FINAL
Remedial Investigation
Quality Assurance Project Plan
Albany Army Aviation Support Facility #3, New York

Remedial Investigations (RI) / Feasibility Studies (FS), Decision Documents, Time and Non-Time Critical Removal Actions (TCRA/NTCRA) for Per- and Polyfluoroalkyl Substances (PFAS) Impacted Sites, Army National Guard Installations, Nationwide

July 2025

Prepared for:

Army National Guard Bureau
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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
6:2 FTS	6:2 fluorotelomer sulfonic acid
8:2 FTS	8:2 fluorotelomer sulfonic acid
A2P JV	AECOM Arcadis PFAS Joint Venture
AASF	Army Aviation Support Facility
ACP	access control point
AECOM	AECOM Technical Services, Inc.
AEL	Advanced Environmental Laboratories, Inc.
AFCEC	Air Force Civil Engineer Center
AFD	Albany Fire Department
AFFF	aqueous film forming foam
AHA	Activity Hazard Analysis
ALS	ALS Environmental
amu	atomic mass unit
amsl	above mean sea level
AOI	Area of Interest
APP	Accident Prevention Plan
ARAR	Applicable or Relevant and Appropriate Requirement
Arcadis	Arcadis U.S., Inc.
ARNG	Army National Guard
ASTM	American Society for Testing and Materials
BA	Bachelor of Arts
BAA	Broad Agency Announcement
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BS	Bachelor of Science
Ca	calcium
CAS	Chemical Abstracts Service
CCB	continuing calibration blank
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CoC	chain of custody
COC	chemical of concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CPR	cardiopulmonary resuscitation
CSM	conceptual site model
DA	Department of the Army

DD	Decision Document
DERP	Defense Environmental Restoration Program
DL	detection limit
DMA	Demonstration of Method Applicability
DO	dissolved oxygen
DoD	Department of Defense
DPT	direct push technology
DQI	data quality indicator
DQL	data quality limit
DQO	data quality objective
DUA	data usability assessment
Dup	duplicate
EA	EA Engineering, Science, and Technology, Inc. PBC
ECF	electrochemical fluorination
EDD	electronic data deliverable
EIS	extracted internal standards
ELAP	Environmental Laboratory Accreditation Program
ELCR	excess lifetime cancer risk
EM	Engineer Manual
EPC	exposure point concentration
EQuIS	Environmental Quality Information System
ERA	ecological risk assessment
ERB	equipment rinsate blank
ESI-L	Environmental Standards International – Low Concentration Tuning Mix
ESTCP	Environmental Security Technology Certification Program
ESV	Ecological Screening Value
EtFOSE	N-ethyl perfluorooctane sulfonamidoethanol
Eurofins	Eurofins Lancaster Laboratory
FAA	Federal Aviation Administration
FD	field duplicate
FHUEA	2H-perfluoro-2-octenoic acid
FMS	field maintenance shop
FOUEA	2H-perfluoro-2-decenoic Acid
FRB	field reagent blank
FS	Feasibility Study
FTOH	Fluorotelomer alcohols
FTS	fluorotelomer sulfonic acid
FWHM	Full Width at Half Maximum
GIS	geographic information systems
GPS	global positioning system
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid

HHRA	human health risk assessment
HI	Hazard Index
HRTW	Hazardous, Toxic, and Radioactive Waste
HSA	hollow stem auger
IB	instrument blank
ICAL	initial calibration
ICB	initial calibration blank
ICV	initial calibration verification
IDQTF	Intergovernmental Data Quality Task Force
IDW	investigation-derived waste
I&E	Installations and Environment
ISC	instrument sensitivity check
ITRC	Interstate Technology Regulatory Council
JV	joint venture
KY	Kentucky
LC/MS/MS	liquid chromatography tandem mass spectrometry
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
LOD	limit of detection
LOQ	limit of quantitation
MB	method blank
MBA	Master of Business Administration
MD	matrix duplicate
MDL	method detection limit
ME	Maine
mg/L	milligrams per liter
MI	Michigan
mL	milliliter
µg/kg	micrograms per kilograms
MO	Missouri
MPC	measurement performance criteria
MS	Master of Science
MS	matrix spike
µS/cm	micro Siemens per centimeter
MSD	matrix spike duplicate
mV	millivolts
m/z	mass-to-change ratio
NA	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDIR	nondispersive infared
NELAP	National Environmental Laboratory Accreditation Program
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
N-Et-FOSE	N-ethyl perfluorooctanesulfonamidoethanol

ng/L	nanograms per liter
NIS	non-extracted internal standard
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NTCRA	Non-Time Critical Removal Action
NTU	nephelometric turbidity unit
NY	New York
NYARNG	New York Army National Guard
NYSDEC	New York State Department of Environmental Conservation
NYDMNA	New York Division of Military and Naval Affairs
OPSEC	Operational Security
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
OSHA	Occupational Safety and Health Administration
OWS	oil-water separator
oz	ounce
PA	Preliminary Assessment
Pace	Pace South Carolina
PAO	Public Affairs Office
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PDT	Project Delivery Team
PE	Professional Engineer
PFAA	perfluoroalkyl acid
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFCA	perfluoroalkyl carboxylic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFDS	perfluorodecanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHpS	perfluoroheptanesulfonic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFMBA	perfluoro-4-methoxybutanoic acid
PFMPA	perfluoro-3-methoxypropanoic acid
PFNA	perfluorononanoic acid
PFNS	perfluorononanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFOSA	perfluorooctanesulfonamide
PFPA	perfluoropentanoic acid
PFPeA	perfluoropentanoic acid

PFPrA	perfluoropropanoic acid
PFSA	perfluoroalkyl sulfonic acid
PFTeDA	perfluorotetradecanoic acid
PFUdA	perfluoroundecanoic acid
PFUnA	Perfluoroundecanoic acid
PG	Professional Geologist
PhD	Doctor of Philosophy
PID	photoionization detector
PM	Project Manager
PMP	Project Management Professional
PP	polypropylene
PPE	personal protective equipment
ppm	parts per million
PQAPP	Programmatic Quality Assurance Project Plan
PRG	Preliminary Remediation Goal
PSC	Pace South Carolina
PWS	Performance Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QL	quantitation limit
QSM	Quality Systems Manual
RAGS	Risk Assessment Guidance for Superfund
RF	response factor
RI	Remedial Investigation
ROE	right of entry
RPD	relative percent difference
RSC	Rapid Site Characterization
RSD	relative standard deviation
RSL	Regional Screening Level
RT	retention time
SC	specific conductance
SDG	sample delivery group
SERDP	Strategic Environmental Research and Development Program
SGS	SGS North American, Inc.
SHPO	State Historic Preservation Officer
SI	Site Inspection
SL	Screening Level
SLERA	Screening-Level Ecological Risk Assessment
S/N	signal to noise ratio
SOP	standard operating procedure
SP	screen point
SPE	solid phase extraction

SS	Site Supervisor
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SU	sampling unit
TAT	turn-around time
TBD	to be determined
TCRA	Time Critical Removal Action
T&E	threatened and endangered
THPO	Tribal Historic Preservation Officer
TO	task order
TOC	total organic carbon
TPP	technical project planning
TSA	Technical System Audit
UCL	upper confidence limit
UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UU/UE	unlimited use/unrestricted exposure
VSP	Visual Sample Plan

1.0 Introduction

1.1 Project Authorization

This Remedial Investigation (RI) Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) (also referred to as the "QAPP") addresses RI activities to be completed at the Albany Army Aviation Support Facility (AASF) #3 (also referred to as the "Albany AASF #3" and the "facility"), in Latham, New York. RI activities for the facility will be conducted over multiple mobilizations, including Prescriptive, Adaptive, and Final Characterization/Monitoring Phases. This UFP-QAPP describes the sampling design for the Prescriptive Phase and overall technical approach for the RI program. Additional planning documents will be prepared for subsequent phases of work.

The Army National Guard (ARNG) Installations and Environment (I&E) is the lead agency in performing *Remedial Investigations (RIs)/Feasibility Studies (FSs), Decision Documents (DDs), Time and Non-Time Critical Removal Actions (TCRA/NTCRA) for Per- and Polyfluoroalkyl Substances (PFAS) Impacted Sites, ARNG Installations, Nationwide*. Documents and reports for subsequent phases of work including the FS, DDs, and TCRA/NTCRA, will be prepared under separate covers, as applicable. This work is supported by the United States (U.S.) Army Corps of Engineers (USACE) Baltimore District and their contractor AECOM Technical Services, Inc. (AECOM)-Arcadis U.S., Inc. (Arcadis) PFAS Joint Venture (JV; herein referred to as the "A2P JV") under Contract Number W912DR-23-D-0007, Task Order (TO) *W912DR23F0388* issued 27 September 2023, and Performance Work Statement (PWS) dated 25 September 2023 (referred to as TO #02). Execution of this work will be performed by the A2P JV.

Programmatically, the ARNG is assessing the potential environmental impacts primarily from aqueous film forming foam (AFFF) and similar chemical releases suspected at their properties related to processes that used PFAS (e.g., fire training, firefighting, and metal plating). A Preliminary Assessment (PA) and Site Inspection (SI) were performed at each of the facilities associated with these TOs under a separate contract on behalf of the ARNG. The PA determined whether there were potential sources and releases to the environment related to processes that used PFAS-containing materials. Based on the findings of the PAs, certain ARNG facilities moved forward to the SI phase for further evaluation. The SIs evaluated the presence or absence of relevant PFAS concentrations above screening levels (SLs), as established by the Office of the Assistant Secretary of Defense (OSD) policy (Assistant Secretary of Defense, 2023). Based on the findings of the SI, ARNG facilities where the presence of relevant PFAS was confirmed to exceed the SLs moved forward to the RI phase.

The RI project elements will be performed by A2P JV in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; US Environmental Protection Agency [USEPA], 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (also referred to as the "National Oil and Hazardous Substances Pollution Contingency Plan [NCP]"; 40 Code of Federal Regulations [CFR] Part 300; USEPA, 1994), and in compliance with US Department of the Army (DA) requirements and guidance for field investigations, including specific requirements for sampling for PFAS. The term PFAS will be used throughout this QAPP to encompass all PFAS being evaluated in the RI. Those PFAS with accepted SLs are considered "relevant compounds" at the time of development of this QAPP and will be assessed and updated accordingly if changes to policy, including screening level updates, are formally accepted by OSD.

1.2 RI Purpose

The objective of the RI is to determine the nature and extent of PFAS above SLs at the Areas of Interest (AOIs) identified in the PA and the SI where the presence of relevant PFAS was confirmed during the SI.

Additionally, the RI will gather sufficient data to define release areas, potential migration pathways, potential receptors, and associated exposure routes. The data will support informed risk management decisions, including whether, or to what extent, a threat to human health or the environment exists.

1.3 QAPP Document Organization

This QAPP meets the requirements and elements set forth in the UFP for QAPPs (Intergovernmental Data Quality Task Force [IDQTF], 2005a-c) and *EPA Requirements for Quality Assurance Project Plans* (USEPA, 2001). The QAPP is comprehensive to the extent practicable and does not refer to or rely on separate work plans, consistent with the USEPA's intent that the QAPP be the premier planning document for an entire project (IDQTF, 2012). Minimizing the existence of separate work plans maintains consistency across project elements and optimizes the administrative effort required to review and revise project documents. The components that are covered under this QAPP are described in **Table 1-1** below.

Table 1-1 Components of the RI QAPP

QAPP Worksheets
Worksheets #1 & #2 – Title and Approval Page and QAPP Identifying Information
Worksheets #3 & #5 – Project Organization and QAPP Distribution
Worksheets #4, #7, & #8 – Personnel Qualifications and Sign-off Sheet
Worksheet #6 – Communication Pathways
Worksheet #9 – Technical Project Planning Session Summary
Worksheet #10 – Conceptual Site Model
Worksheet #11 – Project/Data Quality Objectives
Worksheet #12 – Measurement Performance Criteria
Worksheet #13 – Secondary Data Uses and Limitations
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QAPP Worksheets
Worksheet #28 – Analytical Quality Control and Corrective Actions
Worksheet #29 – Project Documents and Records
Worksheets #31, #32, & #33 – Assessments and Corrective Action
Worksheet #34 – Data Verification and Validation Inputs
Worksheet #35 – Data Verification Procedures
Worksheet #36 – Data Validation Procedures
Worksheet #37 – Data Usability Assessment

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Worksheets #1 & #2: Title and Approval Page and QAPP Identifying Information

Facility Name/Project Name: Remedial Investigations (RIs)/Feasibility Studies (FSs), Decision Documents (DDs), Time and Non-Time Critical Removal Actions (TCRA/NTCRA) for Per- and Polyfluoroalkyl Substances (PFAS) Impacted Sites, ARNG Installations, Nationwide

Installation: Albany Aviation Support Facility #3, New York

Contract Work Assignment Number: USACE Contract No. W912DR-23-D-0007
Task Order No. W912DR23F0388

Relevant Plans and Reports from Previous Investigations: Relevant plans and reports from previous investigations are identified in the references cited in the introductory text that precedes these worksheets and in subsequent worksheets, as appropriate.

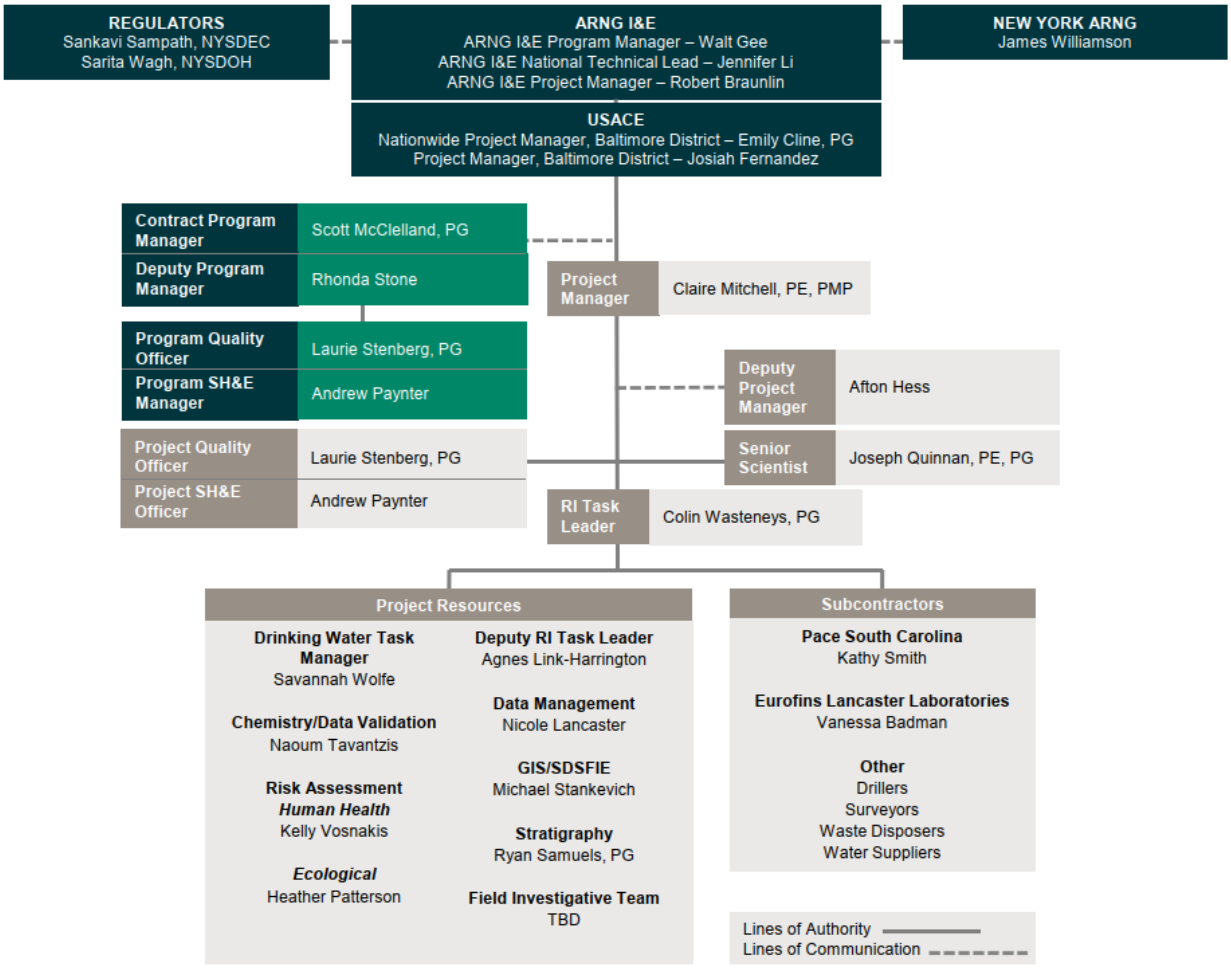
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Investigative Organization Project Manager Printed Name / Organization	Signature / Date Claire Mitchell, PEPMP / A2P JV Project Manager
	Afton Hess — Digitally signed by Afton Hess Date: 2025.07.05 09:40:43 -04'00'
Investigative Organization Deputy PM Printed Name / Organization	Signature / Date Afton Hess / A2P JV Deputy Project Manager
	Laurie Stenberg — Digitally signed by Laurie Stenberg Date: 2025.07.07 08:27:52 -04'00'
Investigative Organization Quality Manager Printed Name / Organization	Signature / Date Laurie Stenberg PG / A2P JV Program Quality Control Officer
	MOSLEY.CHARLTON.JAMES.1106473370 — Digitally signed by MOSLEY.CHARLTON.JAMES.1106473370 Date: 2025.07.07 16:43:28 -04'00'
Federal Project Lead Printed Name / Organization	Signature / Date LTC Charlton J. Mosley / Army National Guard I&E Program Manager
	WILLIAMSON.JAMES.LEO.1620863471 — Digitally signed by WILLIAMSON.JAMES.LEO.1620863471 Date: 2025.07.08 10:39:49 -04'00'
New York Army National Guard Printed Name / Organization	Signature / Date James Williamson / NYARNG Environmental Branch Chief
	CLINE.EMILY.JORDAN.1536813884 — Digitally signed by CLINE.EMILY.JORDAN.1536813884 Date: 2025.07.07 10:05:56 -04'00'
Contract Organization Project Manager Printed Name / Organization	Signature / Date Emily Cline, PG / USACE Baltimore District, Nationwide Program Manager

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Worksheets #3 & #5: Project Organization and QAPP Distribution

Figure 3-1 presents the organization chart, identifying key project personnel and outlining the lines of authority and communication for each RI among the ARNG, USACE, the prime contractor (A2P JV), and other stakeholders. Color coding indicates roles: green for program-level support, gray for project-level support, and blue for clients and other stakeholders. The QAPP will be distributed to all parties listed in **Figure 3-1**.

Figure 3-1 Project Organizational Chart



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Worksheets #4, #7 & #8: Personnel Qualifications and Sign-off Sheet

This worksheet contains a list of the key project personnel who are identified for performing the tasks that are defined in this QAPP and includes the personnel's organization, project role, education/experience, and specialized training/certifications. The personnel have signed and dated the worksheet to signify that they agree with the information in this QAPP and agree to implement it.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Scott McClelland, PG	A2P JV	Contract Program Manager	Education: BA, Geology; MS, Geology Experience. 31+ years; executing and managing environmental investigation and remediation projects including program management of USACE Baltimore contracts.	Professional Geologist, KY AECOM Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher	Signature available upon request.
Rhonda Stone, PMP	A2P JV	Deputy Contract Program Manager	Education: BS, Environmental Science Experience: 28+ years of experience. Program Manager/PM for Hazardous, Toxic and Radioactive Waste projects and USAEC Environmental Remediation Multiple Award contracts. Previously a Program Manager for the Army's Operational Range Assessment Program for the USAEC and USACE	PMP Certification Arcadis Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher Arcadis PFAS Training	Signature available upon request.
Claire Mitchell, PE, PMP	A2P JV	Project Manager	Education: BS, Civil Engineering Experience: 11+ years; environmental engineering experience, including task management for PFAS investigations for DoD clients; PFAS Technical Practice Lead Verifier.	Professional Engineer, MO PMP Certification AECOM Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher AECOM PFAS Sampling Training	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Afton Hess	A2P JV	Deputy Project Manager	Education: BS, Natural Resources and Environmental Management Experience: 19+ years project scientist/manager working on munitions response projects, PFAS PA/SI for USAEC Active Army projects, and PFAS RI for ARNG projects.	Arcadis Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher OSHA 8hr Supervisor Arcadis PFAS Training	Signature available upon request.
Joe Quinnan, PE, PG	A2P JV	Senior Scientist	Education: BS, MS Geological Engineering Experience: 33+ years; served as Global lead for site characterization, North American lead for emerging contaminants and technical lead for US Army PFAS PA/SI program, program technical lead for Army and Air Force PFAS RI program; technical lead for several USACE-led remediation projects for DoD, Principal Investigator for five ESTCP projects and three AFCEC BAA projects.	Professional Engineer, WI Professional Geologist, WI Arcadis PFAS Training	Signature available upon request.
Laurie Stenberg, PG	A2P JV	Project Quality Officer	Education: BA, Geology Experience: 31+ years; served as senior scientist for ORA Phase II Task Orders; experience with PFAS investigations.	Professional Geologist, Pennsylvania AECOM Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher AECOM PFAS Sampling Training	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Andrew Paynter	A2P JV	Federal Program Safety, Health, and Environment Manager	Education: Course Work in Environmental Health and Safety Experience: 19+ years working in the environmental and construction industries, 9+ years managing safety, health, and environment on construction, environmental, and remediation projects.	Construction Health and Safety Technician Safety Trained Supervisor Construction HAZWOPER 40hr Certification HAZWOPER 8hr Supervisor HAZWOPER 8hr Refresher OSHA 30hr Construction Safety Excavation Competent Person Trained Fall Protection Competent Person Trained MSHA 24-Hour NFPA 70 E	Signature available upon request.
Stephanie Tjan, PE	A2P JV	Program Coordinator – Processes	Education: BS, Civil Engineering; MS, Civil and Environmental Engineering Experience: 6+ years working on remediation projects in federal DoD contracts with experience in supporting/leading PFAS Site Inspections and Remedial Investigations.	Professional Engineer, MI OSHA 40hr HAZWOPER OSHA 8hr Refresher OSHA 10hr Construction First Aid/CPR AECOM PFAS Sampling Training AECOM Certified PM	Signature available upon request.
Savannah Wolfe	A2P JV	Program Coordinator – Resources / Drinking Water Task Manager	Education: BS, Chemistry; MS, Chemistry Experience: 5+ years working on remediation projects in federal DoD contracts with experience in supporting/leading PFAS Site Inspections and Remedial Investigations.	AECOM Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher First Aid/CPR AECOM PFAS Sampling Training	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Matt Costakis, PG	A2P JV	Program Coordinator – Field Work	Education: BS, Geology Experience: 17+ years managing environmental investigations; senior geologist for multiple PFAS investigations for DoD clients; task lead for multiple PFAS SIs and RIs for DoD clients; Environmental Site Characterization Practice Lead Verifier.	Professional Geologist, VA, TN OSHA 40hr HAZWOPER OSHA 30hr Construction Manager OSHA 8hr Refresher OSHA 8hr Supervisor AECOM PFAS Sampling Training	Signature available upon request.
Carla DaParma	A2P JV	Program Coordinator – Scheduling	Education: BS, Chemical Engineering Experience: 18+ years of experience in environmental investigations and remediation, including direct management experience with USACE for PFAS Investigations at multiple DoD facilities both Active Army, Air Force, and ARNG. Provide project quality control on PFAS investigations for Active Army installations.	Arcadis Certified PM OSHA 40-Hour HAZWOPER OSHA 8-Hour Refresher Arcadis PFAS Training	Signature available upon request.
Colin Wasteneys	A2P JV	RI/FS Task Manager	Education: BA, Geology Experience: 29+ years RI/FS and remedial construction experience for federal, state, and commercial/industrial clients. Managed multiple PFAS investigations in New York.	Professional Geologist, NY, CA AECOM Certified PM AECOM Safety Qualified Supervisor OSHA 30hr Construction Manager OSHA 40hr HAZWOPER OSHA 8hr Refresher OSHA 8hr Supervisor AECOM PFAS Sampling Training	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Agnes Link-Harrington	A2P JV	Deputy RI Task Manager	Education: BA, Geological Sciences and Mathematics; MS, Applied Environmental Geoscience Experience: 5+ years working on PFAS investigation and remediation projects, PFAS due diligence, and PFAS forensics at the local, state, and federal level.	OSHA 40-Hour HAZWOPER OSHA 8-Hour Refresher Arcadis PFAS Training	Signature available upon request.
Kelly Vosnakis	A2P JV	Human Health Risk Assessor	Education: BA, Environmental Studies; MS, Environmental Health Experience: 28+ years; performing multi-pathway, multi-media HHRAs, vapor intrusion assessment, exposure modelling, data management, experience with PFAS and DoD sites	PFAS Workshops	Signature available upon request.
Heather Patterson	A2P JV	Ecological Risk Assessor	Education: BS, Botany Experience: 18+ years; experience with ERAs, ecotoxicology, and sediment/water quality evaluations for DoD Sites; several years of PFAS risk experience.	OSHA 40hr HAZWOPER OSHA 8hr Refresher Wetland Delineation Certified	Signature available upon request.
David Parse, Jr., PG	A2P JV	Conceptual Site Modeling and Sequence Stratigraphy	Education: BA and MS, Geology Experience: 29+ years of executing environmental site investigations and remediation, including PFAS, for DoD clients; CSM Subject Matter Expert, including leading 42 complex Base-wide and/or facility-specific CSMs at DoD installations using sequence stratigraphy; AECOM PRISM® Team Lead.	Professional Geologist, TX AECOM Certified PM OSHA 40hr HAZWOPER OSHA 8hr Refresher 8hr OSHA Supervisor	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Ryan Samuels, PG	A2P JV	Conceptual Site Modeling and Sequence Stratigraphy	Education: BS, Geology/Applied Mathematics; MS, Sequence Stratigraphy Experience: 6+ years developing integrated hydrogeologic CSMs at some of the DoD's most complex remedial sites, including PFAS RI support. PRISM® subject matter expert.	Professional Geologist, VA OSHA 40hr HAZWOPER OSHA 8hr Refresher AECOM PFAS Sampling Training	Signature available upon request.
Corey Theriault, PE	A2P JV	Feasibility Studies / PFAS Treatment	Education: BS, Chemical Engineering Experience: 21+ years; North American technical expert for PFAS treatment technologies. Engineering manager for PFAS treatment systems at several US DoD installations.	Professional Engineer, ME/NH/OH/SC/WV 40 HR OSHA 8 HR OSHA Refresher Arcadis PFAS Training Trainer	Signature available upon request.
David Liles	A2P JV	Treatability Studies	Education: BS, Biology, MS, Biology Experience: 30+ years with Arcadis Treatability Laboratory; Currently managing Treatability Laboratory.	OSHA 40hr HAZWOPER OSHA 8hr Refresher	Signature available upon request.
Naoum Tavantzis	A2P JV	Project Chemist	Education: BA, Environmental Science; MBA Experience: 15+ years; project chemist for ORA Phase II TOs; PFAS Investigations, data validation, laboratory coordination; project chemist for ANG expanded SIs; PFAS Technical Practice Lead Verifier.	OSHA 40hr HAZWOPER OSHA 8hr Refresher OSHA 8hr Site Supervisor	Signature available upon request.

