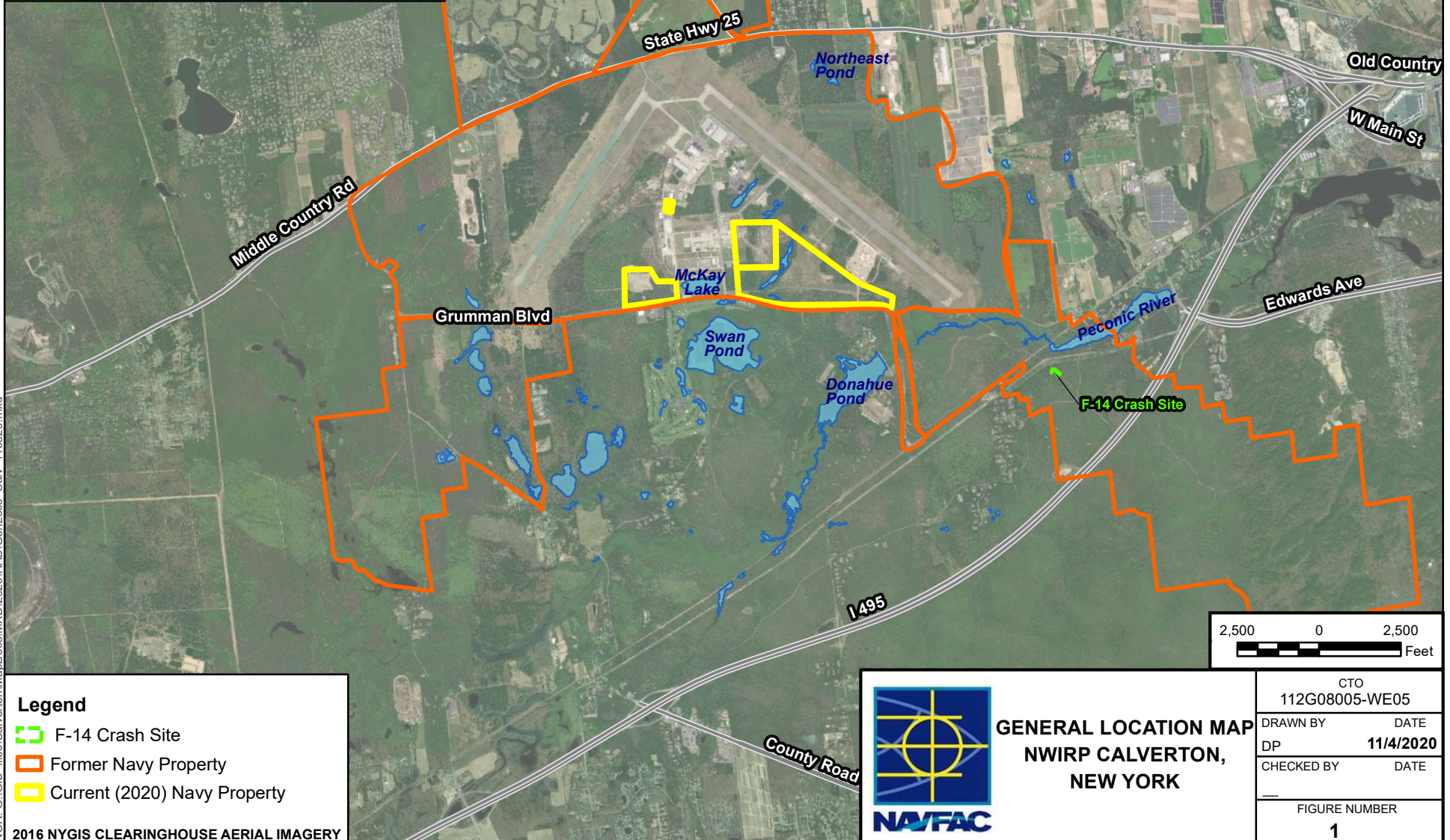
BGS - below ground surface.

1. Macrocores will be collected to the water table. Screen intervals may be revised based on the actual depth of the water table.