Name	Organization	Project Role	Education/Experience	Specialized Training / Certifications	Signature/Date
Michael Stankevich	A2P JV	GIS Specialist	Education: BA, Geography – Environmental Track Experience: 14+ years; completed SDSFIE submittals for multiple ARNG installations	NA	Signature available upon request.
Nicole Lancaster	A2P JV	Data Management	Education: BS, Marine Biology; MS, Chemistry Experience: 11+ years, experience with data validation, data management, laboratory coordination, and field sampling.	OSHA 40hr HAZWOPER OSHA 8hr Refresher First Aid/CPR AECOM PFAS Sampling Training	Signature available upon request.
Vanessa Badman	Eurofins Lancaster Laboratories	Laboratory Project Manager	Education: BS Biology Experience: 10 years laboratory and project management experience	NA	Signature available upon request.
Kathy Smith	Pace South Carolina	Laboratory Project Manager	Education: BS Environmental Science Experience: 23 years laboratory and project management experience	NA	Signature available upon request.

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
AECOM = AECOM Technical Services, Inc.
AFCEC = Air Force Civil Engineer Center
Arcadis = Arcadis U.S., Inc.
ARNG = Army National Guard
BA = Bachelor of Arts
BAA = Broad Agency Announcement
BS = Bachelor of Science
CA = California
CPR = cardiopulmonary resuscitation
CSM = Conceptual Site Model
DoD = Department of Defense
ERA = Ecological Risk Assessment
ESTCP = Environmental Security Technology Certification Program
FS = Feasibility Study
GIS = Geographic Information System
HAZWOPER = Hazardous Waste Operations and Emergency Response
HHRA = human health risk assessment
KY = Kentucky
MBA = Master of Business Administration
ME = Maine
MI = Michigan
MO = Missouri
MS = Master of Science
MSHA = Mine Safety and Health Administration
NA = not applicable
NFPA = National Fire Protection Association
NH = New Hampshire
NY = New York
OH = Ohio
ORA= Operational Range Assessments
OSHA = Occupational Safety and Health Administration
PA = Preliminary Assessment
PE = Professional Engineer
PFAS = per- and polyfluoroalkyl substances
PG = Professional Geologist
PM = Project Manager
PMP = Project Management Professional
PRISM™ = Predictive Integrated Stratigraphic Modelling
QAPP = Quality Assurance Project Plan
RI = Remedial Investigation
SC = South Carolina

SDSFIE = Spatial Data Standards for Facilities, Infrastructure, and Environment
SI = Site Inspection
TN = Tennessee
TX = Texas
US = United States
USACE = United States Army Corps of Engineers
USAEC = United States Army Environmental Command
VA = Virginia
WI = Wisconsin
WV = West Virginia

Worksheet #6: Communication Pathways

Worksheet #6 documents the drivers that trigger the need to communicate with other project personnel or stakeholders. The purpose of **Worksheet #6** is to ensure there are procedures in place for providing the appropriate notifications and generating the appropriate documentation when handling important communications, including those involving regulatory interfaces, unexpected events, emergencies, non-conformances, and stop-work orders.

Communication Driver	Organization	Name	Contact Information	Procedure (Timing, Pathway, Documentation)
USACE Program Manager decisions and modification	USACE Baltimore District Nationwide Program Manager	Emily Cline	410-962-7966 emily.j.cline@usace.army.mil	Award work and options. Track project progress through monthly reporting and daily field reporting. Stop work for quality or performance concerns.
USACE Project Manager – technical review and contractual oversight	USACE Omaha District Project Manager	Josiah Fernandez	443-619-0609 Josiah.P.Fernandez@usace.army.mil	The A2P JV PM will obtain USACE technical review and concurrence of the QAPP and project documents and any field modifications/QAPP changes, as necessary. Approved modifications will be included in QAPP revisions (prior to field work). USACE technical review and comments will be incorporated into the QAPP and project documents and a record of USACE comments saved in project files for documentation.
ARNG Program Manager	ARNG Program Manager	Walt Gee	520-672-1291 walter.f.gee.civ@army.mil	Receives all deliverables to be filed on the ARNG electronic Administrative Record.
ARNG Nationwide technical review	ARNG Technical Lead	Jennifer Li	520-671-6350 Jennifer.j.li2.ctr@army.mil	Provides overall programmatic technical reviews.

Communication Driver	Organization	Name	Contact Information	Procedure (Timing, Pathway, Documentation)
ARNG Project Manager and program technical review	ARNG Project Manager	Robert Braunlin	520-671-6613 robert.f.braunlin.ctr@army.mil	The A2P JV PM will obtain ARNG technical review and concurrence of the QAPP and project documents and any field modifications/QAPP changes, as necessary. Approved modifications will be included in QAPP revisions (prior to field work). ARNG technical review and comments will be incorporated into the QAPP and project documents and a record of ARNG comments saved in project files for documentation.
Regulatory agency interface				The ARNG I&E PM will communicate technical approaches and decisions directly to regulatory agencies' representative(s) on an as-needed basis, documented via phone records and emails.
Community/ media interface				The ARNG I&E PM in coordination with the respective NYARNG Point of Contacts/PAO will communicate information directly to communities or media on an as-needed basis.
Installation interface	NYARNG	James Williamson	518-649-0270 James.L.Williamson133.nfg@army.mil	Communicate project scope/schedule and coordinate logistics between project team and installation personnel on an as-needed basis, documented via phone records and emails. Additionally, the QAPP and other project deliverables will be provided to the OPSEC and PAO for review.
Manage all project phases Field progress reports Field modifications/QAPP changes	A2P JV Project Manager A2P JV Deputy Project Manager	Claire Mitchell, PE, PMP Afton Hess	716-698-5705 claire.mitchell@aecom.com 717-682-5405 afton.hess@arcadis.com	All materials and information about the project will be forwarded from the A2P JV PM to ARNG/ USACE. The A2P JV PM will obtain ARNG/ USACE approval/ concurrence for field modifications/QAPP changes as necessary. All approved modifications will be included in QAPP revisions (prior to field work) or non-conformance report(s) (during field work), and resolution / corrective action identified.
	A2P JV RI Task Manager	Colin Wasteneys, PG	716-225-4396 colin.wasteneys@aecom.com	Support A2P JV PM in implementing RI tasks/procedures.

Communication Driver	Organization	Name	Contact Information	Procedure (Timing, Pathway, Documentation)
	A2P JV Program Quality Manager	Laurie Stenberg, PG	301-500-4573 laurie.stenberg@aecom.com	Oversees/conducts quality audits to assure field program performed in accordance with approved protocols. Supports A2P JV PM, Technical Task Manager, and Team Leaders to assure quality reviews are completed on project deliverables, including consistency and conformance with applicable regulatory and DoD guidance and with industry practices. Works with Project Chemist to resolve performance problems with contracted analytical laboratory.
Analytical laboratory modifications and performance problems	A2P JV Project Chemist/ Data Validator	Naoum Tavantzis	301-267-8761 naoum.tavantzis@aecom.com	Notify A2P JV PM and Quality Manager in a timely manner of performance problems encountered by the contracted analytical laboratory. PM will secure approval for modifications to the QAPP as necessary from ARNG/ USACE. All approved modifications will be included in non-conformance Reports.
Data verification issues (e.g., incomplete records) and data validation issues (e.g., non-compliance with procedures)				Verify/validate all analytical chemistry sample results from analytical laboratories with criteria developed in this QAPP and deliver to the PM and the Project Task Managers.
Data review corrective actions				Notify Laboratory PMs to identify resolution/corrective actions.

Communication Driver	Organization	Name	Contact Information	Procedure (Timing, Pathway, Documentation)
Sample receipt variances	Eurofins Lancaster Laboratories	Vanessa Badman	717-556-9762 vanessa.badman@eurofinset.com	Report all project non-conformances and problems to the A2P JV Project Chemist. A2P JV and laboratory chemists will resolve all non-conformances with appropriate error codes in verification processes.
	Pace South Carolina	Kathy Smith	225-769-4900 kathy.smith@pacelabs.com	
Laboratory QC variances				Report all project non-conformances and problems to the A2P JV Project Chemist. A2P JV and laboratory chemists will resolve all non-conformances with appropriate error codes in verification processes.
Analytical corrective actions				Report all project non-conformances and problems to the A2P JV Project Chemist. A2P JV and laboratory chemists will resolve all non-conformances with appropriate error codes in verification processes.
Laboratory modifications and performance problems				Report all project non-conformances and problems to the laboratory PMs. Laboratory PMs will report to A2P JV Project Chemist. A2P JV and laboratory chemists will resolve all non-conformances with appropriate error codes in verification processes.

Communication Driver	Organization	Name	Contact Information	Procedure (Timing, Pathway, Documentation)
Manage activity hazard analysis on-site	A2P JV SSHO	TBD	TBD	Is present during operations to implement the SSHP.
Improve upon or add to existing analyses as new potential hazards are noticed				Coordinates changes/modifications to the SSHP with the PSHO, PM, and contracting officer.
Conduct required safety and health inspections				Implements and enforces the APP/SSHP, along with safety concerns contained in the SH&E procedures, and reports violations to the PSHO and PM.
Stop work responsibility related to safety and health concerns				Implements stop work action in the field due to unsafe conditions or possible imminent incident. All stop work actions, incidents, or near misses are documented and promptly reported to the PSHO and PM.

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
APP = Accident Prevention Plan
ARNG = Army National Guard
DoD = Department of Defense
NYARNG = New York Army National Guard
PAO = Public Affairs Office
PG = Professional Geologist
PE = Professional Engineer
PhD = Doctor of Philosophy
PM = Project Manager
PMP = Project Management Professional
PSHO = Project Safety and Health Officer
OPSEC = Operations Security
QAPP = Quality Assurance Project Plan
QC = Quality Control
SSHO = Site Safety and Health Officer
SSHP = Site Safety and Health Plan
TBD = to be decided
USACE = US Army Corps of Engineers

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Worksheet #9: Technical Project Planning Session Summary

This worksheet will serve as a record of future Technical Project Planning (TPP) sessions. The intent is to provide a concise record of participants, key decisions or agreements reached, and action items. Minutes and the accompanying slide decks will be approved by participants prior to being implemented into the QAPP (**Appendix A**). Expected participants include representatives from the ARNG I&E (Robert Braunlin, Walt Gee, and Jennifer Li); USACE (Emily Cline, Josiah Fernandez, Genna Huston Rohleder, and Clifford Opdyke); NYARNG (James Williamson, Gregory Austin, and Robert Epp); NYSDEC (John Swartout and Sankavi Sampath); NYSDOH (Renata Ockerby and Sarita Wagh); and A2P JV (Claire Mitchell, Colin Wasteneys, and Agnes Link-Harrington).

A2P JV will implement the TPP process as listed in Engineer Manual (EM) 200-1-2 (USACE, 2016), including facility meetings in a professional and organized manner to obtain consensus on specific Data Quality Objectives (DQOs) for the RI work. Per the PWSs, up to eight TPP meetings per facility will be held, in person or via teleconference, as described below:

- Meeting 1 (11 March 2024) – Introduce project team members and stakeholders to ARNG's PFAS RI program, discuss the overall planned RI approaches, discuss the project schedule, and gain input on stakeholder preferences.
- Meeting 2 (date TBD) – Present the QAPP, including planned approaches implementation. Ensure all stakeholders are in agreement with planned investigative strategies, work schedules, and notification procedures to ensure smooth execution of field work.
- Meeting 3 (date TBD) – Present the results for the Prescriptive Phase, the evaluation of the plume extent to date, and a preview of the anticipated scope for the Adaptive Phase.
- Meeting 4 (date TBD) – Resolve comments or concerns about the anticipated scope of work for the Adaptive Phase or implementation not already addressed during response to comments.
- Meeting 5 (date TBD) – Present findings of the RI (Prescriptive Phase and Adaptive Phase) and gain concurrence on presentation of findings in the RI Report.
- Additional Meetings 6 through 8 (as needed; dates TBD) – Additional meetings that may be held based on the findings of the RI or to address any unforeseen issues that require further discussion.

Meeting minutes will be prepared after each TPP meeting and added as an attachment to the corresponding document. TPP meeting minutes are included in **Appendix A**.

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Worksheet #10: Conceptual Site Model

10.1 Facility Location and Description

Albany AASF #3 is located in Latham, a hamlet within the town of Colonie, Albany County, New York. The facility includes three parcels owned by New York State and a 22-acre area leased from Albany International Airport (ALB) by the New York State Division of Military and Naval Affairs (NYDMNA). The facility is approximately 7 miles north-northwest of Albany city center, a quarter mile west of Interstate 87, and 600 feet (ft) east of ALB's Runway #1. The hamlet of Verdoy and the village of Colonie are 1.25 miles north and 1.75 miles southwest of the facility, respectively. The facility, ALB, and adjacent properties are zoned for 'Airport Business Area' land use. The facility location is shown on **Figure 10-1**.

Prior to 1977, the facility property was undeveloped. A small airplane hangar, which the New York Army National Guard (NYARNG) began operating immediately, was built shortly before 1983. Since that time, lease agreements for multiple additional parcels adjacent to the original facility property expanded the current property to a total of roughly 50 acres.

10.2 Facility Environmental Setting

Albany AASF #3 lies within the Hudson-Mohawk River Lowlands, about 12 miles southwest of the confluence of the two rivers. Located roughly 4-miles north of the facility, the Mohawk River crosscuts the Mohawk River Valley, flowing west to east. The Hudson-Mohawk River Lowlands are bordered on the southwest by the Helderberg Mountains, which form the northeastern edge of the Appalachian Plateau. The leased facility area stands at an elevation of approximately 280 feet above mean sea level (amsl), while the eastern facility parcels are at about 289 feet amsl. The terrain surrounding the facility slopes down to the Mohawk River's southern banks which lie at an elevation of 186 feet amsl. The half mile of land between ALB's northern boundary and the Mohawk River's southern banks are characterized by rolling hills. The topography of Albany AASF #3 is shown on **Figure 10-2**.

10.2.1 Geology

The Hudson-Mohawk River Lowlands, a geologic region within the larger Mohawk River Basin physiographic province, are characterized by bedrock valleys and extensive glacial deposits. The region's bedrock consists primarily of Ordovician and Devonian sedimentary rocks, including shale, sandstone, and limestone, which were deposited in ancient marine environments.

During preglacial time, the Colonie Channel was the primary drainage valley for the Hudson-Champlain lowlands. Running perpendicular to the current Mohawk River, the Colonie Channel begins in Malta and ends just southeast of the city of Albany. During the subsequent glaciations, the bedrock surface of the Colonie Channel was glacially scoured. As the glaciers retreated, they left behind thick deposits of glacial till on the underlying bedrock, and outwash at the glacial margins. As the ice sheet melted, preglacial valleys were filled with meltwater and fine-grained sediment creating proglacial lakes. One of the most notable proglacial lakes of the region, Lake Albany, was a vast lake occupying the entire Hudson Valley. Extensive clay deposits underlying much of the region are attributed to Lake Albany. The nearshore lake sediments were reworked by wind, after the lake had drained, to form well-sorted blanket lake sands and dune fields; this creates permeable dunes and blanket sands that overlie thick sequences of relatively impermeable lacustrine silt and clay (United States Geological Survey [USGS], 1988). The landscape also includes various moraine and kame features, which are indicative of the glacial processes that shaped the region's topography. In comparison, the impact of postglacial processes is only seen along the floodplains of rivers and streams.

The surficial geology at the facility is predominantly lacustrine sand and wind-deposited sand. The lacustrine sand deposits are well sorted, stratified quartz sand, likely deposited in proglacial lake Albany. The wind deposited sand is permeable, well drained, reworked lake sediments, likely from proglacial Lake Albany as well. The bedrock geology underlying the facility is the Late Ordovician Normanskill Shale.

A previous subsurface investigation by the US Department of Agriculture Soil Conservation Service indicated that the upper 0-12 feet of the western side of the facility subsurface material is mostly various types of ground moraines and silt loam. This silt loam consists of low permeability, somewhat-poorly to poorly drained, fine-grained silts and clays with very slow infiltration rates. These soil layers can impede the downward movement of water, suggesting there is high surficial runoff from the facility to surrounding water body features. The central and eastern areas of the facility, however, are composed of fine sands with high infiltration rates and high permeability, causing this area to have more influence on the local groundwater flow.

Soil borings completed during the SI found sand as the dominant lithology of the unconsolidated sediments below the Albany AASF #3. The borings were completed at depths between 5 and 15 feet below ground surface (bgs). The sands were described as silty sand, well-graded sand, and poorly graded sand. Many of the logs also reported varying percentages of gravel included near or at the surface of the boring. These results and facility observations are consistent with the reported depositional environment of the region and near surface fill material expected at a developed site.

10.2.2 Hydrogeology

Regional groundwater flow follows a relatively simple drainage pattern, facilitated by the topographic and structural channel of the Mohawk River Valley. Regional groundwater features are shown in **Figure 10-3**. Generally, groundwater flows from divides of high elevation to the lowland of the Mohawk River Valley and discharges into the streams and rivers (USGS 2006). The direction of regional groundwater flow in Albany County is presumed to be north towards the Mohawk River. Unconsolidated sand and gravel units form a virtually continuous aquifer system underlying the eastern end of the Mohawk River Valley (USGS, 1981). Water in the aquifer is principally under water-table conditions and in hydraulic contact with the Mohawk River. The extent to which pumping of most wells induces recharge from the river is unknown (USGS, 2002).

Based on review of USEPA's map of Sole Source Aquifers, Albany AASF #3 is not located above a sole source aquifer. The primary surficial aquifer underlying the facility occurs in glacial lacustrine and outwash deposits, as well as in postglacial wind-blown sand and alluvial deposits. Underlying the shallow surficial aquifer is a deep complex aquifer system in the buried bedrock Colonie Channel. The Colonie Channel Aquifer consists of permeable stratified drift underlain by glacial till and overlain by lacustrine clay and silt which both act as aquicludes. Recharge to the deep aquifer occurs through infiltration from the permeable high ground along the bedrock valley edges. The largest known water producing, and artesian flow areas of the Colonie Channel Aquifer are in the vicinity of ALB. Additionally, the drainage area of Shakers Creek, a tributary of the Mohawk River located ½ mile west of the facility, overlies the artesian flow area. In the 1930's the Latham Water District begin sourcing drinking water from the Colonie Channel Aquifer. However, it is unknown if the Latham Water District's current wellfield on the southern shore of the Mohawk River pulls from the shallow alluvial sand and gravel of the Mohawk River flood plain or the deeper Colonie Channel Aquifer.

Depths to water measured in April 2022 during the SI ranged from 0.56 to 5.72 feet bgs. Groundwater elevation contours from the SI are presented on **Figure 10-4** and indicate the groundwater flow direction at the facility is primarily to the west which is different from the anticipated flow direction expected to be to the north.

No potable water wells are located on the facility; however, a review of New York State Department of Environmental Conservation's (NYSDEC) publicly available geospatial data indicated that 21 domestic, and 14 irrigation wells exist within a 4-mile radius of the facility (NYSDEC Division of Water Resource Management, 2001; New York State, 2023), as shown on **Figure 10-3**. Domestic wells ranged in depth from 53 to 623 feet bgs, and irrigation wells ranged from 100 to 500 feet bgs.

Drinking water for the facility is supplied by the Latham Water District. The Latham Water District serves a population of 85,590 and sources raw water from the Mohawk River and five groundwater supply wells (Latham Water District, 2023). The five supply wells are located on the Mohawk View Water Treatment Plant property at 100 Onderdonk Avenue in Latham**.** Latham Water District's Mohawk River intake is approximately halfway between Crescent Dam and Lock No. 7 (Maswick, 1995). The exact location of the intake is not publicly available. The Latham 2023 annual drinking water quality report indicates that PFAS were not detected in finished water. The Latham Water District also sampled PFAS in raw water from the supply wells in 2022 (Latham Water District, 2023). PFAS were detected in three of the supply wells, with maximum detected concentrations as follows:

- PFBA: 2.9 nanograms per liter (ng/L)
- Perfluoropentanoic acid (PFPeA): 2.2 ng/L
- PFOS: 8.6 ng/L

10.2.3 Hydrology

The facility is in the Shakers Creek-Mohawk River Watershed (**Figure 10-5**), which is a part of the much larger Mohawk River Basin. The Mohawk River Basin covers 3,500 square miles, drains over 12,000 square miles of streams, and encompasses parts of 14 counties, including all of Montgomery County, most of Schoharie and Schenectady Counties, and parts of Herkimer, Hamilton, Fulton, Greene, Oneida, Saratoga, Albany, Lewis, Madison, Otsego, and Delaware Counties. The Mohawk River is a major tributary to the Hudson River, while the Schoharie and West Canada Creeks are major tributaries to the Mohawk River (USGS, 2006). The main channel of the Mohawk River runs west to east roughly 2 miles north of the facility and forms a floodplain. Surface water resources near the Albany AASF #3 include natural streams, rivers, and open water features (**Figure 10-5**).

Approximately 0.75 miles west of the facility is Shaker's Creek. Shakers Creek headwaters flow south to north from Ann Lee Pond and then west to east-northeast at the end of the Runway 19 of ALB (**Figure 10-5**). A second branch of Shakers Creek flows south to north 0.75 miles east of the facility, which converges with Shaker's Creek slightly east of Runway 19. Shaker's Creek empties into the Mohawk River less than 1 mile after the convergence of the eastern branch (**Figure 10-5**).

The stormwater system at the leased portion of the facility routes surface runoff from the runway to a drainage ditch along the southern boundary of the facility. From this drainage ditch, the runoff travels south around the southern runway (ALB Runway 1) and flows west-northwest before converging with Ann Lee Pond then Shaker's Creek and eventually discharging to the Mohawk River, as described above. Stormwater from the Albany AASF #3 main hangar and vehicle parking area on the southeastern portion of the leased area are also routed to the drainage ditch along the southern boundary of the facility. Given the topography of the facility (**Figure 10-2**), the southern drainage ditch is anticipated to flow from east to west.

On the state-owned portion of the facility, stormwater either infiltrates the surface or is routed to stormwater features. Within the northeastern portion of the facility, including AOI 3, stormwater is

anticipated to infiltrate the surface (i.e., there are no drainage structures directing flow away from these areas). Stormwater from the NYDMNA Headquarters building and several surrounding paved areas (e.g., sidewalks, eastern parking lot) are routed to the two retention ponds located southwest and northeast of the building. The retention pond located southwest of the headquarters has a stormwater overflow to a drainage ditch along the southern boundary of the facility. However, this drainage area (including the retention ponds) does not include stormwater from any of the AOIs and is not anticipated to be impacted by PFAS releases. In addition, the parking lots west of the headquarters and the two smaller buildings west of headquarters (an aircraft storage building and field maintenance shop [FMS] 16) also route stormwater to the southern drainage ditch, but similarly not anticipated to be impacted by PFAS releases since this drainage area does not receive stormwater from any of the AOIs. Thus, the non-AOI stormwater features, including the NYDMNA Headquarters retention ponds, are not planned for investigation in the RI or evaluation in the risk assessments and are not discussed further.

In addition, the drainage ditch along the southern boundary of the leased portion of the facility may also receive facility oil-water separator (OWS) discharges. The OWS is connected to the floor drains within the AASF #3 and the catch basin at the aircraft washdown station west of the hangar and south of the apron. The OWS discharges to the Town of Colonie sanitary sewer system during washing events, and to the drainage ditch when not washing (AECOM, 2023).

10.2.4 Climate

The climate is predominately continental, with an average annual temperature of 49.4 degrees Fahrenheit (°F). Seasonally, temperatures vary from an average summer high of 71.0 °F to average winter lows of 27.2 °F. The total mean annual precipitation is 40.68 inches. February is the driest month, with 2.28 inches of precipitation, while July is the wettest month, with 4.55 inches (National Oceanic and Atmospheric Association, 2022).

10.2.5 Current and Future Land Use

The AASF, located next to ALB, is a secure facility accessible via a guarded gate on Old Niskayuna Road. Its state-owned parcels mainly house offices, parking, and storage buildings, while the leased area is used for training and aircraft maintenance. No expansion plans are currently in place, and the facility's land use is expected to remain unchanged. However, ALB intends to build a service road in Spring 2025. This road will start at the facility's southwestern corner, head south to ALB's boundary, and loop back north, ending near the ALB apron. The surrounding area is primarily used for aviation, commercial, and industrial purposes.

10.2.6 Sensitive Habitat and Threatened / Endangered Species

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in the vicinity of the Albany AASF #3 facility (United States Fish and Wildlife Service [USFWS], 2024a):

- **Insects**: Karner Blue Butterfly, *Lycaeides melissa samuelis* (endangered); Monarch Butterfly, *Danaus plexippus* (candidate)
- **Mammals**: Northern Long-eared Bat, *Myotis septentrionalis*, (endangered); Tricolored Bat, *Perimyotis subflavus* (proposed for listing as endangered)

- In addition, state-listed wildlife species were also identified for Albany County and for a 1-mile radius from the approximate center of the facility (NYSDEC, 2024). Within Albany County, 8 species of vascular plants and 21 species of animals (including the northern long-eared bat) were identified; however, no state-listed species have been reported as occurring within a 1-mile radius of the facility (see **Appendix E** for further details).

- As described in **Worksheet #14**, a habitat assessment will be performed as part of the RI. Trained wildlife biologists will assess the potential for on-facility and off-facility sensitive habitats and species prior to the habitat assessment site visit. The biologists will then direct the habitat assessment completed by field staff.

10.2.7 Cultural and Historical Resources

- NYARNG coordinated with the State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officer (THPO) for the RI to determine the presence of cultural and historical resources on-facility. In a written response from the SHPO, it is their opinion that no historic properties, including archaeological and/or historic resources, will be affected (**Appendix G**).
- If cultural or historical resources are inadvertently discovered during RI field work, the field team will stop work and follow the procedures outlined in the "Inadvertent Discoveries of Cultural or Historical Resources while Conducting Restoration Activities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)" SOP.

10.3 History of AFFF Use and Other PFAS-Containing Materials

Three potential PFAS release areas were identified in the PA where AFFF may have been used, stored, disposed, or released historically at the Albany AASF #3 (AECOM, 2020). AFFF may have historically been released at the facility during fire training, fire equipment maintenance, AFFF storage, and emergency response. An additional potential PFAS release area was identified during the SI planning phase (AECOM, 2021). The potential release areas were grouped into three AOIs based on preliminary data and presumed groundwater flow direction. A more thorough description of the releases is presented in **Section 10.5.1**.

10.4 Historical PFAS Responses

10.4.1 Summary of Historical PFAS Investigations

During the PA and SI at Albany AASF #3, four potential release areas were identified (**Figure 10-6**; AECOM, 2020; AECOM, 2021). Descriptions of the potential release areas and AOIs are presented as part of the preliminary conceptual site model (CSM) in **Section 10.5.** An SI was subsequently conducted at the facility to determine the presence or absence of perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA), and perfluorobutanesulfonic acid (PFBS) at each AOI at concentrations above the SLs, the applicable standard at the time of the investigation. The SI field work included sampling of surface and subsurface soil and temporary well installation and sampling. Field efforts were conducted on 4 January 2022 and from 8 to 14 April 2022 (AECOM, 2023).

The SI results confirmed PFAS in soil at all three AOIs and in groundwater at AOI 1 and AOI 2. All three AOIs will be further evaluated under CERCLA in the RI phase. The findings of the SI are included in the summary of the nature and extent of contamination presented in **Section 10.5.2**.

In June 2024, NYARNG collected waste characterization samples from the soil stockpile at AOI 3. The samples were analyzed for 20 PFAS using USEPA Method 537 modified. PFOS was detected in the soil at a concentration of 1.64 micrograms per kilogram (µg/kg); no other PFAS were detected (**Appendix F**). The analytical results were used for waste profiling and landfill approval. The entire 650-ton stockpile was removed from the facility for disposal by West Central Environmental on 2, 21, and 28 October 2024.

10.5 Preliminary Conceptual Site Model

A summary of the preliminary CSM for the Albany AASF #3 is presented below. A description of the primary release mechanisms at all three AOIs are presented in **Section 10.5.1**. The current interpretation of nature and extent at each AOI is presented in **Section 10.5.2**. The fate and transport of PFAS in environmental media are discussed in **Section 10.5.3**. Lastly, the potential receptors and exposure pathways are discussed in **Section 10.5.4**. Sampling locations completed during the SI are presented on **Figure 10-7**.

The preliminary CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed receptors. An exposure pathway is considered potentially complete when each of the following conditions are present:

1. Contaminant source;
2. Environmental fate and transport;
3. Exposure point;
4. Exposure route; and
5. Potentially exposed populations.

In their anionic forms, PFAS are water-soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. Given the length of time since the AFFF releases, the average precipitation at the facility, and degree of soil permeability, PFAS contamination at the AOIs may have leached from the soil to groundwater. There is also potential for PFAS migration from the stormwater infrastructure and surface runoff to surface water via the drainage ditch along the southern boundary of the facility. Advective-dispersive transport of PFAS in groundwater from potential upgradient source areas may also contribute to potential PFAS contamination at the facility that, combined with PFAS contamination from the AOIs, may expose human receptors to PFAS in groundwater at, and downgradient from the facility, as well as human and ecological receptors to PFAS in surface water at, and downgradient from the facility.

10.5.1 Summary of Potential Release Areas

Based on the findings of the PA and additional information learned during the SI planning phase, four potential release areas were identified at Albany AASF #3 and grouped into three AOIs (AECOM, 2020). The AOIs are shown on **Figure 10-6** and described in the subsection below:

- AOI 1: AASF #3 Hangar Release/ Fire Response Unit
- AOI 2: Garbage Truck Fire
- AOI 3: Stockpiled Soil

Additionally, five off-facility potential PFAS release areas were identified adjacent to the Albany AASF #3 during the PA (**Figure 10-6**). These locations are not associated with ARNG activities and were not evaluated as part of the SI.

10.5.1.1 AOI 1

AOI 1 encompasses two potential release areas, as described below.

AASF #3 Hangar

Two incidents of firefighting foam discharge associated with the facility's fire suppression system are documented. A fire suppression system test in 2012, and an accidental release in 2021 both resulted in foam spilling onto the tarmac and nearby grass. Both incidents were promptly cleaned and addressed by a contractor. The August 2021 incident resulted in the discharge of 75-100 gallons of foam. Clean-up activities following the incident involved rinsing, wiping, and collection of rinse aid into drums.

Uncertainty regarding the timing and use of AFFF at the facility remains. The PA findings indicated in 2012 the fire suppression system was primed with 3 percent (%) AFFF; however, the existing fire suppression system is documented as containing JET-X 2.75% HEF as of 1 August 2007. Based on this finding, it is unknown if the current system is the original fire suppression system or if a retrofit occurred around 2007. In addition to the fire suppression system, the AASF #3 Hangar also contains storage of two 36-gallon floor units of Ansulite 3% AFFF concentrate. NYARNG continues to perform records searches to obtain additional information.

Fire Response Unit

Albany AASF #3 had a Fire Response Unit during the 1980s that was disbanded in the early 1990s. During this time, a firetruck was reported to have been stationed in the Fire Response Unit, housed in a room attached to the northern side of the AASF #3 Hangar. The firetruck was reported to have a 150-gallon dual line of 3% AFFF and water tank and a 400-gallon Purple K tank. It is unknown where the firetruck was filled or washed or whether the firetruck leaked. There were no documented releases of AFFF within the Fire Response Unit. This unit existed between 1983 and 1992 and responded to all fire and emergency related incidents that occurred at the Albany AASF #3 and Albany International Airport, in conjunction with the Albany Fire Department (AFD).

10.5.1.2 AOI 2

AOI 2 (~0.05 acres) encompasses the area where a fire occurred in the back of a garbage truck, southeast of the AASF #3 Hangar, in May 2017; the Colonie Fire Department responded to the incident. While the use of AFFF during the emergency response was not documented, photographs of the incident appear to show foam being used.

A stormwater drop inlet is located immediately north of the AOI 2 release area in the grass on the north side of the road. Historical photographs show that booms and socks were used to protect materials from the garbage truck fire from flowing into the stormwater drain.

10.5.1.3 AOI 3

AOI 3 includes an area where 80 cubic yards of soil, removed from the potential release area at AOI 1 during the construction of new cold storage hangars in 2020, was previously stockpiled

Between May and November 2020, the NYARNG constructed four new cold storage hangars (Hangars A through D) at the facility. The hangars do not have fire suppression systems, and at no time was any AFFF stored or used in the new hangars. During construction activities, soil was removed to approximately 4 feet bgs in portions of the grassy area between the Albany AASF #3 main hangar and Hangar D. Soil was also excavated in this area during construction of an underground stormwater detention system to the east of Hangar D. Additionally, in the grassy area between the main hangar and Hangars C and D, a pit was dug at each side of the taxiway/roadway in order to bore under the taxiway and roadway at a depth of approximately 6 feet bgs. Excavated soil was used as backfill material at the same location. Any excess soil from the excavation work was stockpiled to the north of the facility's access control point (ACP) and

investigated as AOI 3. The entire above grade soil stockpile was removed in October 2024 and taken to a licensed landfill.

10.5.2 Current Understanding of Nature and Extent of Contamination

The current understanding of the nature and extent of PFAS contamination at the three AOIs is presented in the subsections below. The summaries are based on review and evaluation of available analytical results from historical PFAS investigations, as summarized in **Section 10.4**. Sampling included multi-interval soil samples and groundwater sampling of temporary wells. During the SI, and during the following discussion of SI analytical data, the term surface soil refers to the 0-2 feet bgs interval.

Analytical results from the SI are presented in **Appendix B**. The results from the SI are summarized in the subsections below.

AOI 1

Based on the SI findings, PFOA, PFOS, PFBS, perfluorobutanoic acid (PFBA), PFNA, PFHxS, and perfluorohexanoic acid (PFHxA) were detected at AOI 1. **Table 10-1** and the following statements present the SI findings for AOI 1.

Surface soil was sampled from 0 to 2 feet bgs at boring locations AOI01-01 through AOI01-09. PFOS was detected above the SL of 13 µg/kg at two of nine boring locations: AOI01-04 and AOI01-08 at concentrations of 60.1 and 14.1 µg/kg, respectively. PFOA, PFHxS, PFHxA, PFNA, PFBS, and PFBA were also detected at concentrations less than 1.24 µg/kg, and all detections were below their SLs.

Soil was sampled from the shallow subsurface interval (between 2 and 6.2 feet bgs) from boring locations AOI01-01 through AOI01-06. All detected concentrations for PFOA, PFOS, PFNA, PFHxS, PFHxA, and PFBS below their SLs by at least one order of magnitude. PFOS was the most frequently and highest detected compound, with a maximum concentration of 14.7 µg/kg, an order of magnitude below the SL of 160 µg/kg.

Groundwater was sampled from temporary monitoring wells AOI01-01 through AOI01-07. PFOA, PFOS, PFHxS, and PFNA were detected above their SLs in groundwater, and at least one SL exceedance was measured in all temporary wells, except for AOI01-07, located north and side-gradient to the AOI 1 source area. The exceedances of the SLs ranged in concentrations from 8.55 to 61.9 ng/L (PFOA), 57.8 to 15,000 ng/L (PFOS), and 139 to 1,180 ng/L (PFHxS). The SL of 6 ng/L for PFNA was exceeded at one temporary well, AOI01-06, at a concentration of 13.3 ng/L. PFBS, PFBA, and PFHxA were detected in all temporary wells below their respective SLs.

AOI 2

Based on the SI findings, PFOS, PFOA, PFNA, PFHxS, PFHxA, PFBS, and PFBA were detected at AOI 2. **Table 10-2** and the following statements present the SI findings for AOI 2.

Surface soil was sampled from 0 to 2 feet bgs at boring locations AOI02-02, AOI02-03, and AOI02-05; surface soil was also sampled at AOI02-01 from 0.9 to 3.5 feet bgs below the asphalt. PFOS and PFNA were detected in surface soil at concentrations below their SLs. PFOS was detected in all borings at concentrations ranging from 0.071 J (estimated) to 0.492 J µg/kg. PFNA was detected in two borings at concentrations of 0.031 J and 0.029 J µg/kg. PFHxA was detected in two borings below the SL of 3,200 µg/kg with a maximum concentration of 0.042 J µg/kg. PFOA, PFHxS, PFBS, and PFBA were not detected in surface soil.

Soil was sampled from the shallow subsurface interval (between 2 and 5.5 feet bgs) from boring locations AOI02-01 through AOI02-04. PFOS, PFHxS, PFHxA, and PFBS were detected at

concentrations less than 0.398 µg/kg, and all detections were below their SLs. PFOA, PFNA, and PFBA were not detected in shallow subsurface soil.

Groundwater was sampled from temporary monitoring wells AOI02-01 through AOI02-04. PFOA and PFOS were detected above their SLs in groundwater. PFOA exceeded the SL of 6 ng/L in temporary well AOI02-03, at concentrations 10.5 and 9.97 ng/L (duplicate). PFOS was above the SL of 4 ng/L in all wells (ranging from 11.6 to 21.8 ng/L) except AOI02-04, which was located north and side-gradient to the AOI 2 source area. PFHxS, PFHxA, PFNA, PFBS, and PFBA were detected in groundwater below their SLs.

AOI 3

Based on the SI findings, PFOS, PFOA, PFNA, PFHxS, PFHxA, PFBS, and PFBA were detected at AOI 3. **Table 10-3** and the following statements present the SI findings for AOI 3.

Surface soil was sampled from 0 to 2 feet bgs at boring locations AOI03-03 through AOI03-07 per the SI QAPP Addendum (AECOM, 2021). Due to groundwater being encountered at 1 foot bgs at AOI03-01 and AOI03-02, surface soil was sampled from 0 to 1 feet bgs at those locations. PFOA, PFOS, PFHxS, PFHxA, PFBA, and PFNA were detected in surface soil below their SLs. PFOS was the most frequently and highest detected compound, with a maximum concentration of 3.44 µg/kg. PFBS was not detected in surface soil.

Soil was sampled from the shallow subsurface interval (2 to 4 feet bgs) from boring locations AOI03-03 through AOI03-07. PFOA, PFOS, PFHxS, PFHxA, PFBA, and PFNA were detected below their SLs in shallow subsurface soil. PFOS was the most frequently detected compound and at the highest concentrations; with a maximum concentration of 4.12 µg/kg, two orders of magnitude below the SL of 160 µg/kg. PFBS was not detected in shallow subsurface soil.

Groundwater was sampled from temporary wells AOI03-01 and AOI03-02. PFOA and PFOS were detected in both wells and exceeded their SLs. PFOA was detected above the SL of 6 ng/L, at concentrations of 13.7 and 17.9 ng/L. PFOS was detected above the SL of 4 ng/L, at concentrations of 11.4 and 24.6 ng/L. PFHxS, PFHxA, PFNA, PFBA, and PFBS were detected in groundwater below their respective SLs.

AOI Summary

Based on the results of the SI completed to date, PFOA, PFOS, PFNA, PFHxS, PFHxA, PFBS, and PFBA were detected at all three AOIs. PFOS and PFOA exceeded groundwater SLs at all three AOIs, and PFHxS exceeded its SL at AOI 1. The only exceedances of soil SLs were in surface soil at AOI 1. PFOS was the most frequently detected and exceeded compound at all AOIs. Additionally, PFAS exceedances at AOI 1 were an order of magnitude higher than at AOI 2 and AOI 3.

Data Gaps for PFAS

Based on the evaluation of available data, as presented above, the presence of PFAS has been confirmed in soil and groundwater at all three AOIs, with exceedances of the SLs in groundwater at all three AOIs and in soil at AOI 1. However, the exact locations of the PFAS releases to soil, the distribution due to construction activities, and the migration pathways between the release areas and boundaries are not fully understood. Detailed descriptions of the approach for addressing the PFAS data gaps are presented in the sampling design and rationale tables in **Worksheet #17**.

10.5.3 Fate and Transport of PFAS

Contaminant fate and transport is an evaluation of the changes that occur in constituents and concentrations as they move through different environmental media. Understanding the fate and transport of chemicals is important in evaluating their potential impacts to receptors. Fate is a summary of all the physical and chemical processes that act on the constituents during transport. Transport is the simple movement of the constituents, for example, with the flow of groundwater or surface water.

The primary source of PFAS at Albany AASF #3 is likely from fire suppression system testing and accidental AFFF spills/releases attributable to ARNG activities. Multiple AFFF formulations have been produced over the years, and the exact composition of any given AFFF used or manufactured in any given year is highly variable (Backe et.al, 2013). AFFF contains highly diverse mixtures of PFAS which may vary based on the production process used: electrochemical fluorination (ECF) or fluorotelomerization. The ECF process results in a PFAS mixture dominated by perfluoroalkyl acids (PFAAs), both perfluoroalkyl sulfonic acid (PFSA) and perfluoroalkyl carboxylic acid (PFCA) homologues, while the fluorotelomerization process produces AFFF formulations dominated by polyfluorinated compounds with lesser amounts of PFAAs (Houtz et al., 2013). In general, ECF-based AFFF is the dominant source of PFAS at AFFF-impacted sites (Interstate Technology Regulatory Council [ITRC], 2018a).

Both the PFSA and PFCA homologues produced as part of AFFF manufacture (including PFOA and PFOS) are long-chain PFAS that are persistent in the environment, bioaccumulative in wildlife and humans, and are toxic to laboratory animals and wildlife, producing reproductive, developmental, and systemic effects in laboratory tests. Shorter-chain PFSAs, such as PFBS and PFHxS, are generally less toxic and less bioaccumulative in wildlife and humans, and alternative products containing these shorter-chain chemicals have been introduced as replacements for long-chain PFAS. Increasing levels of PFBS and PFHxS in surface water have been observed indicating that short-chain alternatives to PFOA and PFOS are also persistent in the environment (Buck et al., 2011).

Precursors typically are raw materials or intermediary compounds in the PFAS manufacturing process. Generally, they consist of polyfluorinated alkyl compounds that can be biotically and abiotically transformed into PFAA terminal “end-member” compounds (i.e., PFAS) in the environment. Transformation of these precursors to PFAAs has been shown to occur in a variety of environmental media and can result in unexpected temporal and spatial trends in PFAS occurrence. The susceptibility of individual precursors to transformation processes can also influence how each will bioconcentrate and bioaccumulate within various biotic species. The analysis of precursor compounds in surface soils can be used to help identify source release areas because precursor compounds tend to be larger, transform slowly and adsorb more strongly to soil. Fluorotelomer alcohols (FTOHs) and fluorinated sulfonamides, such as N-ethyl perfluorooctane sulfonamidoethanol (EtFOSE), are examples of such precursor compounds (Houtz et al., 2013).

PFAS most commonly detected in the environment typically have a carbon-fluorine “tail” and a nonfluorinated “head” consisting of a polar functional group. The tail is hydrophobic and lipophobic, while the head groups are polar and hydrophilic. These competing tendencies of the head and the tail can lead to a wide distribution in the environment. Important PFAS partitioning mechanisms include hydrophobic and lipophobic effects, electrostatic interactions, and interfacial behaviors. The hydrophobic and lipophobic effects drive the association with organic carbon in soils and sediments (ITRC, 2018a). Because the head and the tail compete, partitioning to interfaces of environmental media such as soil/water, air/water and water/non-aqueous phase liquid co-contaminants can occur (Guelfo and Higgins, 2013; McKenzie et al., 2016; Brusseau, 2018). Preferential accumulation of PFAS above the water table within the vadose zone is a common example of partitioning at the air/water interface.

PFCAs and PFSAs are present as organic anions at most pH levels found in the environment and are therefore relatively mobile in groundwater (Xiao et al., 2015) but tend to associate with the organic carbon fraction that may be present in soil or sediment (Higgins and Luthy, 2006; Guelfo and Higgins, 2013). When sufficient organic carbon is present, organic carbon-normalized distribution coefficients (K_{oc} values) can help in evaluating transport potential, though other geochemical factors (for example, pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC, 2018a).

Sorption and retardation of PFAS show correlations with carbon chain length and structure. Sorption generally increases with increasing perfluoroalkyl tail length (Higgins and Luthy, 2006; Guelfo and Higgins, 2013; Sepulvado et al., 2011), indicating that the short-chain PFSAs, like PFBS and PFHxS, are retarded less than longer chain chemicals like PFOA and PFOS. Also, branched versus linear isomers of the same compound display different sorptive behavior, with linear isomers tending to sorb more strongly than their branched counterparts.

Sorption of PFCAs and PFSAs is also affected by soil solution chemistry, with decreased pH and increased levels of polyvalent cations (for example, calcium $[Ca]^{2+}$) leading to increased sorption and retardation (Higgins and Luthy, 2006; McKenzie et al., 2015). Vapor pressures of these compounds are generally low, and water solubilities are high, limiting partitioning from water to air (USEPA, 2000).

Once organic chemicals are released to soils, a variety of processes may occur that cause them to become immobilized or to be mobilized to another environmental medium. Chemicals may be taken up and held on soil particles by adsorption (sticking to a particle surface) or absorption (diffusion into the particle). Chemicals may sorb directly to the soil grains or to organic or metal oxyhydroxide coatings on the grains. The degree of sorption of a particular chemical in the environment is controlled by both soil properties (i.e., organic carbon content, metal oxyhydroxide content, clay content, or specific surface area) and by chemical properties (i.e., partition coefficients, solubility, polarity). The fate properties of PFOS and PFOA are similar and make these compounds less likely to desorb from these matrices than PFBS and PFHxS (ITRC, 2018a).

Chemicals may be transported downward through the soil strata by liquids that infiltrate through the soils or by water from precipitation. Chemicals released to, or transported into, soils beneath the groundwater surface may be leached from the soils by groundwater and transported downgradient in groundwater. Leaching potential is a function of both media properties (for example, pH, redox conditions, and increased partitioning with organic-rich soil) and PFAS structural properties (for example, ionic charge, and chain length) (Gellrich, Stahl, and Knepper 2012). PFAS may be transported to the sediment and surface water through direct discharges from drainage outfalls, overland runoff/erosion, and groundwater discharge.

10.5.4 Potential Receptors and Exposure Pathways

As described above, soil and groundwater may have been impacted by PFAS releases associated with historical ARNG activities at the AOIs within the Albany AASF. In addition, PFAS in these media may have migrated to seasonally present surface water via stormwater flow and surface runoff into the stormwater drainage ditch along the southern boundary of the facility, as well as potentially migrated to downgradient, off-facility water features (e.g., Ann Lee Pond, Shaker's Creek, Mohawk River). Therefore, human and ecological receptors present within the AOIs may be exposed to PFAS. The currently understood human health and ecological receptors, along with potentially complete exposure pathways under current and reasonably anticipated future land use scenarios, are summarized below and presented in **Figures 10-8** and **10-9**.

The human health and ecological receptors and exposure pathways identified below may be refined based on data from the Prescriptive Phase of the RI. Further evaluations of the exposure pathways will be considered during future mobilization(s).

Human Health

The facility is located on approximately 50 acres and is a controlled access facility accessible only through a guarded gate. Non-military land uses in off-facility areas adjoining the facility include residential, commercial, aviation, and industrial use, where access is open to the public.

The AOI areas are mostly covered by pavement, buildings, landscaping, and heavy vegetation, leaving few areas of exposed soil and little potential for soil exposure. Therefore, human exposure to PFAS in AOI soil is expected to be low under the current scenario. Soil contact is possible in the future if ground-disturbing activities take place or if there is redevelopment. NYSDEC guidelines (NYSDEC, 2010) for human health exposure suggest 0 to 2 inches for surface soil screening. However, due to the amount of soil turnover that has occurred during the facility's constructions and operations, 0 to 0.5 feet is more representative of surface soil exposure and will be used as the surface soil interval for the Human Health Risk Assessment (HHRA).[1] Subsurface soil for the HHRA will be defined as any soil sample collected at a depth greater than 0.5 feet bgs. Consistent with typical USEPA risk assessment practice (USEPA, 1989), soils deeper than 15 feet bgs or the top of the water table, whichever is shallower, will not be included in the HHRA because receptors are not likely to contact these deeper soils. Given the shallow water table at the facility, it is likely that subsurface soil samples will be collected to about 4 feet bgs. For future scenarios in which development of the area may occur, resulting in the mixing of surface and subsurface soils, the combined surface and subsurface soil interval will be evaluated in the HHRA (including samples collected between the ground surface and the top of the water table).