This page intentionally left blank

FIGURES

This page intentionally left blank



Legend

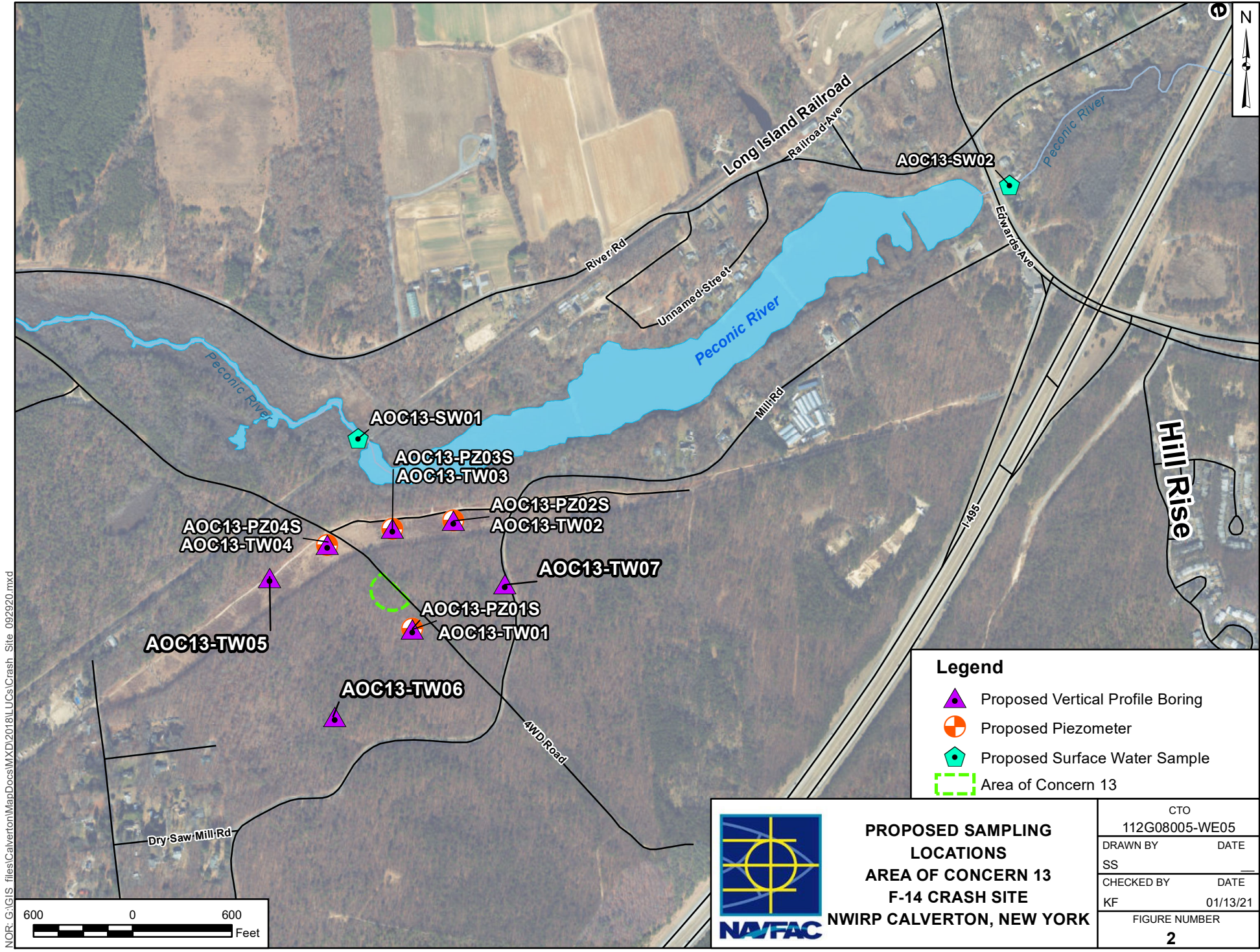
- F-14 Crash Site
- Former Navy Property
- Current (2020) Navy Property

2016 NYGIS CLEARINGHOUSE AERIAL IMAGERY

GENERAL LOCATION MAP
NWIRP CALVERTON,
NEW YORK

CTO 112G08005-WE05	
DRAWN BY DP	DATE 11/4/2020
CHECKED BY	DATE
FIGURE NUMBER 1	

NOR: G:\GIS_files\Calverton\MapDocs\IMXD\2020\RAB\GenLocs Calv 110320.mxd



NDR: G:\GIS files\Calverton\MapDocs\MXD\2018\18LUCs\Crash_Site_092920.mxd

- Legend**
- Proposed Vertical Profile Boring
 - Proposed Piezometer
 - Proposed Surface Water Sample
 - Area of Concern 13



**PROPOSED SAMPLING
LOCATIONS
AREA OF CONCERN 13
F-14 CRASH SITE
NWIRP CALVERTON, NEW YORK**

CTO	
112G08005-WE05	
DRAWN BY	DATE
SS	
CHECKED BY	DATE
KF	01/13/21
FIGURE NUMBER	
2	