Current human receptors at the facility include on-facility workers and approved visitors (e.g., National Guard/Army Reserve trainees. Outdoor workers may contact exposed surface soil in the AOIs while performing maintenance or other similar activities. If the drainage ditches contain water, outdoor workers may also contact surface water and sediment while performing maintenance. Visitors and trainees may also contact soil in the AOIs but are anticipated to have a lower exposure potential as compared to outdoor workers who would presumably be present more frequently and perform more soil-intense activities, such as landscaping.

The facility does not have any areas that are currently used recreationally. Therefore, an on-facility recreational scenario is only included under a hypothetical future use scenario. Further, entry to the facility by trespassers is considered unlikely under the current scenario. However, it is conservatively assumed that trespassers may access soil at the facility under a future scenario where access is no longer controlled. If the drainage ditches contain water, trespassers may also contact surface water and sediment while traversing the facility. Construction/utility workers may also be present and access soil and shallow groundwater (in an excavation trench) in the future if redevelopment or utility activities were to occur.

As discussed in **Section 10.2.2,** there are no potable water wells on the facility, but there are domestic wells within a 4-mile radius. The facility obtains its drinking water from the Latham Water District, which sources raw water from the Mohawk River and five groundwater supply wells (Latham Water District, 2023). As noted previously, PFAS were not detected in finished water (Latham Water District, 2023). Therefore, there are no current exposures to PFAS in drinking water at the facility.

Reasonably anticipated future land use is not expected to change from the current land use described above. However, the HHRA (to be performed as part of the RI following the Adaptive Phase) will conservatively evaluate an unlimited use/unrestricted exposure (UU/UE) scenario to inform future risk-management decisions in the FS, if applicable. This scenario includes the evaluation of a hypothetical future on-facility residential scenario and the evaluation of on-facility

[1] For delineation purposes and RSC screening in the development of SUs, surface soil is defined as the interval from 0-2 feet bgs.

groundwater collected from permanent monitoring wells as a source of drinking water. A remedial response will not necessarily be taken based on the results of the future UU/UE scenario, given it is not a reasonably anticipated future use for the facility, per the Department of Defense (DoD) Defense Environmental Restoration Program (DERP) Management Manual, which states "The DoD Component shall consider current and reasonably anticipated future land uses in risk assessments. The DoD Component does not have to assume that the reasonably anticipated future land use is residential" (DoD, 2012). The receptors and potentially complete exposure pathways that will be considered for a current and/or future use scenario are as follows.

Area	Receptor	Exposure Pathway(s)
On-facility	Outdoor Worker	Current: • Exposure to surface soil (0-0.5 feet bgs) through incidental ingestion and dermal contact. • Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.
		Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to monitoring well groundwater[(a)] via ingestion as drinking water. • Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.
	Construction/Utility Worker	Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to groundwater seeping into an excavation trench via incidental ingestion and dermal contact where groundwater depth is less than or equal to 15 feet bgs, representing the maximum depth of typical excavations.
	Trespasser (Adolescent)	Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.
	Hypothetical Resident (Adult and Child)	Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to groundwater[(a)] via ingestion of drinking water and dermal contact during bathing/showering.

Area	Receptor	Exposure Pathway(s)
Off-facility (b)	Hypothetical Recreational User (Adult and Child)	Current/Future: • Exposure to surface water and sediment through incidental ingestion and dermal contact if off-facility water body used for recreation is potentially affected by installation activities. • The fish consumption exposure pathway will be qualitatively evaluated.
	Commercial/Industrial Worker	Current/Future: • Exposure to groundwater[a] via ingestion of drinking water.
	Resident (Adult/Child)	Current/Future: • Exposure to groundwater[a] via ingestion of drinking water and dermal contact during bathing/showering.

Notes:

(a) Site groundwater is not currently used as a source of drinking water. For the purposes of the HHRA, monitoring well groundwater data will be used to evaluate the hypothetical future use of groundwater as potable water scenario.

(b) Off-facility sampling is not currently planned. These potential receptors would only be evaluated if off-facility migration pathways for PFAS are confirmed and if off-facility data are collected during the Adaptive Phase.

Potential exposure to airborne particles in outdoor air (from soil) will not be quantitatively evaluated because toxicity values for the inhalation exposure route are not available for PFAS; therefore, quantitative assessment of the inhalation exposure pathway cannot be performed. The associated uncertainties with the inhalation pathway will be discussed in the HHRA.

Ecological

The current facility is heavily developed with buildings (e.g., aircraft hangars, NYDMNA Headquarters, etc.), paved areas (aircraft runway, aircraft parking apron, aircraft washdown station, vehicle parking lots), and landscaped areas, which are primarily landscaped. AOI 1 is within the leased western portion of the facility and terrestrial habitat is limited due to the continuing military land uses and presence of actively mowed, disturbed, and maintained grassy areas where PFAS releases occurred or may have migrated. AOI 2 is on the NYDMNA property and is comprised entirely of a paved road, which does not provide ecological habitat. AOI 3, located in the northeastern portion of the NYDMNA property, was previously comprised of a soil stockpile that had revegetated similarly to the surrounding area (i.e., grassy vegetation) but did not appear to be regularly maintained (i.e., mowed). The entire above grade soil stockpile was removed in October 2024 (i.e., the area is now at-grade with the surrounding area). It is anticipated that revegetation will occur, and that the former stockpile area will be mowed/maintained with the surrounding area. Although bird and mammal species may access the fragmented areas of open space within AOIs 1 and 3, these upland habitats offer limited ecological foraging resources. Upland habitats that would support significant plant or animal communities are not expected to be present within the AOIs. Terrestrial plants and soil invertebrates may serve as food sources for birds and mammals if areas with viable habitat occur on-facility. The findings of the Habitat Assessment will be used to assess whether on-facility terrestrial habitat may be present.

Based on the current understanding of facility conditions (e.g., lack of viable terrestrial habitat; ephemeral stormwater drainage ditch along the southern boundary of the facility), it is assumed that potentially complete exposure pathways for ecological receptors are not present on-facility. The following exposure pathways for upland areas will be evaluated only if they are determined to be complete based on the findings of the habitat assessment (i.e., if viable habitat is identified):

- Soil invertebrates, terrestrial plants, reptiles, and amphibians directly exposed to PFAS in surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs).[1]

- Terrestrial birds and mammals exposed to PFAS through incidental ingestion of soil and by ingestion of contaminated plant and prey items impacted by surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs).[1]

- If present, burrowing mammals may be exposed to PFAS in sub-surface soils (>2 feet bgs, [above the water table]) through incidental soil ingestion while digging and grooming; however, this pathway is anticipated to be minor and will be evaluated qualitatively in the Screening-Level Ecological Risk Assessment (SLERA).

The stormwater drainage ditch is ephemeral and not expected to provide habitat for ecological receptors. However, this ditch could provide habitat for some species depending on the frequency and duration of standing water and growth of natural vegetation. The stormwater drainage ditch along the southern boundary of the facility receives stormwater from the leased portion of the facility, including AOI 1. In addition, AOI 2 is located adjacent and upgradient to this drainage dich, with the potential for surface runoff to the ditch. Given the likely ephemeral presence of water in the southern drainage ditch, this feature is unlikely to support an aquatic or benthic community. Based on the findings of the habitat assessment (e.g., the presence of riparian or wetland plants or standing water other than after a rainfall event), the substrate of the basin may be treated as either soil or sediment for the purpose of evaluating ecological exposures to PFAS. Habitat conditions within the stormwater drainage ditch will be considered to determine if ecological habitat is provided by this feature and whether to evaluate solid material from the ditch, if collected, as soil or sediment. If the habitat assessment indicates that semi-aquatic habitat is present in the southern drainage ditch, then ecological receptors may seasonally contact PFAS in surface water and sediment.

The drainage ditch along the southern boundary of the facility connects with the ALB drainage ditch system, which discharges to Ann Lee Pond. This pond has connectivity to Shaker's Creek, which is a tributary of the Mohawk River. Thus, aquatic and aquatic-dependent receptors may also be exposed to PFAS potentially present in surface water and sediment within downgradient, off-facility aquatic habitats (e.g., Ann Lee Pond, Shaker's Creek, Mohawk River). In addition, although there are no complete pathways for direct exposure of ecological receptors to groundwater at Albany AASF #3, ecological exposure to PFAS present in groundwater may occur if groundwater discharges or seeps into a water feature (e.g., the drainage feature seasonally, Ann Lee Pond, Shaker's Creek, Mohawk River).

Based on the current understanding of facility conditions (e.g., ephemeral stormwater drainage ditch along southern boundary), it is assumed that potentially complete exposure pathways for ecological receptors are not present on-facility. If the aquatic exposure pathway is determined to be complete for the on-facility stormwater feature and/or off-facility aquatic habitats, the following aquatic habitat exposure pathways will be evaluated in the SLERA, as warranted

- Amphibians, reptiles, and aquatic organisms (e.g., aquatic plants, aquatic invertebrates) exposed to PFAS in surface water and sediment associated with the southern stormwater drainage ditch and/or downgradient water bodies via direct contact, ingestion, or bioaccumulation.

- Aquatic-dependent birds and mammals exposed to PFAS through incidental ingestion of sediment, incidental or intentional ingestion of surface water, and ingestion of contaminated plant and prey items impacted by bioaccumulation of PFAS from sediment or surface water associated the southern stormwater drainage ditch and/or downgradient water bodies.

In cases where receptor-specific PFAS toxicity information is not available and exposure pathways are complete, potential impacts on receptors (e.g., reptiles, benthic invertebrates) will be considered qualitatively in the SLERA.

Table 10-1 AOI 1 Data Summary

Analyte	Max Concentration Surface Soil (µg/kg)[b]	Max Concentration Sample ID Surface Soil	Residential Soil (µg/kg) 0-2 feet bgs	Max Concentration Subsurface Soil (µg/kg)[b]	Max Concentration Sample ID Subsurface Soil	Industrial/ Commercial Composite Worker Soil (µg/kg) 2-15 feet bgs	Max Concentration Groundwater (ng/L)[b]	Max Concentration Sample ID Groundwater	Tap Water (Groundwater and/or Surface Water) (ng/L)
HFPO-DA[a]	NA	NA	23	NA	NA	350	NA	NA	1.5
PFBA	0.082J	AOI01-03-SB-00-02	7,800	ND	NA	120,000	52.2	DUP-GW-01 (AOI01-04-GW)	1,800
PFBS	0.039J	AOI01-04-SB-00-02	1,900	0.027J	AOI01-01-SB-03-04	25,000	51.6	DUP-GW-01 (AOI01-04-GW)	600
PFHxA	0.188J	AOI01-04-SB-00-02	3,200	0.313J	AOI01-SB-DUP-2 (AOI01-05-SB-03-04)	41,000	167	DUP-GW-01 (AOI01-04-GW)	990
PFHxS	1.24	AOI01-04-SB-00-02	130	3.23	AOI01-01-SB-03-04	1,600	**1,180**	DUP-GW-01 (AOI01-04-GW)	39
PFNA	0.079J	AOI01-07-SB-00-02	19	0.057J	AOI01-01-SB-05.6-06.2	250	**13.3**	AOI01-06-GW	5.9
PFOA	0.242J	AOI01-07-SB-00-02	19	0.726J	AOI01-01-SB-03-04	250	**61.9**	DUP-GW-01 (AOI01-04-GW)	6
PFOS	**60.1**	AOI01-04-SB-00-02	13	14.7	AOI01-01-SB-05.6-06.2	160	**15,000**	DUP-GW-01 (AOI01-04-GW)	4

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter; NA = not applicable; ND= nondetect; Max =maximum
a. HFPO-DA was not analyzed for during the SI.
b. Screening level exceedances are indicated by bold text.

Table 10-2 AOI 2 Data Summary

Analyte	Max Concentration Surface Soil (µg/kg)[b]	Max Concentration Sample ID Surface Soil	Residential Soil (µg/kg) 0-2 feet bgs	Max Concentration Subsurface Soil (µg/kg)[b]	Max Concentration Sample ID Subsurface Soil	Industrial/ Commercial Composite Worker Soil (µg/kg) 2-15 feet bgs	Max Concentration Groundwater (ng/L)[b]	Max Concentration Sample ID Groundwater	Tap Water (Groundwater and/or Surface Water) (ng/L)
HFPO-DA[a]	NA	NA	23	NA	NA	350	NA	NA	1.5
PFBA	0.118J	AOI03-03-SB-00-02	7800	ND	NA	120000	13.3	AOI02-03-GW	1800
PFBS	ND	NA	1900	0.032J	AOI02-04-SB-05-05.5	25000	6.69	AOI02-03-GW	600
PFHxA	0.129J	AOI03-04-SB-00-02	3200	0.027J	AOI02-02-SB-03-03.7	41000	43.5	AOI02-02-GW	990
PFHxS	0.163J	AOI03-04-SB-00-02/AOI03-07-SB-00-02	130	0.166J	AOI02-04-SB-05-05.5	1600	2.89J	AOI02-03-GW	39
PFNA	0.101J	AOI03-07-SB-00-02	19	ND	NA	250	2.13J	AOI02-03-GW	5.9
PFOA	0.196J	AOI03-04-SB-00-02-DUP	19	ND	NA	250	**10.5**	AOI02-03-GW	6
PFOS	3.44	AOI03-06-SB-00-02	13	0.398J	AOI02-02-SB-03-03.7	160	**21.8**	AOI02-03-GW	4

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter; NA = not applicable; ND= nondetect; Max =maximum

a. HFPO-DA was not analyzed for during the SI.
b. Screening level exceedances are indicated by bold text.

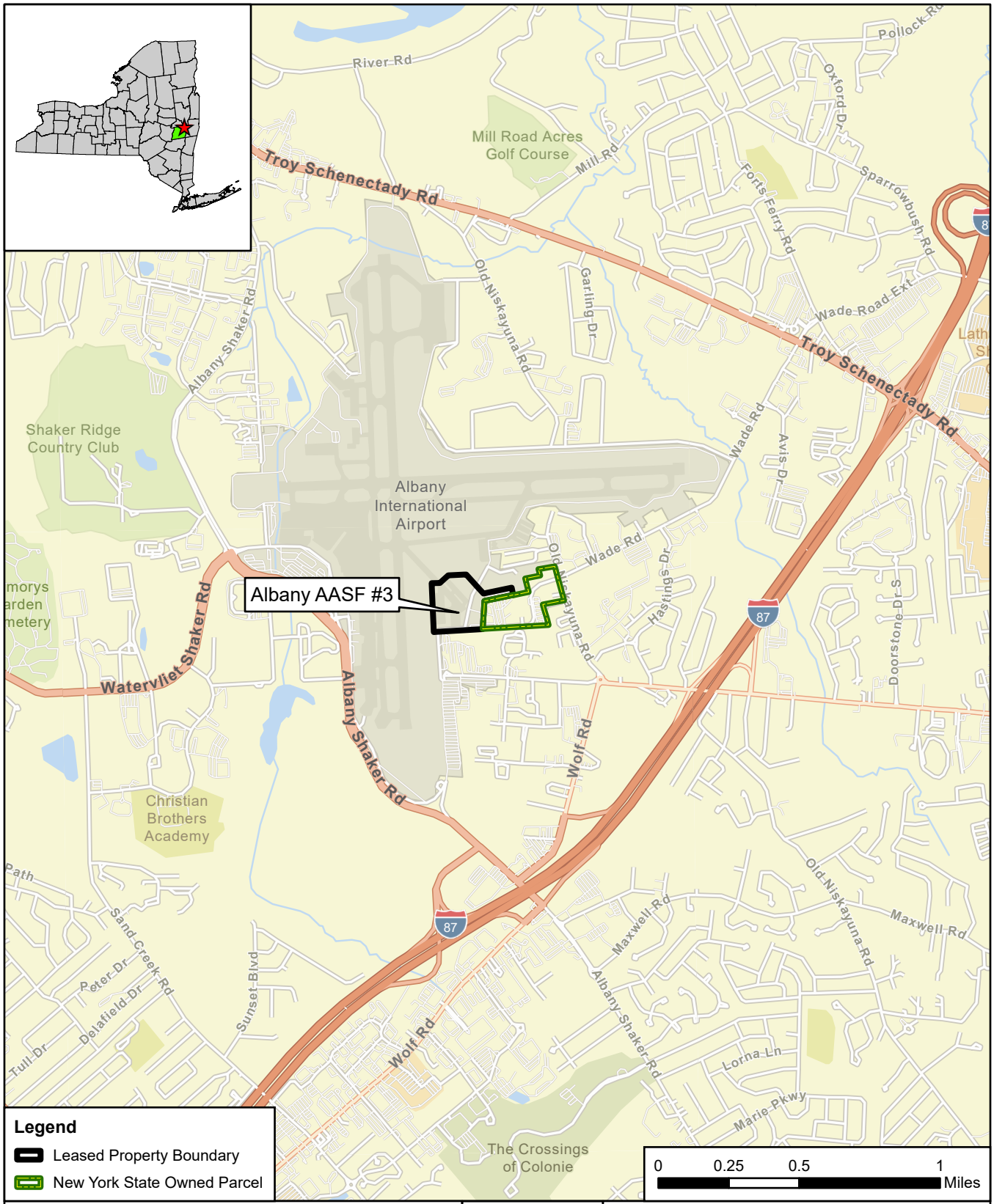
Table 10-3 AOI 3 Data Summary

Analyte	Max Concentration Surface Soil (µg/kg)[b]	Max Concentration Sample ID Surface Soil	Residential Soil (µg/kg) 0-2 feet bgs	Max Concentration Subsurface Soil (µg/kg)[b]	Max Concentration Sample ID Subsurface Soil	Industrial/ Commercial Composite Worker Soil (µg/kg) 2-15 feet bgs	Max Concentration Groundwater (ng/L)[b]	Max Concentration Sample ID Groundwater	Tap Water (Groundwater and/or Surface Water) (ng/L)
HFPO-DA[a]	NA	NA	23	NA	NA	350	NA	NA	1.5
PFBA	0.118J	AOI03-03-SB-00-02	7,800	0.149J	AOI03-05-SB-02-04	120,000	9.27	AOI03-01-GW	1,800
PFBS	ND	NA	1,900	ND	NA	25,000	3.30J	AOI03-01-GW	600
PFHxA	0.129J	AOI03-04-SB-00-02	3,200	0.11J	AOI03-06-SB-02-04	41,000	3.59J	AOI03-01-GW	990
PFHxS	0.163J	AOI03-04-SB-00-02/AOI03-07-SB-00-02	130	0.144J	AOI03-04-SB-02-04	1,600	3.36J	AOI03-01-GW	39
PFNA	0.101J	AOI03-07-SB-00-02	19	0.131J	AOI03-06-SB-02-04	250	1.17J	AOI03-02-GW	5.9
PFOA	0.196J	AOI03-04-SB-00-02-DUP	19	0.235J	AOI03-06-SB-02-04	250	**17.9**	AOI03-01-GW	6
PFOS	3.44	AOI03-06-SB-00-02	13	4.12	AOI03-06-SB-02-04	160	**24.6**	AOI03-01-GW	4

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter; NA = not applicable; ND= nondetect; Max =maximum

a. HFPO-DA was not analyzed for during the SI.
b. Screening level exceedances are indicated by bold text.

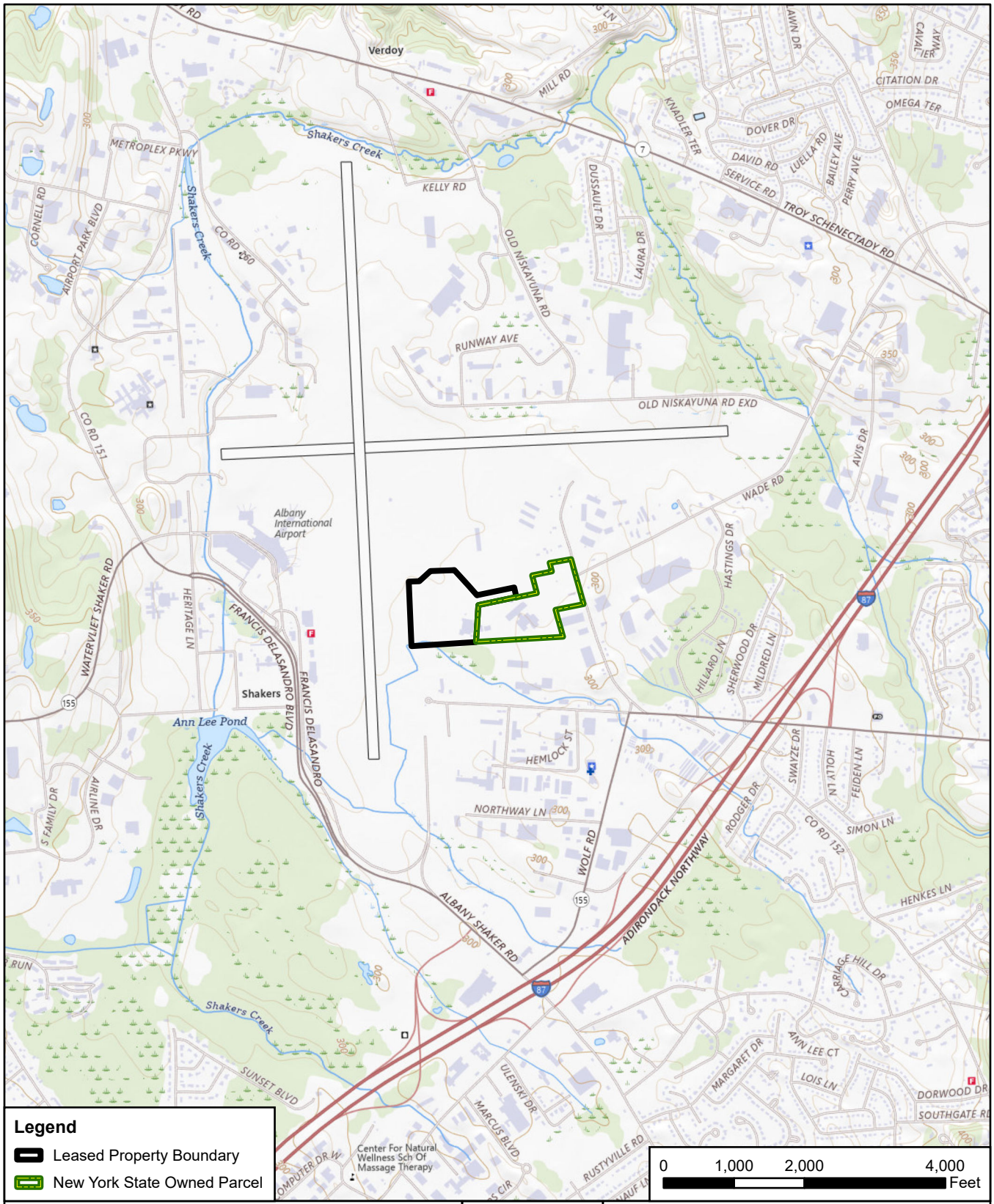
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CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
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SCALE	1:31,680	CHK BY	AB	2/18/2025
Base Map: World Street Map: Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS,		PM	CM	2/18/2025

Facility Location

Figure 10-1

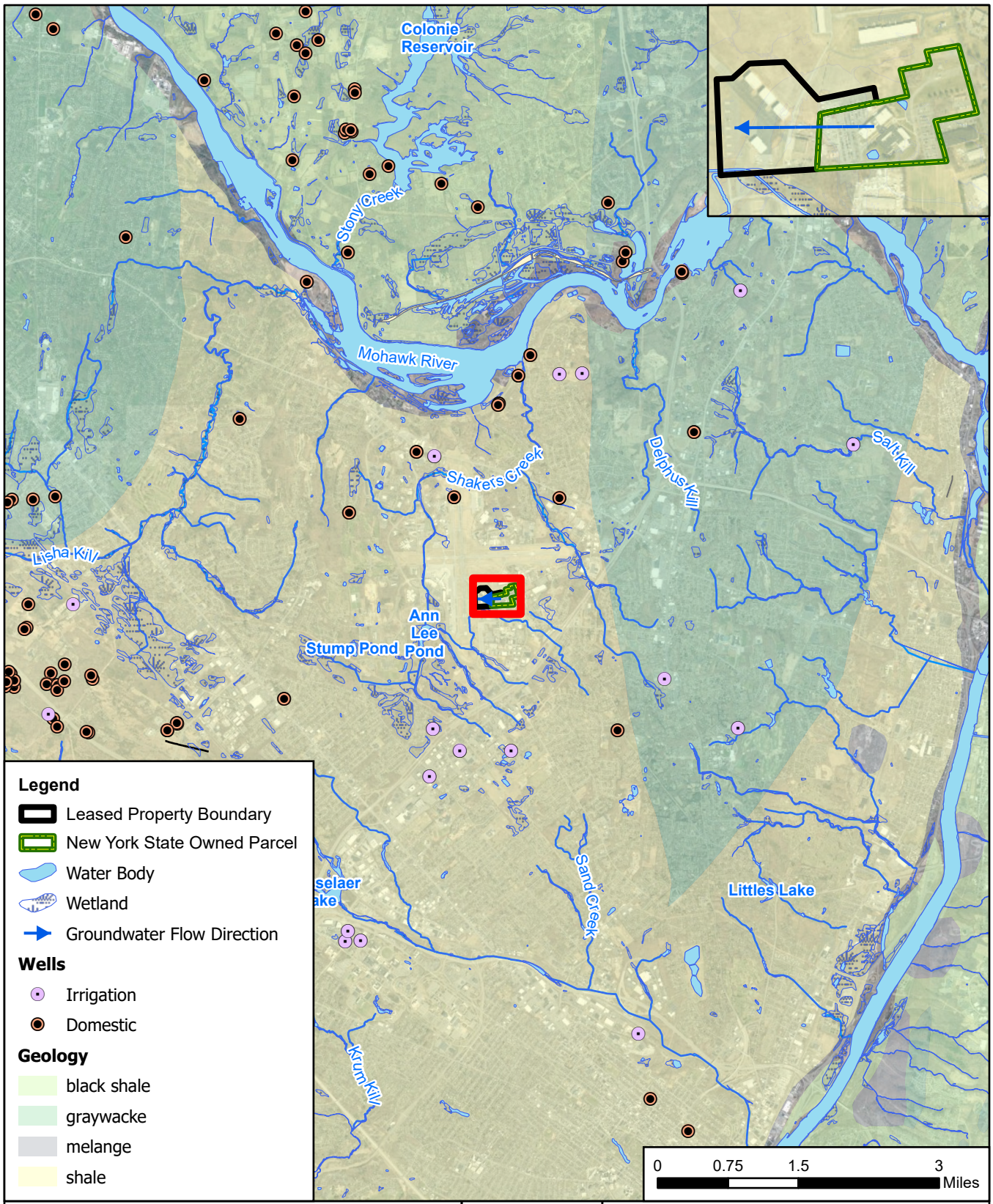


CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:24,000	CHK BY	AB	2/18/2025
Base Map: USGSTopo: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	2/18/2025

N

Facility Topography

Figure 10-2



CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:95,040	CHK BY	AB	2/18/2025
Base Map: World Imagery: New York State, Maxar World Imagery: New York State, Earthstar Geographics		PM	CM	2/18/2025

N

Groundwater Features

Figure 10-3



Groundwater elevations in ft NAVD88.

CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:2,400	CHK BY	AB	2/18/2025
Base Map: World Imagery: New York State, Maxar, Microsoft		PM	CM	2/18/2025

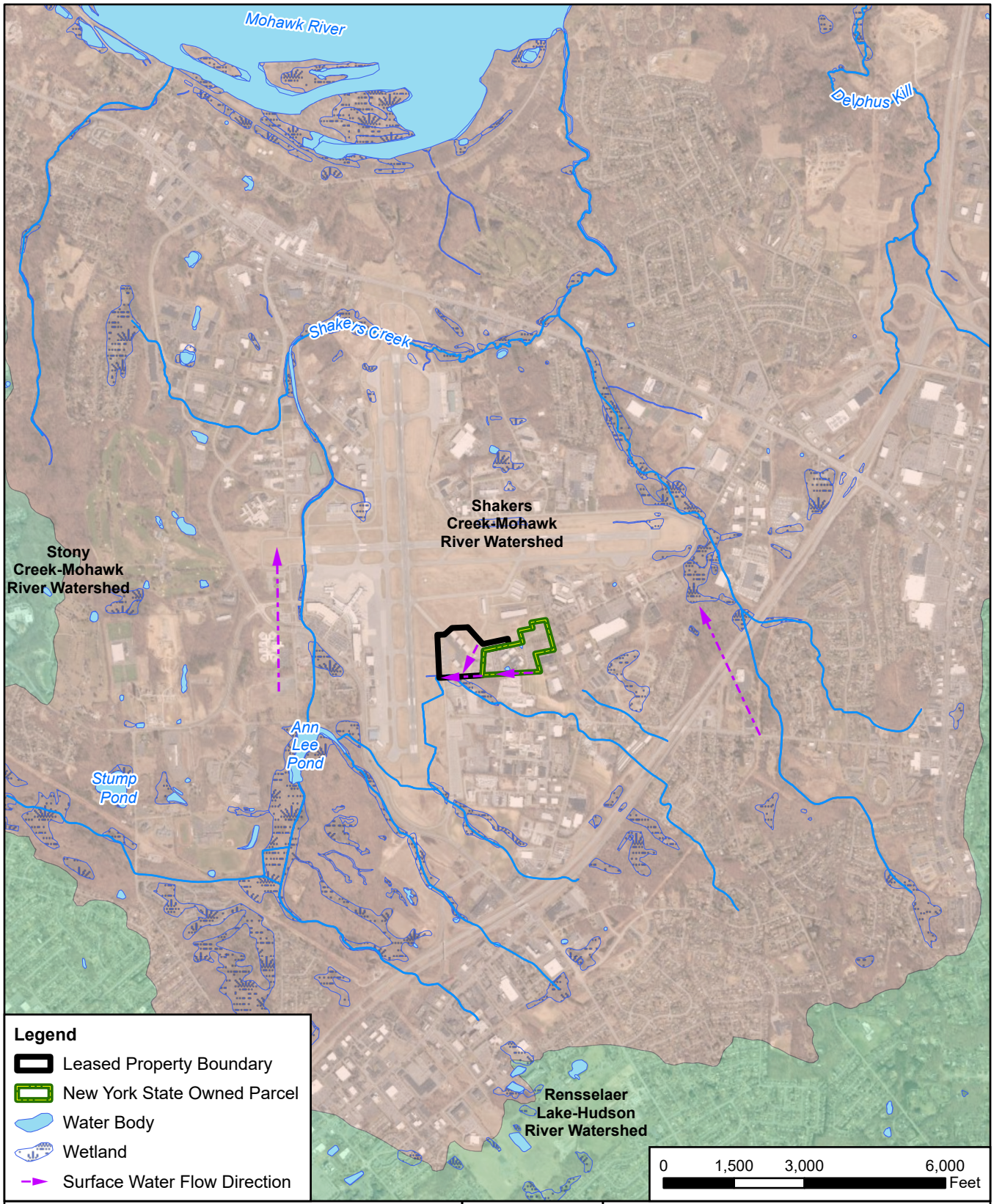
- Soil Boring/Monitoring Well Location
- Leased Property Boundary
- New York State Owned Parcel
- Water Body
- Wetland
- River/Stream
- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction

0 100 200 400 Feet

N

Groundwater Elevations, April 2022

Figure 10-4

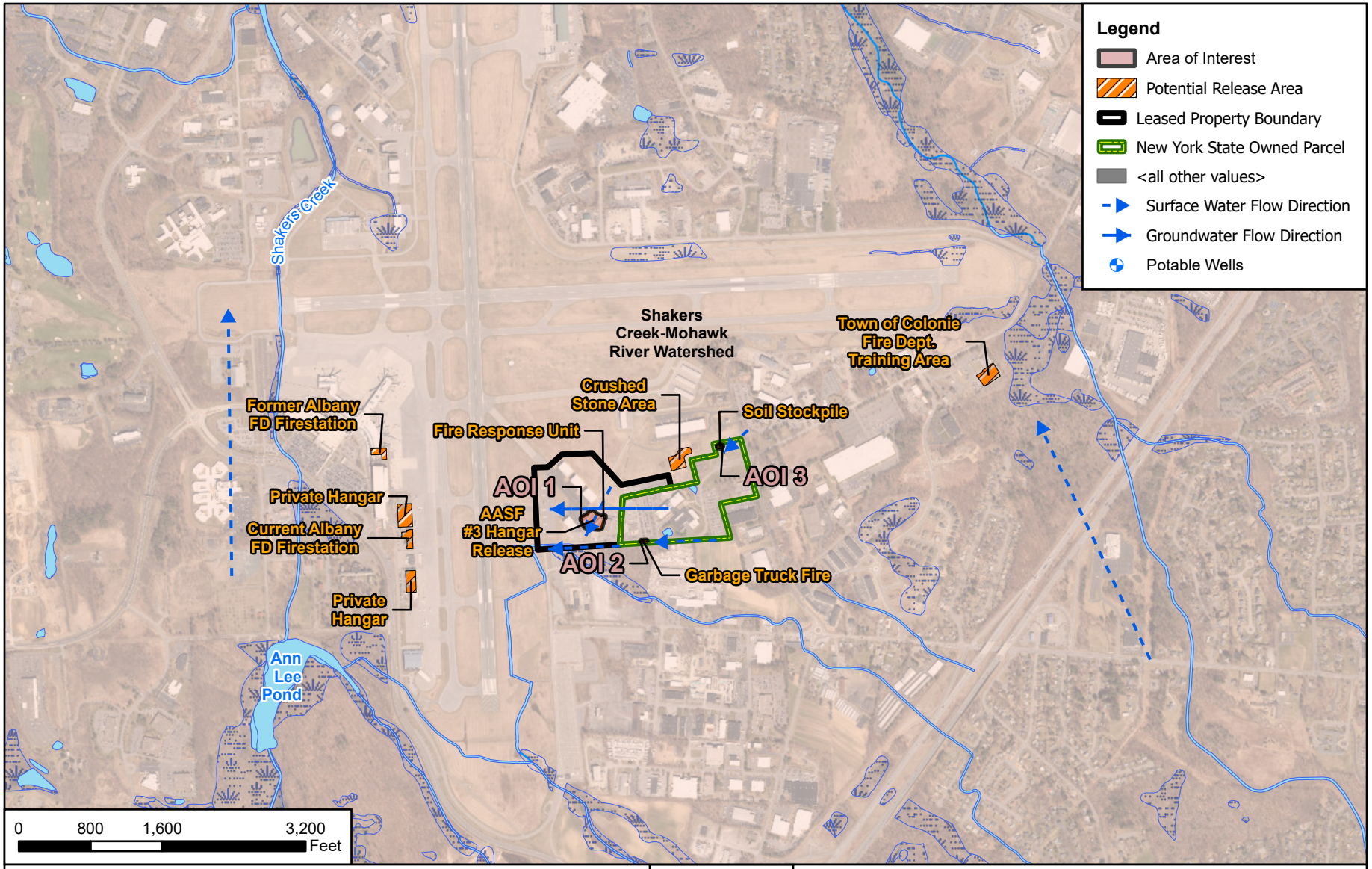


CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:36,000	CHK BY	AB	2/18/2025
Base Map: World Imagery: New York State, Maxar WMS:		PM	CM	2/18/2025

N

Surface Water Features

Figure 10-5



CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:19,200	CHK BY	AB	2/18/2025
Base Map: World Imagery: New York State, Maxar		PM	CM	2/18/2025

N

Areas of Interest

Figure 10-6



CLIENT	ARNG			
PROJECT	Remedial Investigation at Albany AASF #3, NY			
REVISED	2/18/2025	GIS BY	MS	2/18/2025
SCALE	1:2,400	CHK BY	AB	2/18/2025
Base Map: World Imagery: New York State, Maxar, Microsoft		PM	CM	2/18/2025

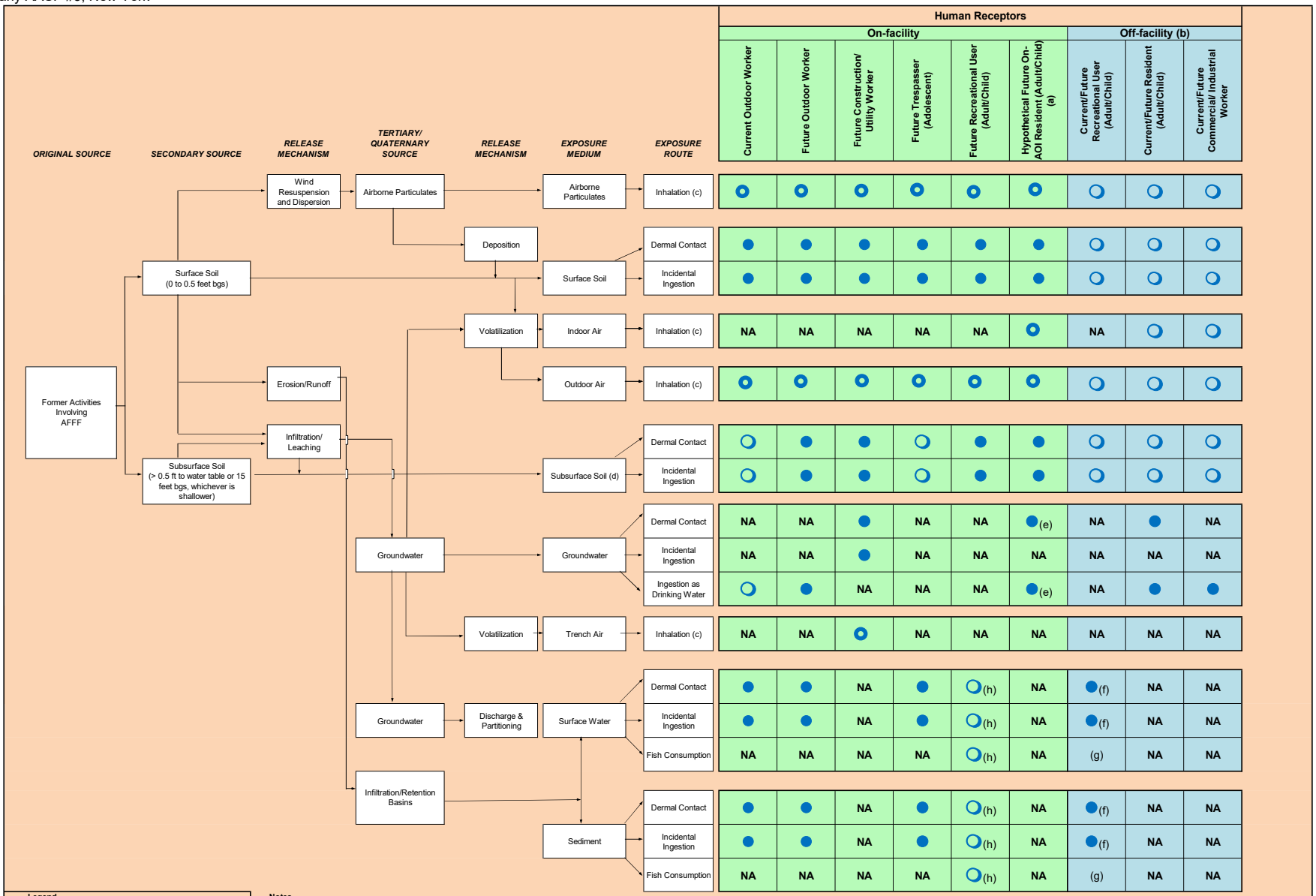
- Soil Boring/Monitoring Well Location
- Hand Auger Soil Sample Location
- Area of Interest
- Leased Property Boundary
- New York State Owned Parcel
- Water Body
- Wetland
- Surface Water Flow Direction
- Groundwater Flow Direction

0 100 200 400 Feet

N

Site Inspection Sample Locations

Figure 10-7



Legend

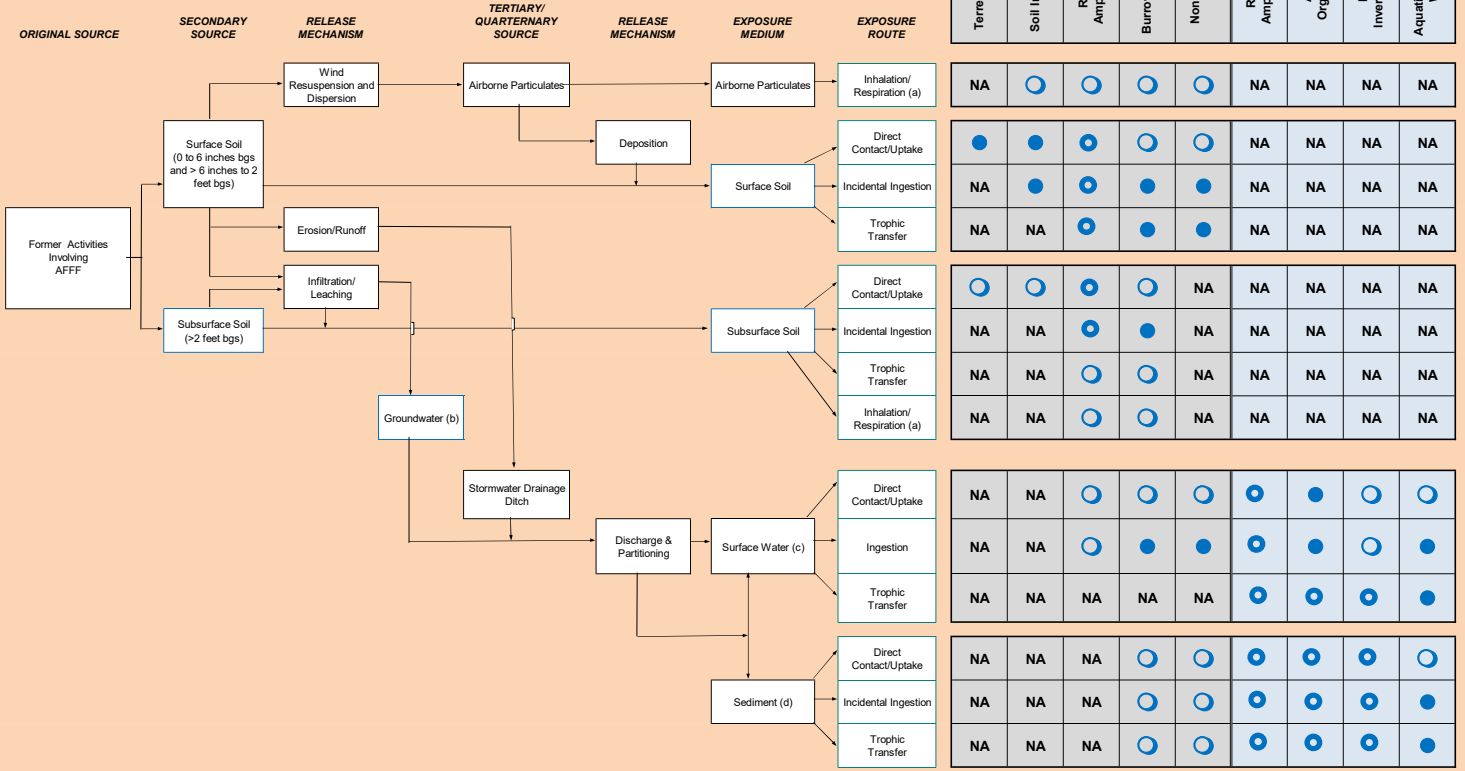
- Potentially complete pathway
- Potentially complete pathway but exposure not quantifiable; discussed in the report text.
- Incomplete or insignificant pathway
- NA Not Applicable

Notes

AFFF - Aqueous film forming foams.
AOI - Area of interest.
bgs - below ground surface.
HHRA - Human health risk assessment.
PFAS - Per- and polyfluoroalkyl substances.

(a) An on-facility resident is not a reasonable anticipated future use at the facility. However, for purposes of the HHRA, an unlimited use/unrestricted exposure (UU/UE) scenario will be conservatively evaluated for informational purposes.
(b) Off-facility sampling is not currently planned. These potential receptors would only be evaluated if off-facility migration pathways for PFAS are confirmed and if off-facility data are collected during the Adaptive Phase.
(c) Potential exposure via inhalation will not be quantitatively evaluated in the HHRA because toxicity values for the inhalation exposure route are not available for PFAS. The associated uncertainties will be discussed in the uncertainty analysis of the HHRA.
(d) It is conservatively assumed that there could be future redevelopment of the facility, and current subsurface soils may be brought to the surface and become available for exposure under a future use scenario.
(e) Site groundwater is not currently used as a source of drinking water. The evaluation of on-facility groundwater (represented by permanent monitoring well data) as a future source of potable water will be performed for informational purposes to represent an unrestricted groundwater use scenario.
(f) If the Prescriptive Phase data indicate potential off-facility impact to waterbodies used recreationally, additional data may be collected.
(g) The fish consumption pathway will be qualitatively evaluated.
(h) There are no surface water bodies used recreationally on the facility.

Project No. 60668768	Risk Assessment Workplan	HUMAN HEALTH CONCEPTUAL SITE MODEL	Figure 10-8
	Albany AASF #3		



Legend

- Potentially complete pathway
- Potentially complete pathway but exposure not quantifiable; discussed in the report text.
- Incomplete or insignificant pathway
- NA Not Applicable

Notes

AFFF - Aqueous film forming foams.
bgs - below ground surface.
PFAS - Per- and polyfluoroalkyl substances.

(a) Inhalation/respiration of airborne particulates (dust) is expected to be minor compared to soil exposure pathways.
(b) There are no direct, complete, ecological exposure pathways to groundwater. However, exposure to PFAS present in groundwater may occur when it discharges or seeps into a surface water body (e.g., Ann Lee Pond, Shaker's Creek).
(c) Potential exposures will be evaluated for surface water associated with the stormwater drainage feature if water is present and viable habitat identified (see footnote i), and for off-facility aquatic habitats if off-facility migration pathways are identified (see footnote j).
(d) If conditions within the stormwater drainage feature are dry at the time of sampling and viable terrestrial habitat is present, then surface soil samples will be collected and will be evaluated as part of the surface soil exposure pathway.
(e) Amphibians and reptiles may be exposed to PFAS in terrestrial or aquatic habitats; however, media-specific screening values may not be available to evaluate these pathways. Therefore, these exposure pathways will be considered qualitatively.
(f) If viable aquatic habitat is present in the stormwater drainage feature, aquatic plants and invertebrates may be present. Aquatic plants, invertebrates, and fish may be present in off-facility aquatic habitats (e.g., Ann Lee Pond, Shaker's Creek). These exposure pathways will be evaluated only if aquatic habitat and off-facility migration of PFAS are identified. Aquatic screening values based on trophic transfer may not be available; therefore, this pathway will be considered qualitatively.
(g) Benthic invertebrates may be exposed to PFAS in sediment; however, sediment screening values based on direct contact, incidental ingestion, and trophic transfer may not be available and screening values are not available for most PFAS. When PFAS-specific screening values are not available, these pathways will be considered qualitatively.
(h) Given the lack of on-facility viable upland habitat, on-facility terrestrial exposure pathways are not expected to be complete. This assumption will be confirmed during the habitat assessment and these exposure pathways will be evaluated only if applicable.
(i) The on-facility stormwater drainage features are maintained and are not expected to provide habitat for ecological receptors; therefore, on-facility aquatic and semi-aquatic exposure pathways are not expected to be complete. This assumption will be confirmed during the habitat assessment and these exposure pathways will be evaluated only if applicable.
(j) Off-facility sampling is not currently planned. The Prescriptive Phase data for on-facility media will aid in determining if there are off-facility migration pathways. If off-facility migration pathways are identified, sampling in downgradient water bodies, such as Ann Lee Pond and Shaker's Creek, may be warranted during a later mobilization and would be described in future planning documents.

Project No. 60717766	Risk Assessment Workplan	ECOLOGICAL CONCEPTUAL SITE MODEL	Figure 10-9
Albany AASF #3 Latham, New York			

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Worksheet #11: Project/Data Quality Objectives

DQOs specify the level of data required to support the decision-making process for a project. Specific DQOs have been established for the RI at this facility and are described in this worksheet. These DQOs will follow the USEPA's seven-step iterative process for DQO development. DQOs are influenced by the ongoing project planning discussions with stakeholders and will be updated if new consensus decisions are reached.

RI activities for the facility will be conducted in multiple phases. This QAPP addresses DQOs for an initial Prescriptive Phase, a secondary Adaptive Phase, and a Final Characterization/Monitoring Phase. DQOs for the Adaptive Phase may be modified based on analysis of data collected during the Prescriptive Phase. Modifications to the DQOs will be presented in the future planning documents for review and approval by ARNG and USACE.

1. State the Problem

PFAS are classified as emerging environmental contaminants that have garnered regulatory interest due to their potential risks to human health and the environment. The regulatory framework for managing PFAS at both the federal and state level continues to evolve. The DoD has implemented a policy to retain facilities within the CERCLA process, comparing PFAS analytical results to SLs derived from the USEPA Regional Screening Levels (RSLs) for soil and tap water (Assistant Secretary of Defense, 2023). The ARNG program follows this policy, recommending AOI(s) for further investigation if PFAS concentrations exceed the SLs during the SI phase. While PFAS concentrations exceeding SLs were confirmed during the SI phase at all three AOIs at Albany AASF #3, the extent of potential risk to human health or the environment remains uncertain. If the results of the risk assessment performed as part of the RI Report identifies potential unacceptable risk as defined under the NCP (40 CFR Part 300.430; USEPA, 1994), then an FS will be recommended to evaluate remedial action alternatives.

The OSD policy instructs the use of USEPA RSLs based on a cancer risk level of 1E-06 and a hazard quotient of 0.1 for soil and groundwater. The OSD updated its website in March 2024 to direct the use of the November 2023 RSLs for specific PFAS (Assistant Secretary of Defense, 2024b). Sediment SLs are multiplied by a factor of 10 from soil RSLs to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario. The Mohawk River is a source of potable water for the Latham Water District. The exact location of the intake is not publicly available, and it is not known if the intake is upstream or downstream of the facility. Therefore, the tap water RSLs will conservatively be used as SLs for surface water. **Table 11-1** summarizes the PFAS listed on the OSD website, which have USEPA RSLs derived from final, peer-reviewed toxicity values. These PFAS will be used by the DoD in CERCLA risk assessments and are also included in the USEPA Method 1633A analytical list. The SLs presented in **Table 11-1** will be used to guide field investigations and evaluate analytical data.

Applicable SLs may change over the contract period. Those PFAS with accepted SLs are considered "relevant compounds" at the time of development of this QAPP and will be assessed and updated accordingly if changes to policy, including screening level updates, are formally accepted by OSD.

Table 11-1 PFAS Screening Levels[2]

Analyte	Residential (Soil) (µg/kg)[a, b] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater and/or Surface Water) (ng/L)[a, b]
HFPO-DA	23	350	1.5
PFBA	7,800	120,000	1,800
PFBS	1,900	25,000	600
PFHxA	3,200	41,000	990
PFHxS	130	1,600	39
PFNA	19	250	5.9
PFOA	19	250	6.0
PFOS	13	160	4.0

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

[a] USEPA Regional Screening Level (RSL) based on a cancer risk level of 1E-06 and a hazard quotient of 0.1 (November 2023). RSLs are used consistent with the memorandum from the OSD, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (24 August 2023) and the list of RSLs included in Department of Defense Investigations of PFAS as of March 2024 (Assistant Secretary of Defense, 2024b).

[b] Note that the OSD memo values are applicable to tap water (groundwater and/or surface water) and soil. Sediment SLs are multiplied by a factor of 10 from soil RSLs to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario. The Mohawk River is a source of potable water for the Latham Water District. The exact location of the intake is not publicly available and it is not known if the intake is upstream or downstream of the facility. Therefore, the tap water RSLs will conservatively be used as SLs for surface water.

2. Identify the Goals of the Study

The unique nature of PFAS was considered when establishing goals for the investigation. Because of the very low action levels and highly mobile nature of PFAS, the traditional characterization of nature and extent and definition of boundaries will be modified, focusing on data necessary to evaluate response actions. Additionally, the ubiquitous nature of PFAS was considered when establishing the goals. Many studies have been published that show widespread distribution of certain PFAS, such as PFAAs, in various matrices including sediment, surface water, groundwater, wildlife, and human blood (whole, plasma, and serum) (Kannan et al., 2004; Yamashita et al., 2005; Higgins et al., 2005; Rankin et al., 2016). Some PFAS (such as PFAAs) are found in many places throughout the globe, even in areas well beyond where they were initially used or manufactured (Houde et al., 2011).

The goals of the RI are:

1. Conduct a geological investigation to aid in geologic and hydrogeologic characterization in support of the RI drilling and sampling program. Based on data collected during the SI, the lithologies were consistent with the lacustrine deposits or proglacial Lake Albany. This investigation will examine the subsurface extent and thickness of fine-grained silty sand and poorly graded sands.

[2] The relevant SLs for DoD RIs for PFAS are updated regularly based on new regulations and policies. As such, the SLs current at the time of finalization of the QAPP are presented in Appendix H. These SLs will be used for screening relevant media and will be incorporated within the limitations of the contract under which this work is being performed

2. Refine the extent of relevant compounds, attributable to ARNG activities in groundwater at concentrations above the SLs on-facility at the Albany AASF #3 (Assistant Secretary of Defense, 2023).
3. Evaluate the extent of relevant compounds, attributable to ARNG activities in groundwater at concentrations above the SLs downgradient of the Albany AASF #3 (off-facility).
4. Identify or confirm possible non-ARNG sources coming onto the facility and co-mingling with PFAS plumes.
5. Collect groundwater samples from newly installed permanent monitoring wells to further refine groundwater flow direction and support grab groundwater evaluation. Collect groundwater samples from permanent monitoring wells for analysis of PFAS to refine the extent of relevant compounds attributable to ARNG activities in groundwater at concentrations above the SLs at the facility boundary at the Albany AASF #3. Determine whether the concentrations of these compounds in groundwater are more than likely the result of ARNG activities (originate on the facility). If relevant compounds are detected, conduct preliminary screening and evaluate the results in the HHRA as part of the comprehensive RI report that will be prepared following completion of RI field activities, as indicated in **Section 14.6**, and as described in Goals 12 and 13 below.
6. Collect transects of vertical subsurface borings to assess the relative vertical and horizontal distribution of PFAS concentrations in the vadose zone and in the surficial aquifer. Collect groundwater and soil samples from transect borings for analysis of PFAS to refine the extent of relevant compounds above the SLs at the facility. Determine whether the concentrations of these compounds are more than likely the result of ARNG activities (originating on the facility). If relevant compounds are detected, conduct preliminary screening and evaluate the results in the HHRA as part of the comprehensive RI report that will be prepared following completion of RI field activities, as described in Goals 12 and 13 below.
7. Within an established AOI, locate the release areas in soil where relevant compounds in soil are linked to groundwater containing these compounds that is attributable to ARNG activities. Refine the occurrence of relevant compounds in soil to the SLs (Assistant Secretary of Defense, 2023). If, due to significant facility construction and soil movement, no release area is apparent, collect sufficient soil data to support a quantitative risk assessment. If relevant compounds are detected, further evaluate these results in the risk assessment as part of the comprehensive RI report that will be prepared following completion of RI field activities, as described in Goals 12 and 13 below.
8. Collect surface water samples (if available) from the drainage ditch/stormwater structure running through the southwest corner of the facility to determine the presence or absence of relevant compounds within the detention basin attributable to ARNG activities. If relevant compounds are detected in the Prescriptive Phase, further evaluate these results via screening and additional data collection during the Adaptive Phase to inform the risk assessment as part of the comprehensive RI report that will be prepared following completion of RI field activities, as described in Goals 12 and 13 below.
9. Collect sediment samples from the drainage ditch/stormwater structure running through the southwest corner of the site to evaluate relevant compounds in sediment where stormwater with PFAS impacts attributable to ARNG activities may have discharged. If relevant compounds are detected in the Prescriptive Phase, further evaluate these results via screening and additional data collection during the Adaptive

Phase to inform the risk assessment as part of the comprehensive RI report that will be prepared following completion of RI field activities, as described in Goals 12 and 13 below.

10. Collect data to evaluate facility characteristics that influence the fate and transport of relevant compounds, support refinement of the CSM, and inform the potential remedial alternatives evaluation.
11. Collect and document data that is both representative of field conditions and defensible within the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) parameters. This includes sufficient field samples to fully characterize field conditions and heterogeneity as well as quality control (QC) samples sufficient to demonstrate data quality. Collect legally defensible samples with an unbroken chain of custody (CoC) maintained from sampling through analysis.
12. Conduct a facility-specific HHRA in accordance with USEPA Risk Assessment Guidance for Superfund (RAGS) and DA risk assessment guidance and policies (DA, 1999; Assistant Secretary of Defense, 2023) as part of the comprehensive RI report that will be prepared following this and subsequent mobilizations, as indicated in **Section 14.6**. If no potential unacceptable risk or hazard to human receptors, as defined in the NCP [40 CFR § 300.430] (USEPA, 1991; USEPA, 1994), is identified, then no further action for human receptors will be recommended. If potential unacceptable risk or hazard to human health, as defined in the NCP [40 CFR § 300.430] (USEPA, 1991; USEPA, 1994), is presented by facility-related concentrations of relevant compounds in soil, groundwater, sediment, and/or surface water, then an FS will be recommended to evaluate remedial action alternatives.
13. If relevant compounds are detected in on-facility media at concentrations exceeding SLs as described in Goals 5, 6, 7, 8 and 9, a SLERA will be conducted following completion of the Adaptive Phase data collection. The SLERA will be conducted in accordance with USEPA Ecological RAGS (USEPA, 1997) and DA risk assessment guidance (DA, 2010) for relevant compounds, as well as other PFAS with relevant ecological screening values (e.g., perfluorododecanoic acid [PFDoA], perfluoroundecanoic acid [PFUdA], perfluorodecanoic acid [PFDA], perfluoroheptanoic acid [PFHpA], PFHxA, PFPeA, and PFBA). An exceedance of an ecological screening value does not necessarily correlate to an effect and a weight of evidence assessment will be used to determine the need for further evaluation. Lower trophic level receptors (e.g., invertebrates, plants) will be evaluated qualitatively on a community level basis. If the SLERA and subsequent SLERA refinement (Step 3a in the USEPA ecological risk assessment [ERA] process) identify the potential for adverse effects on ecological receptors due to exposure to PFAS in soil, sediment, or surface water, then a risk management decision will be made by the team regarding the need for further ecological evaluations.

3. Identify Information Inputs

Primary information inputs include:

- Analytical data collected as part of drinking water (as applicable) and environmental sampling efforts around the facility;
- Findings from the CERCLA PA completed for Albany AASF #3 (AECOM, 2020). This information was used to identify potential release areas and mechanisms.
- Findings from the CERCLA SI completed for Albany AASF #3, including PFAS analytical data from groundwater and soil from each of the AOIs, (AECOM, 2023). The soil and groundwater data were used to determine PFAS presence or absence and inform the

current understanding of nature and extent of contamination in these media, as described in **Worksheet #10**. Additionally, the data were used to refine the sampling approach for these media during the Prescriptive Phase, as described in **Worksheets #17 & #18**.

- Publicly available sampling results from off-facility potable water well sampling, performed as part of the Latham Water District Annual Water Quality Report (Latham Water District, 2023; Latham Water District, 2024).
- Responses from SHPOs, USFWS, and/ or tribes identifying natural, cultural, or historical items that may be impacted by CERCLA activities.
- Grab groundwater sample data that will be collected during the RI Prescriptive and Adaptive Phase mobilizations, and the Final Characterization/Monitoring Phase;
- Definitive sample data collected during the Final Characterization/Monitoring Phase;
- Field data collected during the SI and RI Prescriptive, Adaptive, and Final Characterization/Monitoring Phases, including groundwater elevation, water quality parameters, hydraulic conductivity, vertical gradients, and lithology;
- A subset of soil and/or sediment samples within each AOI will be selected for geotechnical analyses (grain size, total organic carbon [TOC], and pH)
- In addition to soil and sediment quality characteristics gathered via geotechnical analyses, a subset of water samples (e.g., surface water and/or daylighting groundwater) will be analyzed for water quality parameters (e.g., pH, dissolved organic carbon, temperature, salinity, if applicable), as these types of data may be helpful to understanding exposure and effects in the risk assessment.
- The findings of the habitat assessment to be performed during the RI field activities will be incorporated into the ERA to aid in the biological characterization and receptor selection.
- The CSM, which will be refined based on the field and analytical data collected during the RI Prescriptive, Adaptive, and Final Characterization/Monitoring Phases.

4. Define the Boundaries of the Study

The scope of the Prescriptive Phase sampling is bounded by the Albany AASF #3 facility boundary. PFAS were detected in soil and groundwater during the SI. As such, to meet DQOs, additional sampling will be performed from these media and from surface water and sediment.

Sampling beyond the facility boundaries will not be conducted during the Prescriptive Phase sampling, as detailed in **Worksheets #17 & #18**. If off-facility sampling is required, the proper stakeholders will be notified, and right of entry (ROE) will be obtained by USACE and ARNG with property owner(s). The temporal boundaries of the study will be limited by seasonal conditions at Albany AASF #3; the field work for the scope will be performed over multiple mobilizations and quarterly monitoring will be performed over the course of one year.

The vertical boundaries of the investigation will be determined during the Prescriptive Phase. Vertical profile borings will be drilled, and discrete interval groundwater samples will be collected to determine the hydraulic connectivity of aquifer and potential migration of contamination.

5. Develop the Analytic Approach

Samples will be analyzed by a DoD Environmental Laboratory Accreditation Program (ELAP) and National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory. Copies of the laboratory accreditation certificates are included in **Appendix C**. Analytical

services are summarized in **Worksheets #19 & #30**. Analyses will be conducted via the final version of USEPA Method 1633A and in accordance the DoD Quality Systems Manual (QSM) Version 5.4 (DoD, 2021) or Version 6.0 (DoD, 2023a), depending on the laboratory's accreditation cycle. Laboratories are in the process of updating their standard operating procedures (SOPs) to be compliant with the final version of USEPA Method 1633A and will update their accreditation to the published DoD QSM 6.0. The laboratories will be required to follow the current version of their SOPs and the QAPP will be updated to reflect DoD QSM 6.0 and 1633A when the laboratories update their accreditation.

Screening-level PFAS data analyses, using the American Society for Testing and Materials (ASTM) D8421, has been approval for use via a Demonstration of Method Applicability (DMA) Study (AECOM, 2024c). Screening-level data analyzed using ASTM Method D8421 will not be used in risk assessments, consistent with OSD policy (Assistant Secretary of Defense, 2024a). Screening-level data will be used to refine and inform subsequent phases of work, which will collect the USEPA Method 1633A definitive data necessary for risk assessments. These screening-level PFAS data will be used in conjunction with definitive PFAS data as part of the Rapid Site Characterization (RSC) tasks. Details regarding the RSC process for using these screening and definitive data collaboratively are provided in **Worksheets #14 & #16** and **Worksheets #17 & #18**.

A laboratory specification was developed in conjunction with the ARNG and USACE Baltimore in order to provide consistency amongst laboratories conducting these analyses and to provide the appropriate levels of quality assurance (QA)/QC for the screening-level DQOs. The specifications have been incorporated into the appropriate worksheets (as listed below) and is provided along with the ASTM D8421 SOP in **Appendix C**. Confirmation split sampling, at a minimum of 10% frequency of samples for USEPA Method 1633A analyses, will be performed on all samples involving the ASTM D8421 screening-level PFAS data analyses. Assessment of the confirmation data, along with protocols for corrective action, will be conducted as part of the data validation and data usability assessment (DUA) tasks in the same manner as the other quality control sample results. Details for these assessments are provided in **Worksheet #12**, **Worksheet #20**, and **Worksheet #37**.

Chemical analyses will be performed in accordance with the analytical methods identified in **Worksheet #23**. Analytical sensitivity for the methods selected is compared to project screening criteria in **Worksheet #15**. Requirements for laboratory instrument calibration and equipment maintenance and testing are presented in **Worksheet #24** and **Worksheet #25**, respectively. Measurement performance criteria (MPC) for field and laboratory QC samples are presented in **Worksheet #12** and **Worksheet #28**, respectively. The general analytic approach to achieve the goals outlined in Step 2 of this Worksheet is described below.

The environmental sampling program during the Prescriptive Phase will include:

- Installation, sampling, and gauging of new permanent monitoring wells;
- Collection of RSC surface soil samples for analysis of the shortlist of twelve PFAS, as specified in **Worksheet #15**, under rapid 48-hour turn-around time (TAT) at AOI 1;
- Collection of RSC co-located grab soil and groundwater samples from transects of direct push technology (DPT) borings for analysis of the shortlist of fourteen PFAS, as specified in **Worksheet #15**, under rapid 48-hour TAT at AOI 1;
- Collection of co-located grab soil and groundwater samples from transects of DPT borings for analysis of PFAS (target list of 40 PFAS) at AOI 2 and AOI 3;
- Collection of surface water and sediment for analysis of PFAS (target list of 40 PFAS) from the drainage ditch along the southern boundary of the facility.

The specific details and rationale for the sampling design, sampling locations, and methods are presented in **Worksheets #17 & #18**.

6. Specify Performance/Acceptance Criteria

The performance and acceptance criteria are established in **Worksheet #12** and **Worksheet #37**. Laboratory data are considered usable if data validation criteria are met, as described in **Worksheet #34**, **Worksheet #35**, and **Worksheet #36**. Analytical data quality will be compared to DoD QSM Version 5.4 (DoD, 2021) specification for PARCCS. The analytical methods will provide the lowest available detection limits (DLs) using standard methods that will allow the data to be screened against the data quality limits (DQLs) in **Worksheet #15**.

If 95% upper confidence limits (UCLs) are calculated using analytical data, USEPA's software (ProUCL) will be used. The software identifies the underlying data distribution and uses an algorithm to select the most appropriate UCL. UCLs will be calculated at the 95% confidence limit, meaning that one can be 95% confident that the population mean is less than the UCL. The derivation and use of UCLs will be more fully described in the facility-specific risk assessment work plans.

7. Develop the Detailed Plan for Obtaining Data

The detailed plan for obtaining data is established in **Worksheets #17 & #18**.

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Worksheet #12: Measurement Performance Criteria

This worksheet documents the quantitative MPC in terms of precision, bias, and sensitivity for both field and laboratory measurements and is used to guide the selection of appropriate measurement techniques and analytical methods. MPC are developed to ensure collected data will satisfy the DQOs documented in **Worksheet #11**. For analytical methods, MPC are determined for each matrix, analyte, and concentration level. Representative MPCs for PFAS, geotechnical, and other geochemical parameters are detailed below.

Matrix Groundwater/ Surface Water/ Porewater/ Potable Wells
Analytical Group PFAS by USEPA Method 1633A
Concentration Low

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling, Analytical, or Both
Accuracy/Bias	LCS/LCSD and MS/MSD shall be spiked with all analytes. Analyte recovery limits per **Worksheet #28**	LCS/LCSD, MS/MSD	S & A
Precision	Laboratory duplicates analysis should have an RPD < 30%	LCS/LCSD, MS/MSD	A
Precision	Values > 5X LOQ: RPD must be ≤ 30%; Absolute difference ≤ 2x the LOQ for Values ≤ 5X LOQ:	Field Duplicates	S
Representativeness	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Method Blank, Field Reagent Blanks, Equipment Rinsate Blanks	S & A
Accuracy	Extracted Internal Standard Analyte recoveries must be within 20% to 150% of ICAL midpoint standard area	EIS	A
Sensitivity	Verify point of known precision and accuracy at the lowest point of the calibration range (quarterly)	Lowest point of the calibration curve e.g., LOQ Verification	A
Sensitivity	Detection limits ≤ to acceptance criteria, See **Worksheet #15** for specific laboratory reporting limits.	Reported Sample Data	S & A
Sensitivity	Instrument Sensitivity Check concentrations must be within ±30% of their true values	ICS, Low-Level LCS	A
Completeness	Completeness criteria will be considered met if 95% of all planned sample data (as requested on CoC in lab reports and EDD; including requested reanalyses) are collected	SOPs, and acceptance per data validation	S & A
Representativeness	Based on accuracy and media comparison	Laboratory Receipt Checklist, Cooler Temperature Blank, Use of standardized SOPs in field and laboratory	S
Representativeness	10% of all samples submitted for ASTM D8421 analysis will be analyzed for USEPA 1633A	Quality assurance for ASTM D8421 Data	S & A

Notes:
% = percent
< = less than
> = greater than
≤ = less than or equal to
A = analytical
CoC = chain of custody
EDD = electronic data deliverable
EIS = Extracted Internal Standards
ICAL = initial calibration
LCS/LCSD = laboratory control spike/ laboratory control spike duplicate
LOQ = limit of quantitation
MS/MSD = matrix spike/ matrix spike duplicate
QC = quality control
RPD = relative percent difference
S = sampling
SOP = Standard Operating Procedure

Matrix Soil/ Sediment
Analytical Group PFAS by USEPA Method 1633A
Concentration Low

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling, Analytical, or Both
Accuracy/Bias	LCS/LCSD and MS/MSD shall be spiked with all analytes. Analyte recovery limits per **Worksheet #28**	LCS/LCSD, MS/MSD	S & A
Precision	Laboratory duplicates analysis should have an RPD < 30%	LCS/LCSD, MS/MSD	A
Precision	Values > 5X LOQ: RPD must be ≤ 50%; Absolute difference ≤ 4x the LOQ for Values ≤ 5X LOQ:	Field Duplicates	S
Representativeness	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Method Blank, Field Reagent Blanks, Equipment Rinsate Blanks	S & A
Accuracy	Extracted Internal Standard Analyte recoveries must be within 20% to 150% of ICAL midpoint standard area	EIS	A
Sensitivity	Verify point of known precision and accuracy at the lowest point of the calibration range (quarterly)	Lowest point of the calibration curve e.g., LOQ Verification	A
Sensitivity	Detection limits ≤ to acceptance criteria, See **Worksheet #15** for specific laboratory reporting limits.	Reported Sample Data	S & A
Sensitivity	Instrument Sensitivity Check (ISC) concentrations must be within ±30% of their true values	ICS, Low-Level LCS	A
Completeness	Completeness criteria will be considered met if 90% of all planned sample data (as requested on CoC in lab reports and EDD; including requested reanalyses) are collected	SOPs, and acceptance per data validation	S & A
Representativeness	Based on accuracy and media comparison	Laboratory Receipt Checklist, Cooler Temperature Blank, Use of standardized SOPs in field and laboratory	S
Representativeness	10% of all samples submitted for ASTM D8421 analysis will be analyzed for USEPA 1633A	Quality assurance for ASTM D8421 Data	S & A

Notes:
% = percent
< = less than
> = greater than
≤ = less than or equal to
A = analytical
CoC = chain of custody
EDD = electronic data deliverable
EIS = extracted internal standards
ICAL = initial calibration
LCS/LCSD = laboratory control spike/ laboratory control spike duplicate
LOQ = limit of quantitation
MS/MSD = matrix spike/ matrix spike duplicate
RPD = relative percent difference
QC = quality control
S = sampling
SOP = Standard Operating Procedure

Matrix Groundwater and Soil
Analytical Group [1]PFAS by ASTM D8421
Concentration Low

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling, Analytical, or Both
Accuracy/Bias	LCS shall be spiked with all analytes. Analyte recovery limits 40%-150%	LCS	S & A
Precision	LCS and field duplicates: Aqueous: LCS/LCSD RPD ≤ 30 Solid: LCS/LCSD RPD ≤ 50	LCS Duplicates and Field Duplicates	S &A
Representativeness	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Method Blank, Field Reagent Blanks, Equipment Rinsate Blanks	S & A
Accuracy	All EIS recovered within 70-130% of expected concentration. Lab will contact project chemist if EIS recovery is below 20% or above 150%.	EIS	A
Sensitivity	Verify point of known precision and accuracy at the lowest point of the calibration range.	Lowest point of the calibration curve e.g., Limit of Quantitation (LOQ) Verification	A
Sensitivity	Detection limits ≤ to acceptance criteria, See **Worksheet #15** for specific laboratory reporting limits.	Reported Sample Data	S & A
Completeness	Completeness criteria will be considered met if 95% of all planned sample data (as requested on CoC in lab reports and EDD; including requested reanalyses) are collected	SOPs	S & A
Representativeness	Based on accuracy and media comparison	Laboratory Receipt Checklist, Cooler Temperature Blank	S
Representativeness	10% of all samples submitted for ASTM D8421 analysis will be analyzed for USEPA 1633A	Quality assurance for ASTM D8421 Data	S & A
Representativeness/ Field Decision Quality	10% of all samples submitted for ASTM D8421 analysis will be analyzed for USEPA 1633A. Percent Decision Match > 90%	Confirmation split samples	S & A

Notes:
1) Method modifications and acceptance criteria are based on ASTM D8421 laboratory specification provided in **Appendix C**.

% = percent
< = less than
> = greater than
≤ = less than or equal to
A = analytical
ASTM = American Society for Testing and Materials
CoC = chain of custody
EDD = electronic data deliverable
EIS – Extracted Internal Standards
ICAL = initial calibration
LCS = laboratory control spike
LCSD = laboratory control spike duplicate
LOQ = limit of quantitation
MS/MSD = matrix spike/ matrix spike duplicate
PFAS = per- and polyfluoroalkyl substances
QC = quality control
RPD = relative percent difference
S = sampling
SOP = Standard Operating Procedure

Matrix Soil/ Sediment
Analytical Group TOC

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling, Analytical, or Both
Accuracy/ Bias	LCS/LCSD: See **Worksheet #15** MS/MSD: See **Worksheet #15**	LCS/LCSD and MS/MSD	S & A
Precision	Laboratory duplicates analysis should have RPD ≤ 20% for soil; RPD ≤ 10% for water	Matrix Duplicate	A
Representativeness	Target compound < RL	Method Blank	A
Completeness	Completeness criteria will be considered met if 100% of all planned sample data (as requested on CoC in lab reports and EDD; including requested re-analyses) are collected	Reported Sample Data	S & A
Comparability	Based on accuracy and media comparison	Use of standardized SOPs in field and laboratory	S & A

Notes:
% = percent
A = analytical
CoC = chain of custody
EDD = electronic data deliverable
LCS/LCSD = laboratory control spike/ laboratory control spike duplicate
MS/MSD = matrix spike/ matrix spike duplicate
QC = quality control
RL = reporting limit
RPD = relative percent difference
S = sampling
SOP = standard operating procedure
TOC = total organic carbon

Matrix Soil/ Sediment
Analytical Group pH

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling, Analytical, or Both
Accuracy/ Bias	85-115% for soil	LCS/LCSD	A
Precision	RPD ≤ 20% for soil	Matrix Duplicate	A
Completeness	Completeness criteria will be considered met if 100% of all planned sample data (as requested on CoC in lab reports and EDD; including requested reanalyses) are collected	Reported Sample Data	S & A
Comparability	Based on accuracy and media comparison	Use of standardized SOPs in field and laboratory	S & A

Notes:
% = percent
A = analytical
CoC = chain of custody
EDD = electronic data deliverable
LCS/LCSD = laboratory control spike/ laboratory control spike duplicate
LOQ = limit of quantitation
QC = quality control
RPD = relative percent difference
S = sampling
SOP = standard operating procedure

Matrix Soil/ Sediment
Analytical Group Grain Size

Data Quality Indicators	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
Precision	RPD ≤ 20%	Sample Duplicate	S & A
Completeness	Completeness criteria will be considered met if 100% of all planned sample data (as requested on CoC in lab reports and EDD; including requested re-analyses) are collected	Reported Sample Data	S & A
Comparability	Based on accuracy and media comparison	Use of standardized SOPs in field and laboratory	S & A

Notes:
% = percent
A = analytical
CoC = chain of custody
EDD = electronic data deliverable
QC = quality control
RPD = relative percent difference
S = sampling
SOP = standard operating procedure

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Worksheet #13: Secondary Data Uses and Limitations

Secondary data sources, uses, and limitations are tabulated below. Original source documents were reviewed for uncertainty discussions that may identify additional or more suitable data limitations.

Data Type	Source	Data Uses Relative to Current Project	Factors Affecting Reliability of Data and Limitations on Data Use
Meteorological	National Weather Service	Estimates of seasonal fluctuations in precipitation.	Meteorological data are generally for a regional area. Actual facility conditions may vary.
Topographic	USGS	Inferred groundwater flow pathways based on local topography at each facility. Groundwater flow maps will ultimately rely upon groundwater measurements from monitoring wells.	Topography of some facilities may have been altered by building or grading activities.
Soil and groundwater chemistry, groundwater monitoring data, and data gaps identification	Historical facility reports	Applicable to the evaluation of historical facility conditions in soil and groundwater to supplement data being collected under this delivery order.	The data may not represent current conditions because of the age of some of the data. Reliability of second- or third-party data quality.
Historical facility records (i.e., material inventories)	Purchase records, facility inventories, on-facility records, safety data sheets	Applicable to the evaluation of potential constituents of concern and release areas.	Records may be incomplete or inaccurate.
Periodicals (i.e., news articles)	Local newspapers, magazines, or other periodicals	Applicable to the evaluation of the use of potential constituents of concern at off-facility locations or mutual use/ aid agreements with local fire department or other entities.	Records may be incomplete or inaccurate.

Notes:
USGS = United States Geological Survey

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Worksheets #14 & #16: Project Tasks and Schedule

Worksheets #14 & 16 provides the project schedule and details the general project tasks that are expected to be completed as part of the RI. The RI program will include tasks as detailed in the following sections:

- **Section 14.1** – Mobilization
- **Section 14.2** – Field Investigation Activities
- **Section 14.3** – Laboratory Analysis
- **Section 14.4** – Data Management, Review, and Validation
- **Section 14.5** – Human Health and ERA
- **Section 14.6** – Report Preparation

The RI field activities for Albany AASF #3 will consist of multiple phases. This RI QAPP specifically addresses the activities to be performed during the RI Prescriptive Phase, as developed in conjunction with the data from the SI (AECOM, 2023). During the Prescriptive Phase, discrete soil, grab groundwater, surface water, and sediment samples will be collected to further refine the nature and extent of impacts previously identified, as summarized in **Worksheet #10**. Any results in exceedance of the screening levels will be considered for ongoing refinement during the RI Adaptive Phase. The technical aspects of the Adaptive Phase and Final Characterization/Monitoring Phase are described in this document, but details regarding the sampling locations, intervals, and rationale of the Adaptive Phase and Final Characterization/Monitoring Phase will be included in future planning documents after completion of the Prescriptive Phase.

The specific details and rationale for the Prescriptive Phase sampling design, in addition to sampling locations and methods, are presented in **Worksheets #17 & #18.** Field activities will be completed per the SOPs in **Appendix D**.

Table 14-1 below presents the schedule for the RI as anticipated based on ongoing project planning discussions with stakeholders, to be updated if new consensus decisions materialize.

Table 14-1 RI Schedule

Task	Start Date	End Date
RI QAPP (Prescriptive)	January 2025	April 2025
Pre-mobilization (Prescriptive)	April 2025	April 2025
Mobilization (Prescriptive)	August 2025	August 2025
Field Work (Prescriptive)	August 2025	August 2025
Demobilization (Prescriptive)	August 2025	September 2025
Data Analysis / Data Validation (Prescriptive)	September 2025	January 2026
Pre-mobilization (Adaptive)	May 2026	May 2026
Field Work (Adaptive)	June 2026	June 2026
Demobilization (Adaptive)	June 2026	July 2026
Data Analysis / Data Validation (Adaptive)	July 2026	November 2026
Pre-mobilization (Final Characterization/Monitoring)	May 2027	May 2027

Task	Start Date	End Date
Field Work (Final Characterization/Monitoring)	May 2027	June 2027
Demobilization (Final Characterization/Monitoring)	June 2027	June 2027
Data Analysis / Data Validation (Final Characterization/Monitoring)	June 2027	October 2027
Reporting	October 2027	March 2028

14.1 Mobilization

The following subsections present field tasks that may be completed as part of the mobilization activities.

ROE Documentation Support

ROEs may be necessary to complete the RI field activities during the Adaptive and Final Characterization/Monitoring Phases; including monitoring well installation and sampling; well gauging; vertical profile boring drilling and sampling; and surface water, and sediment sampling. ROE documentation and property identification will be sent by USACE project manager (PM) at least 60 days prior to entry onto a property. ROE property data will include a property parcel number, legal description, owner name, mailing and physical addresses, phone number, and a map of the property. A2P JV will provide support to USACE developing the parcel property maps. Monitoring wells will be installed within public rights-of-way, to the extent possible. Access will be coordinated with the Albany International Airport and the Town of Colonie as necessary.

Health and Safety Requirements

Health and safety requirements for field activities will be specified in the Accident Prevention Plan (APP) (AECOM, 2024a) and Site Safety and Health Plan (SSHP) (AECOM, 2024b). Personnel mobilized to the facility will be required to meet training requirements identified in Federal Regulation 29 CFR 1910.120 and applicable Occupational Safety and Health Administration (OSHA) training, including Hazardous Waste Operations and Emergency Response (HAZWOPER) and medical surveillance requirements. At least two personnel trained in first aid and cardiopulmonary resuscitation (CPR) will be on-facility during intrusive field activities. Training certificates for personnel (HAZWOPER 40-hour training; current HAZWOPER 8-hour refresher training; and first aid/CPR) will be maintained on-facility by the Site Safety and Health Officer (SSHO) during field work.

The SSHO will have completed the 30-hour OSHA General Industry or Construction Industry Safety Class or equivalent, as specified in *EM 385-1-1* (USACE, 2014). For non-construction related field activities (such as groundwater, surface water or sediment sampling) a Hazardous, Toxic, and Radioactive Waste (HTRW) SSHO may be utilized. The HTRW SSHO must have a minimum of 1 year of experience implementing health and safety programs and meet the training requirements listed in *EM 385-1-1* (USACE, 2014). The SSHO will be responsible for managing, implementing, and enforcing the health and safety program in accordance with the accepted APP/SSHP. The SSHO will be a competent person that can identify existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate them.

The SSHO will also perform as the Site Supervisor (SS), who will have completed the 8-hour OSHA Supervisor training, as specified in EM-385-1-1. The SS will lead field operations, coordinate field activities, and act as the liaison between facility and laboratory personnel, among other responsibilities.

In general, field personnel will wear PFAS-free Level D personal protective equipment (PPE). If elevated levels of PPE are warranted based on facility conditions, it will be established in the SSHP. Detailed Activity Hazard Analysis (AHA) forms identifying the physical, chemical, and biological hazards that may be encountered at the facility and the associated mitigation methods are presented in the APP/SSHP.

Personnel and visitors who enter the facility will be required to review the APP/SSHP and sign the acknowledgement form. Facility workers will be required to sign the daily tailgate safety meeting form and fill out daily AHA forms. Safety issues that arise during implementation of field activities will be addressed during tailgate safety meetings held daily before the workday and will be documented in the daily tailgate safety meeting form.

Additional Personnel Qualifications

In addition to the health and safety requirements specified above, personnel mobilized to the facility will complete the DoD's *Operations Security Awareness for Military Members, DoD Employees, and Contractors* and *Level 1 Antiterrorism Awareness Training*. AECOM employees that will be performing sample collection will also take an internal PFAS sampling guidance training.

The field work at the facility will be performed adjacent to and on the Albany International Airport. Field personnel may be required to participate in Airfield Safety Training or similar facility-specific training as necessary.

Permits and Notifications

Utility clearance is required for intrusive work, regardless of planned intrusive depth. Prior to intrusive activities, existing utility maps will be requested from facility personnel, and a facility walk will be scheduled with the appropriate ARNG personnel and adjacent airport (lessor) personnel as applicable, to mark out locations of the subsurface utilities. A2P JV or its drilling subcontractor will contact UDig NY the local one-call utility location system. Precautionary measures (e.g., geophysical survey, air knifing methods, hand-digging to 5 feet) are required at any location where intrusive activities are proposed. Lack of confirmation can include urban locations, areas adjacent to roadways, areas not previously assessed, areas with insufficient utility information, or areas with multiple utility lines. The location of utilities will be noted and recorded during the facility visits and referenced when selecting investigation locations. Utility clearance will be conducted in accordance with *SOP 3-01: Utility Clearance* (**Appendix D**).

Federal Aviation Administration (FAA) notifications and approval will be required for sample locations on the Albany International Airport property and potentially some locations on the Albany AASF #3 property where the height of the drilling equipment is of concern relative to airport setbacks. The FAA Notice of Proposed Construction or Alternation (Form 7460-1) will be submitted 45-days in advance of drilling activities.

A2P JV will also contact the NYARNG Environmental Branch Chief at least 20 business days prior to the scheduled start of the field activities. Field work will be coordinated with the appropriate contact and/or their designee to ensure investigation activities do not impact facility operations.

Facility Preparation

Preparation activities for the RI field investigation operations include mobilization of field team personnel and equipment. Vegetation clearance may be required during field investigation activities. If necessary, clearing activities will be coordinated with appropriate parties. The SHPO did not identify cultural or historical resources within the RI investigation area (**Section 10.2.7**). If cultural or historical resources are inadvertently discovered during RI field work, the field team will follow the procedures outlined in the "Inadvertent Discoveries of Cultural or Historical

Resources while Conducting Restoration Activities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)" SOP. Additionally, traffic control measures will be required to complete investigations at sampling locations at or near roadways. Procedures will be outlined in the SSHP.

As described in **Section 10.2.7**, if cultural or historical resources are inadvertently discovered during RI field work, the field team will follow the procedures outlined in "The Inadvertent Discoveries of Cultural or Historical Resources while Conducting Restoration Activities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)" SOP.

14.2 Field Investigation Activities

The following subsections present field tasks that may be completed as part of RI field efforts. Field tasks, including investigative-derived waste (IDW) management, will be completed following the SOPs listed in **Worksheet #21** and provided in **Appendix D**. Drilling and monitoring well installation work will be performed by a New York State registered driller. In instances where deviations from the field protocols established in this QAPP need to be made due to unforeseen conditions, a Field Change Request Form will be generated to document the change and request feedback from the A2P JV Task Manager and Project Manager, USACE, and ARNG. In instances where deviations from the field protocols established in this QAPP are made in the field due to encountered conditions that are considered major deviations, a Nonconformance and Corrective Action Report will be generated to document the change after the field work is completed.

Habitat Assessment

An initial habitat assessment will be performed as part of the Prescriptive Phase to identify representative habitats and species present in the vicinity of the sampling locations. The habitat assessment findings may be used to confirm the receptors and exposure pathways identified in the preliminary CSM (**Worksheet #10**) and may be considered in the characterization of potential adverse impacts, if identified based on comparisons to screening values. Habitats will initially be identified through the review of existing maps, available geographic information system (GIS) data, and aerial images.

It is anticipated that the primary habitats of interest will be the on-facility AOIs and stormwater drainage ditch. A site visit will be conducted to identify potential habitat within these areas. A brief qualitative survey of up to six locations will be conducted. It is anticipated that the assessment of the stormwater drainage ditch will confirm the presence/absence of riparian or wetland plant species that would imply an aquatic habitat is seasonally present. The assessment will also confirm that the drainage feature discharges into the ALB drainage system.

Although these assessments are not intended to be threatened and endangered (T&E) species surveys, the biologists will be familiar with the habitat requirements and appearance of the federally listed species and any observations of relevant habitats or listed species, as well as other general habitat and species observations, will be recorded.

If needed based on the results of the initial habitat assessment and the evaluation of the data collected during the Prescriptive and Adaptive Phases, additional assessment may be needed during subsequent mobilization(s) of the RI. Risk management decisions related to performing additional receptor or habitat surveys will be made by the project team and additional efforts may include wetland delineation, vegetation surveys, T&E species surveys, or other methods, as needed. If no potential for adverse impacts on ecological receptors are identified, additional, more intensive habitat or receptor survey efforts will not be warranted.

Field Instrument Calibration and Quality Control

Equipment will be checked to ensure its completeness and operational readiness. Any equipment found damaged or defective will be returned to the point of origin, and a replacement will be secured. Instruments and equipment that require routine maintenance and/or calibration will be checked initially upon arrival and then prior to use each day, if needed, to support that day's operations. Equipment calibration and daily checks will be documented in accordance with appropriate SOPs.

This system of checks ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating properly, and field repair cannot be made, the equipment will be tagged and removed from service, and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

PFAS Site Water Supply Sampling and Sampling Equipment Acceptability

A sample from the potable water source (i.e., decontamination water, drilling water) will be collected prior to mobilization to confirm that it is acceptable for use during field activities. For decontamination purposes, the water source is acceptable for use if the detected concentration of relevant compounds is less than or equal to the SL, provided the non-dedicated sampling equipment, including drilling equipment, is given a final decontamination rinse with laboratory grade PFAS-free water. If the water is intended for downhole drilling use (i.e., added drilling water), the water source is acceptable for use if the detected concentration is less than or equal to ½ the SL. If the source water has concentrations greater than the appropriate threshold, the project team will determine whether the water is acceptable for its intended use based on facility-specific factors (i.e., drilling methodology, relevant sample media). If the water is deemed unacceptable, water will be brought on-facility from another source confirmed to be suitable for use or treated on-facility prior to use.

Materials being purchased or rented for field work will be confirmed as acceptable for use in the PFAS sampling environment. A summary of acceptability of materials for use in the PFAS sampling environment is provided in *SOP 3-41: Perfluoroalkyl Substance Field Sampling Protocol* (**Appendix D**). As an additional layer of control, prior to the start of field work each day, a PFAS Sampling Checklist will be completed. The checklist will serve as a reminder to each field team member regarding the allowable materials within the sampling environment. An example of the checklist is included in the SOP.

Additionally, all field staff are required to complete AECOM's internal *PFAS Sampling Training*. This training accounts for correct equipment, prohibited field items, clothing, personal care products, sunscreen, insect repellants, and additional confirmed or suspected sources of environmental sample contamination. The ITRC guidance on *Site Characterization, Considerations, Sampling Precautions, and Laboratory Analytical Methods for PFAS* was referenced in the development of this guidance (ITRC, 2018b).

Soil Sample Collection

Soil samples will be collected from both transect borings across the facility, and from RSC surface soil grids at AOI 1. For delineation purposes and RSC screening in the development of soil sampling units (SUs), surface soil is defined as the interval from 0-2 feet bgs. Specific sampling locations and rationales are detailed in **Worksheets #17 & #18**. Proposed transect boring, and RSC grid locations are shown on **Figure 17-1**. Individual RSC surface soil sample locations within each RSC grid are shown on **Figure 17-2**.

Soil samples will be collected at every transect boring during the Prescriptive Phase. Surface soil samples (0 to 2 feet bgs) will be collected at each transect boring with a hand auger. The borings

will then be pre-cleared to 5 feet bgs using a hand auger, and an air knife in accordance with AECOM utility clearance procedures. Transect borings will then be advanced via DPT. Macro-Core tooling (or equivalent) will be used to collect continuous soil cores to target depth. An exclusion zone will be established with cones surrounding the drilling operation. The drilling team will place plastic sheeting under the drill rig and will pull it up around the tracks to act as a containment barrier. All drilling materials will be PFAS-free. Details regarding air monitoring procedures and specific action levels are provided in the APP.

Up to three soil samples will be collected from each transect boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil between 2 feet bgs and the groundwater table, and one subsurface sample approximately 2 feet above the groundwater table. The number of soil samples collected at each boring will be dependent upon depth to water at the boring. Soil samples will not be collected from the saturated zone. Recovered soil will be continuously logged for lithological descriptions by a field geologist using the Unified Soil Classification System (USCS). Observations and measurements will be recorded on field forms and in a non-treated field logbook. Photographs of the recovered cores will also be taken. At a minimum, depth interval, recovery thickness, photoionization detector (PID) concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) will be recorded. Additional observations to be recorded may include groundwater or perched water depth, organic material, or cultural debris. Refer to *SOP 3-16: Soil and Rock Classification* and *SOP 3-21: Surface and Subsurface Soil Sampling Procedures* (**Appendix D**) for additional details.

To aid in the identification of source areas and address data gaps at Albany AASF #3, RSC surface soil grids will be utilized during the RI. RSC soil sample locations will be marked with a pin flag or spray paint with sample identification number, photo-documented, and recorded with a hand-held global positioning system (GPS). Surface soil samples (0 to 2 feet bgs) will be collected at each RSC soil sampling location using a hand auger. All sampling materials will be PFAS-free. Recovered soil will be continuously logged for lithological descriptions by a field geologist using the USCS. Observations will be recorded on field forms, and the recovered surface soil will be photographed. At a minimum, depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) will be recorded. Additional observations to be recorded may include organic material, or cultural debris. Refer to *Surface and Subsurface Soil Sampling Procedures* (**Appendix D**) for additional details. RSC surface soil grid sampling design and rationale are provided in **Worksheets #17 & #18**.

It is anticipated that all borings and most RSC soil sample locations will be advanced in areas without surface cover. If a boring is required in asphalt, the onsite drill rig will penetrate the asphalt, followed by hand augering to either 2 or 5 feet bgs, depending on the location type. The boring will then be abandoned by backfilling with bentonite chips to approximately 6 inches bgs, and the remainder of the borehole will be patched with an asphalt cold patch. Concrete locations are not anticipated and will be avoided. Boring locations on or near active runways or ramps will be thoroughly cleaned to prevent foreign object debris from interfering with ARNG training activities.

Each sample will be collected into laboratory-supplied bottleware and submitted to the laboratory for analysis of selected parameters. Transect boring surface and subsurface soil samples at AOI 2 and AOI 3 will be analyzed under standard TAT for the target list of PFAS (ASTM D8421). Transect boring surface and subsurface soil samples at AOI 1 will be analyzed as RSC samples with rapid 48-hour TAT for a shortlist of fourteen PFAS (ASTM D8421). The fourteen PFAS included in the shortlist are the compounds for which OSD has established SLs (Assistant Secretary of Defense, 2023), in addition to four precursor compounds (N-ethyl perfluorooctanesulfonamidoacetic acid [NEtFOSAA], N-methyl perfluorooctanesulfonamidoacetic acid [NMeFOSAA], 8:2 fluorotelomer sulfonic acid [8:2 FTS], 6:2 fluorotelomer sulfonic acid [6:2 FTS]) and two carboxylic acids frequently detected in SI groundwater data (PFPeA, and PFHpA). RSC surface soil samples from the RSC grid locations will be analyzed for a shortlist of twelve PFAS (ASTM D8421) under rapid 48-hour TAT. The twelve PFAS included in the shortlist are the

compounds for which OSD has established SLs (Assistant Secretary of Defense, 2023), in addition to four precursor compounds to aid in identification of PFAS release areas (NEtFOSAA, NMeFOSAA, 8:2 FTS, and 6:2 FTS). If a 48-hour TAT cannot be met, a 72- to 96-hour TAT will be assumed. 10% of screening level samples (those analyzed via ASTM D8421) will also be analyzed via liquid chromatography tandem mass spectrometry (LC/MS/MS) compliant with USEPA Method 1633A as confirmation samples. The laboratory method DLs for these analytes are presented in **Worksheet #15**. The required sample containers, preservatives, and holding times are specified in **Worksheets #19 & #30**.

Calls will be held with the Project Delivery Team (PDT) as necessary to review the available RSC data and make decisions on additional sampling locations. The general timing will be approximately 7 days following sample collection to discuss whether additional samples are warranted. For example, RSC soil samples collected on a Monday would arrive at the analytical laboratory on a Tuesday, A2P JV would receive analytical results on Thursday, and A2P JV will review and evaluate the data by the following Monday to discuss with the project team and recommend whether additional RSC surface soil samples for PFAS are needed.

Groundwater Sample Collection using Direct-Push Technology

Groundwater samples will be collected from transect borings across the facility. Specific sampling locations and rationales are detailed in **Worksheets #17 & #18**. Proposed transect boring locations are shown on **Figure 17-1**. Groundwater samples collected from transect borings will be co-located with soil samples collected from transect borings, as described in the previous section.

Borings will be advanced via DPT using a GeoProbe® DT45 or DT60 dual-tube sampling system (or equivalent). Once the target depth has been reached or refusal encountered, the DPT tooling will be retracted, the dual-tube sampling equipment will be removed, and the screen point (SP) sampler will be attached and advanced to the target depth to create a temporary well. Groundwater samples will be collected via the SP sampler from the shallowest interval first. The tooling will be retracted, decontaminated, offset by up to 5 feet, and then advanced to the next depth interval to minimize cross-contamination. Offset groundwater interval borings will be cleared to 5 feet bgs using a hand auger or air knife but will not be sampled for soil.

A grab groundwater sample will be collected from each interval using a peristaltic pump with tubing that has been determined to be PFAS-free (i.e., high-density polyethylene [HDPE] or other PFAS-free material). Target intervals for groundwater sampling are presented in **Worksheets #17 & #18**. If the peristaltic pump cannot generate enough hydraulic lift to bring the groundwater to the surface, groundwater samples will be collected using a PFAS-free 0.85-inch Geotech Bladder pump or other sampling device. Non-disposable sampling equipment will be decontaminated between each temporary well.

Prior to sampling, the temporary well will be purged in order to remove sediment, to the extent reasonable, in an effort to minimize the turbidity of the sample. Refer to *SOP 3-37: Grab Groundwater Sampling Techniques* (**Appendix D**) for additional details. The degree of purging will be dependent on groundwater recharge within the well. If sufficient groundwater recharge is observed, the well will be purged until the turbidity is ≤ 25 nephelometric turbidity unit (NTU), stabilizes at a level above 25 NTU, or for a maximum duration of 1 hour, whichever occurs first. In wells with limited groundwater recharge, the sample will be collected using the available groundwater.

In addition to turbidity, other water quality parameters (e.g., temperature, specific conductance [SC], pH, dissolved oxygen [DO], and oxidation-reduction potential [ORP]) will be measured and recorded on the field sampling form every 0.5 to 1.0 liter purged, or approximately every 3 to 5 minutes, depending on the purging rate, until the above turbidity criteria are met. Water quality

parameters will be measured using a water quality meter and flow-through cell. Refer to *SOP 3-14: Monitoring Well Sampling* and *SOP 3-24: Water Quality Parameter Testing* for additional details. The multi-parameter water quality meter will be calibrated initially and continually throughout its usage each day, as needed. A calibration check will be performed at the end of each day.

Each groundwater sample will be collected into laboratory-supplied bottleware and submitted to the laboratory for analysis of selected parameters. Sample containers will be PFAS-free, and the samples will not be filtered. Grab groundwater samples collected from transect borings at AOI 2 and AOI 3 will be analyzed under standard TAT for the target list of PFAS (ASTM D8421). Grab groundwater samples collected from transect borings at AOI 1 will be analyzed as RSC samples with rapid 48-hour TAT for a shortlist of fourteen PFAS (ASTM D8421). The fourteen PFAS included in the shortlist are the compounds for which OSD has established SLs (Assistant Secretary of Defense, 2023), in addition to four precursor compounds (NEtFOSAA, NMeFOSAA, 8:2 FTS, and 6:2 FTS) and two carboxylic acids frequently detected in SI groundwater data (PFPeA, and PFHpA). 10% of screening level samples (those analyzed via ASTM D8421) will also be analyzed via LC/MS/MS compliant with USEPA Method 1633A as confirmation samples. The laboratory method DLs for these analytes are presented in **Worksheet #15**. The required sample containers, preservatives, and holding times are specified in **Worksheets #19 & #30**.

Calls will be held with the PDT as necessary to review the available RSC data and make decisions on additional sampling locations. The general timing will be approximately 7 days following sample collection to discuss whether additional samples are warranted. For example, grab groundwater samples collected on a Monday would arrive at the analytical laboratory on a Tuesday, A2P JV would receive analytical results on Thursday, and A2P JV will review and evaluate the data by the following Monday to discuss with the project team and recommend whether additional RSC grab groundwater samples for PFAS are needed.

Surface Soil Sample Collection from SUs

Following completion of the RSC of groundwater and surface soil, as described above, delineation of soil release areas and collection of soil data for risk assessments will be completed using a sampling grid approach within SUs. Further details on the development of SUs is provided in **Worksheets #17 & #18**. The specific design and rationale for SU grids will be included in the planning documents for subsequent phases of RI work. Within each SU, an unbiased statistical soil sampling plan will be generated using Visual Sample Plan (VSP) version 7 software (VSP Development Team, 2020). For each SU, samples will be collected from a total of 12 locations, as recommended by the ProUCL guidance document (USEPA, 2015). SU soil sample locations will be marked with a pin flag or spray paint with sample identification number, photo-documented, and recorded with a hand-held GPS.

Borings will be advanced to the target depth using hand augers. All sampling materials will be PFAS-free. Recovered soil will be logged for lithological descriptions by a field geologist using the USCS. Observations will be recorded on field forms, and the recovered surface soil will be photographed. At a minimum, depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) will be recorded. Additional observations to be recorded may include organic material, or cultural debris. Refer to *Surface and Subsurface Soil Sampling Procedures* (**Appendix D**) for additional details.

It is anticipated that all SU soil sample locations will be advanced in areas without surface cover. If a boring is required in asphalt, the onsite drill rig will penetrate the asphalt, followed by hand augering to 4 feet bgs. The boring will then be abandoned by backfilling with bentonite chips to approximately 6 inches bgs, and the remainder of the borehole will be patched with an asphalt cold patch. Concrete locations are not anticipated and will be avoided. Boring locations on or near

active runways or ramps will be thoroughly cleaned to prevent foreign object debris from interfering with ARNG training activities.

Each sample will be collected into laboratory-supplied bottleware and submitted to the laboratory for analysis of selected parameters. SU soil samples will be analyzed under standard TAT for the target list of 40 PFAS (LC/MS/MS compliant with USEPA Method 1633A). Additionally, other geochemical and physical parameters will be analyzed in a subset of SU soil samples to support evaluation of PFAS fate and transport, in addition to the remedial alternatives analysis. 10% of surface soil samples from the SUs will be analyzed for TOC (USEPA Method 9060A) and pH (USEPA Method 9045D). The laboratory method DLs for these analytes are presented in **Worksheet #15**. The required sample containers, preservatives, and holding times are specified in **Worksheets #19 & #30**.

Permanent Monitoring Well Installation

New permanent monitoring wells will be installed during the Albany AASF #3 RI. Proposed locations for the first phase of work are shown on **Figure 17-1**. The specific monitoring locations and target screen intervals have been determined in part on identified data gaps from the SI as specified in **Worksheets #17 & #18**. It is anticipated that additional monitoring wells will be installed during later phases of work, details pertaining to their location, depth, and rationale will be provided in a future planning document.

Well installation will be completed in accordance with *SOP 3-12: Monitoring Well Installation* (**Appendix D**). Soil borings will be completed at the permanent monitoring well locations using the methods described above for subsurface soil sample collection. Once the borehole has been advanced to the target depth using DPT, hollow stem auger (HSA) drilling will be used to over-drill the borehole for monitoring well installation. A GeoProbe® 7822DT drill rig, or similar type of rig, capable of both DPT and HSA drilling will be used. Permanent monitoring wells will be constructed of 5- to 10-foot long, 2-inch diameter, 0.010-inch or 0.020-inch slot Schedule 40 PVC screens and sufficient casing to reach the ground surface. Screen length will be determined by observed lithology and targeted monitoring well depth. A clean silica sand filter pack appropriately sized for the screen slot size will then be added through the augers and constructed in the annulus around the well screen. The filter pack will extend from 6 inches below the well end cap to at least 18 inches above the top of the well screen. A minimum 2-foot-thick bentonite seal will be placed in 1-foot lifts through the augers above the filter pack using bentonite chips. Each lift will be hydrated and, after the final lift is in place, allowed to hydrate for at least the minimum time recommended by the manufacturer. Once the bentonite seal has hydrated, a cement-bentonite grout will be placed in the annulus from the top of the bentonite seal up to the ground surface. The borehole will be grouted using a tremie pipe or, alternatively, through the open borehole when at shallow depths (i.e., <10 feet bgs) and the borehole wall is self-supported. Filter pack and well seal dimensions may be adjusted based on RI field observations to ensure proper well construction if groundwater is observed near the ground surface. Monitoring wells will be fitted with a locking gripper cap with a keyed lock, completed as flush mounts using a minimum 8-inch diameter, bolt-down manhole cover. Monitoring well identifications will be clearly marked on the outside of the casing or by well tag. The manhole will be centered in a 2-foot by 2-foot by 6-inch-thick concrete pad.

Drilling materials and equipment will be PFAS-free. Monitoring well locations, top of casing elevation, and ground surface elevation will be surveyed as described later in this section.

Permanent Monitoring Well Development

Permanent monitoring wells will be developed at a minimum of 24-hours after completion of well installation or in accordance with state-specific guidance. Development will be completed by a combination of surging with a surge block and over-pumping with a submersible pump and

associated HDPE tubing, in accordance with *SOP 3-13: Monitoring Well Development* (**Appendix D**).

Following the initial removal of the bulk sedimentation in the well, water clarity will be visually monitored and water quality parameters, including temperature, SC, pH, DO, and ORP will be measured using a flow-through cell every 5 minutes during purging to determine progress of development in accordance with *SOP 3-24: Water Quality Parameter Testing for Groundwater Sampling* (**Appendix D**). The water quality meter will be calibrated initially and continually throughout its usage each day, as needed. A calibration check will be performed at the end of each day.

Each well will be developed until a minimum of three standing well volumes has been removed and the well produces clear (silt-free) water with a minimum of 3 stable water quality readings as outlined below:

- pH – within ± 0.2 units
- SC – within ± 3%
- ORP – within ± 10 millivolts (mV)
- Temperature – within ±1 degree Celsius (°C)
- Turbidity – at or below 10 NTU or within ± 10% if above 10 NTU and a minimum of 1 hour of purging has been completed
- DO readings may be recorded but DO readings will not be used as development completion criteria because DO may not stabilize during development.

If the well has slow groundwater recharge and is purged dry, the well will be considered developed when bailed or pumped dry three times in succession and the turbidity has decreased. If any water is added to the borehole during drilling or development, three times the volume of water lost to the borehole (i.e., not returned to the surface during drilling) will also be removed during well development. Exceptions to the removal of three times the volume of added water may be necessary in some cases of low yield wells. Excess soil or groundwater generated will be containerized, managed, and/or disposed of as IDW. Refer to *SOP 3-13: Monitoring Well Development* (**Appendix D**) for more details.

Groundwater Sample Collection from Permanent Monitoring Wells

Permanent monitoring wells will be sampled a minimum of 24-hours after completion of well development, in accordance with *SOP 3-14: Groundwater Sampling* (**Appendix D**). The specific monitoring wells selected for groundwater sample collection are specified in **Worksheets #17 & #18** and shown on **Figure 17-1**. The monitoring wells will be purged following low-flow sampling techniques using a peristaltic pump with tubing that has been determined to be PFAS-free (i.e., HDPE or other PFAS-free material). If the peristaltic pump cannot generate enough hydraulic lift to bring the groundwater to the surface, groundwater samples will be collected using a PFAS-free 0.85-inch Geotech Bladder pump or other sampling device. Non-disposable sampling equipment will be decontaminated between each well.

Water clarity will be visually monitored and water quality parameters, including DO, SC, ORP, pH, temperature, and turbidity will be measured using a flow-through cell per the *SOP 3-24: Water Quality Parameter Testing for Groundwater Sampling* (**Appendix D**). Readings will be collected every 0.5 to 1.0 liter purged, or approximately every 3 to 5 minutes, depending on the purging rate, until the well produces clear (silt-free) water with a minimum of 3 stable water quality readings, as outlined below:

- pH – within ± 0.2 units
- DO – within ± 10%
- SC – within ± 3%
- ORP – within ± 10 mV
- Temperature – within ±1°C
- Turbidity – at or below 10 NTU or within ± 10% if above 10 NTU and a minimum of 1 hour of purging has been completed

The multi-parameter water quality meter will be calibrated initially and continually throughout its usage each day, as needed. A calibration check will be performed at the end of each day.

Once the water quality parameters reach stabilization, each groundwater sample will be collected into laboratory-supplied bottleware and submitted to the laboratory for analysis of selected parameters. If the water quality readings do not reach stabilization or the turbidity is above 10 NTU, samples will be collected after a minimum purging time of one hour. Sample containers will be PFAS-free, and the samples will not be filtered. Groundwater samples from permanent monitoring wells will be analyzed under standard TAT for the target list of PFAS (LC/MS/MS compliant with USEPA Method 1633A). The laboratory method DLs for these analytes are presented in **Worksheet #15**. The required sample containers, preservatives, and holding times are specified in **Worksheets #19 & #30**. Non-disposable sampling equipment will be decontaminated between each well. Refer to *SOP 3-14: Monitoring Well Sampling and SOP 3-24: Water Quality Parameter Testing* (**Appendix D**) for additional details.

In addition, a subsample of each groundwater sample will be collected in a separate container and undergo a shaker test to identify if there is any foaming. If foaming is observed, the observation will be noted on the CoC to notify the laboratory prior to analysis.

Surface Water and Sediment Sample Collection

Co-located surface water (if available) and sediment samples will be collected from the drainage ditch/stormwater structure running through the southwest corner of the site. Specific sampling locations and rationale are specified in **Worksheets #17 & #18**.

Sampling will occur from downstream to upstream in locations where surface flow direction can be clearly identified; agitation of the sediment and water at shallow locations will be minimized. Samples will be collected regardless of prescriptive phase field and weather conditions.

Surface water samples will be collected first at each location, prior to sediment sampling. The surface water samples will be collected from a single point by dipping the sample container in standing water, approximately from the depth midpoint of the water. Sampling will be performed deliberately and methodically to minimize disturbance of bottom sediments, and as quickly as possible to ensure a representative sample is collected. After the surface water sample is collected, water quality parameters, including ORP, pH, SC, salinity, temperature, DO, and turbidity, will be measured with a water quality meter and recorded in the field logbook or sampling form. Physical characteristics of the sampling locations (e.g., water depth) will be documented. Refer to *SOP 3-10: Surface Water and Liquid Sampling* (**Appendix D**) for additional details.

After surface water sampling is complete, sediment samples will be collected from 0 to 0.5 feet bgs using a hand-driven coring barrel. The sediment will be transferred to a stainless-steel bowl or other PFAS-free container (i.e., 1-gallon Ziploc® bags) from which material such as twigs, leaves, and stones will be removed prior to homogenization and documented in the field log or field forms. Sediment samples will target fine-grained material from depositional areas. Refer to *SOP 3-22:*

Sediment Sampling (**Appendix D**) for additional details. The sediment coring device, and water quality probe will be stainless steel or another PFAS-free material.

Each sample will be collected into laboratory-supplied bottleware and submitted to the laboratory for analysis of selected parameters. Sample containers will be PFAS-free, and the aqueous samples will not be filtered. Surface water, sediment, and porewater samples will be analyzed under standard TAT for the target list of PFAS (LC/MS/MS compliant with USEPA Method 1633A). Additionally, 25% of sediment samples will be analyzed for TOC (USEPA Method 9060A), pH (USEPA Method 9045D), and grain size analysis with sieve and hydrometer (ASTM D-422). The laboratory method DLs for these analytes are presented in **Worksheet #15**. The required sample containers, preservatives, and holding times are specified in **Worksheets #19 & #30**.

In addition, a subsample of each surface water sample will be collected in a separate container and undergo a shaker test to identify if there is any foaming. If foaming is observed, the observation will be noted on the CoC to notify the laboratory prior to analysis.

Synoptic Groundwater Level Measurements

Synoptic groundwater level measurements will be collected from newly installed monitoring wells at least 24 hours after well development. Specific measurement locations for the initial phase of work are detailed in **Worksheets #17 & #18**. The gauging round will be conducted as quickly as feasible, following a period of minimal precipitation and on a day with little to no forecasted precipitation.

Hydraulic Conductivity (Slug) Tests

In-situ hydraulic conductivity test data, via rising or falling head slug tests, may be conducted at select permanent monitoring wells to assess the hydraulic conductivity of the soil surrounding the tested monitoring well. The design and rationale for slug testing locations will be included in the planning documents for subsequent phases of RI work. The standard slug test will entail measurement of water level changes resulting from submergence or withdrawal of a solid cylinder of known volume. Water levels will be monitored and recorded until the water level returns to static conditions or sufficient data are collected to perform the hydraulic conductivity calculations.

The response of the water level will be monitored using an In-Situ Level Troll 700 Data Logger or equivalent. The datalogger will be lowered into each monitoring well and hung at a field-determined depth below top of casing. The datalogger depth will be set low enough to fully submerge the slug. Each datalogger will be programed using a Win-Situ Software application through use of an In-Situ Rugged Reader, laptop, or cell phone. Test results will be monitored real-time in the field. Equipment that comes into contact with groundwater will be decontaminated between each test location. Hydraulic conductivity testing will be conducted in accordance with *SOP 3-35: In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing* (**Appendix D**).

Field Quality Control Samples

Field QC samples will include field duplicates (FDs), matrix spike (MS)/MS duplicates (MSDs), field reagent blanks (FRBs), and temperature blanks. FD samples will be collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSD samples will be collected at the rate of 5% and analyzed for the same parameters as the accompanying samples. FRBs will be collected at a rate of one per sampling event for groundwater, soil, surface water, and sediment media, or one per day or one per 10 samples (whichever is more) for drinking water media, as needed based on collection. A temperature blank shall be placed in each cooler to ensure that samples are preserved at or below 6 °C during shipment.

If non-dedicated sampling equipment is used, an equipment blank will be collected at a rate of 5% and analyzed for the same parameters as the accompanying samples.

Sampling Handling, Storage, and Transport

Samples will be stored on ice, packaged, and submitted to the analytical laboratory for analysis as specified in **Worksheet #15**. **Worksheets #17 & #18** provides the sampling design and rationale. **Worksheets #17 & #18**, **Worksheets #19 & #30**, and **Worksheet #20** provide sample identifications, necessary sample volume and preservative requirements, and hold time limitations. Samples will be QC checked by the SS (label correctness and completeness) and recorded on CoC forms. Samples will be packaged on ice and transported via overnight by commercial carrier or a laboratory courier under standard custody procedures to the laboratory. See *SOP 3-04: Sample Handling, Storage, and Shipping* (**Appendix D**) for additional information.

Field Documentation

Field documentation will be performed in accordance with *SOP 3-02: Logbooks* (**Appendix D**). Sample collection information will be recorded in PFAS-free bound field notebooks, tablet computers, or specific field forms. A summary of field activities will be properly recorded in a bound logbook with consecutively numbered pages that cannot be removed. Logbooks will be assigned to field personnel and stored in a secured area when not in use. Entries will be written in indelible ink, and no erasures will be made. If an incorrect entry is made, striking a single line through the incorrect information will correct the text, and the person making the correction will initial and date the change. Sampling forms and other field forms will also be used to document field activities. *See SOP 3-02: Logbooks* (**Appendix D**) for additional information.

Borehole Abandonment & Site Restoration

All boring locations will be abandoned using bentonite chips at completion of sampling activities unless they are being converted into monitoring wells. If the boring is required in asphalt, it will be abandoned by backfilling with soil cuttings to approximately 6 inches bgs, and the remainder of the borehole will be patched with an asphalt cold patch. Borings into concrete will be avoided if possible. However, if borings are advanced into concrete, the borings will be abandoned by backfilling with soil cuttings to approximately 6 inches bgs, and the remainder of the borehole will be filled with concrete to provide as flush a surface as possible. The surface at each location will be restored to match the surrounding area. The field team will make the necessary adjustments if state regulations dictate the use of bentonite or grout to abandon soil borings or monitoring wells. Water used for grouting will be PFAS-free (tested before use). See *SOP 3-15: Monitoring Well and Borehole Abandonment* (**Appendix D**) for more details.

Equipment Decontamination

The team will utilize dedicated and disposable sampling equipment to the extent possible to avoid cross contamination due to inadequate decontamination processes. The dedicated/disposable sampling equipment will include disposable polyethylene tubing, disposable gloves, and laboratory-supplied sample bottles.

Non-disposable or non-dedicated sampling equipment (e.g., water level meters, water quality meters, etc.) will be decontaminated prior to sampling and between sample locations. Decontamination will generally consist of a water rinse station to remove gross contamination, followed by a non-phosphate detergent (e.g., Liquinox®) water rinse, and a double rinse with PFAS-free, de-ionized water. Water used for the initial and non-phosphate rinse (facility water) will be tested prior to use (see **PFAS Site Water Supply Sampling and Sampling Equipment Acceptability** section above). Paper towels containing recycled paper content are prohibited.

Decontamination activities will be performed in accordance with *SOP 3-06: Decontamination* (**Appendix D**).

Land Surveying and Geographic Position Measurement

Newly installed permanent monitoring wells will be surveyed by a state-registered surveyor to a horizontal accuracy of 0.1 feet and a vertical accuracy of 0.01 feet. A small notch will be cut on the northern side of the well casing, which will be surveyed. The top of casing and ground surface elevation will be surveyed for each newly installed well. The data will be collected in the Universal Transverse Mercator Zone 18 N projection with WGS84 datum. Refer to *SOP 3-07: Land Surveying* (**Appendix D**) for more details.

Sample locations which are not permanent monitoring wells (i.e., vertical profile borings, surface water/sediment locations) will be documented using a handheld GPS.

Investigation-Derived Waste Management

IDW generated during the sampling activities will be handled in accordance with *SOP 3-05: Investigation-Derived Waste Management* (**Appendix D**) and relevant guidance as referenced below.

Where possible and agreed to with facility personnel and state regulators, solid IDW (i.e., soil cuttings) generated on the facility during RI activities will be left in place at the point of the source. The soil cuttings will be distributed on the downgradient side of the borehole. This IDW will not be sampled and will assume the PFAS characteristics of the associated soil samples collected from that source location. Where distribution of solid IDW to the ground is not possible (e.g., in the facility flightline or landscaped areas), IDW will be containerized, managed, and disposed at a Resource Conservation and Recovery Act Subtitle C landfill.

Liquid IDW (e.g., purge water and decontamination fluids) generated on the facility during RI activities will be discharged directly to the ground surface slightly downgradient of the source of generation, following consultation with state regulators, in accordance with USEPA Management of IDW (USEPA, 2020).This IDW will not be sampled and will assume the PFAS characteristics of the associated groundwater samples collected from that source location. However, if the shaker test of aqueous samples indicates foaming or if direct ground discharge is not permitted, liquid IDW will be containerized in properly labeled 55-gallon drums.

If off-facility investigation is warranted during later phases of RI work, IDW generated off-facility will be containerized, managed, and disposed at a Resource Conservation and Recovery Act Subtitle C landfill. If conditions require an alternative approach be considered, options will be evaluated in accordance with the DoD Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing PFAS Substances in the United States (DoD, 2023b) and/or with methods approved by ARNG legal counsel. The IDW will be stored at a location designated by the NYARNG Environmental Branch Chief. The containerized IDW will be segregated based on location, to the extent possible, and the material will assume the characteristics of the associated sample. If analytical samples are not planned for the location (i.e., soil PFAS samples at well boring locations), composite IDW samples will be collected for analysis of PFAS. Additional analyses may also be required by the disposal facility for proper profiling and handling.

At locations where soil and liquid IDW are left on the ground surface at the source of generation, the A2P JV will collect GPS points around (i.e., polygon) the location of the where the IDW was placed. The polygon will be included in the reporting phase for future use, if required.

Other solids such as spent PPE, plastic sheeting, tubing, rope, unused monitoring well construction materials, and other environmental media generated during the field activities will be disposed of at a Subtitle D licensed solid waste landfill.

All phases of field activities will follow the same technical approach as outlined above. If new guidance requires a modification to this approach, a Field Planning Request form will be submitted for review and approval, documenting the revised approach.

14.3 Laboratory Analysis

Chemical analyses will be performed by one of our primary laboratories, Eurofins Lancaster Laboratories (Eurofins) or Pace South Carolina (Pace), depending on laboratory capacity. Backup laboratories as identified in the Programmatic Quality Assurance Project Plan (PQAPP) (A2P JV, 2024) are SGS North American, Inc. (SGS), Advanced Environmental Laboratories, Inc. (AEL), and ALS Environmental (ALS). All are DoD/ELAP accredited laboratories. Laboratory capacity will be evaluated prior to the field mobilization. Should the primary laboratories not be able to accommodate the volume of samples and provide data within contract required timelines, one of the approved backup laboratories from the PQAPP may be considered. Copies of the laboratory accreditation certificates are included in **Appendix C**. Analytical requirements for containers, preservatives and holding times are summarized in **Worksheets #19 & #30**. PFAS analyses will be conducted in accordance with DoD QSM version to which the laboratory is currently accredited (DoD, 2021) and the current laboratory SOP(s) at the time of the analysis.

A DMA Study (AECOM, 2024c) has been performed under a separate contract to determine the efficacy of a PFAS screening method, ASTM D8421, to meet DQOs as established in **Worksheet #11**. A laboratory specification for the use of ASTM D8421 has been created for this work and is included in **Appendix C**. The RI sampling program will apply both a screening method (ASTM D8421) and/or definitive method (USEPA Method 1633A) for PFAS analysis, as defined in **Worksheets #17 & #18**. Where ASTM D8421 is used, confirmation samples will be collected and analyzed by USEPA Method 1633A at a rate of 10%. Screening-level data analyzed using ASTM Method D8421 will not be used in risk assessments, consistent with OSD policy (Assistant Secretary of Defense, 2024a). Screening-level data will be used to refine and inform subsequent phases of work, which will collect the USEPA Method 1633A definitive data necessary for risk assessments.

Chemical analyses will be performed in accordance with the analytical methods identified in **Worksheet #23**. Analytical sensitivity for the methods selected is compared to project DQLs in **Worksheet #15**. Requirements for laboratory instrument calibration, and equipment maintenance and testing are presented in **Worksheet #24** and **Worksheet #25**, respectively. Measurement performance criteria for field and laboratory QC samples are presented in **Worksheet #12** and **Worksheet #28**, respectively.

The laboratory will provide Contract Laboratory Program-like Level IV data packages. These data packages will include summary forms containing QC information and raw data (Stage IV data packages as described in the DoD QSM Version 5.4).

14.4 Data Management, Review, and Validation

The principal data generated for this project will be from field observations of geologic settings, water quality measurements, habitat characteristics/receptor surveys, and laboratory analytical data. Copies of the field forms, CoC forms, air bills, and logbooks will be placed in the project files after completion of the field program. The field logbooks for this project will be used only for this facility and will also be categorized and maintained in the project files after the completion of the field program. Project records will be maintained in a secure location.

Data Tracking

The RI Task Manager is responsible for the overall tracking and control of data generated for the project. Data are tracked from generation to archiving in the project-specific files. The Project Chemist, or designee, is responsible for tracking the samples collected and shipped to the contracted laboratory. The laboratory will report data using A2P JV format Electronic Data Deliverables (EDDs) along with a hard copy of the laboratory's final data report, which will include supporting documentation such as chromatographs and instrument calibrations. Upon receipt of the data packages from the analytical laboratory, the Project Chemist will oversee the data validation effort, which includes verifying that the data packages are complete and that results for samples have been delivered by the analytical laboratory.

Data Review and Validation

Upon receipt of data packages from the analytical laboratory, the Project Chemist will oversee the data validation effort, which includes verifying data completeness, as specified in **Worksheet #34**. To evaluate whether the analytical results meet the data quality objectives, the laboratory data will undergo verification and validation, as cited in **Worksheet #34**, **Worksheet #35**, and **Worksheet #36.** The usability assessment processes are described in **Worksheet #37**.

Prior to data validation, electronic laboratory data will be verified for accuracy against the hardcopy laboratory report and QAPP using the project-specific criteria defined in **Worksheet #12**, **Worksheets #19 & #30**, and **Worksheet #28**. The laboratory will be requested to resubmit electronic data found to be deficient of critical information and/or inaccurate. Laboratory calibration will be assessed against the criteria presented in **Worksheet #24**.

Data Storage, Archiving, and Retrieval

After the data are validated, the data packages are entered into the file system and archived in secure files. The field records including field logbooks, sample logs, CoC records, and field calibration logs will be submitted by the field team lead to be entered into the file system before archiving in secure project files. Project files will be kept in a secured, limited access area. A2P JV will add electronic data to the existing project database.

Data Security

Laboratory data, provided in electronic format, will be verified for accuracy prior to use and during the data review process. After data are reviewed, the electronic data results will be uploaded into the database for use in data evaluation and subsequent report preparation. The project database will be on a secure network, and access to changing data files will be restricted to qualified personnel. The RI Task Manager, or designee, is responsible for the overall tracking and control of data generated for the project. File and data backup procedures are routinely performed.

14.5 Human Health and Ecological Risk Assessment

A HHRA and SLERA will be conducted in accordance with CERCLA and USACE risk assessment guidance. The results of the SLERA, in conjunction with the SLERA refinement (Step 3a) and the findings of the habitat assessment, will determine whether a Baseline Ecological Risk Assessment (BERA) is needed. A Risk Assessment Work Plan, which provides further detail on the HHRA and SLERA/BERA processes, is included as **Appendix E**. A summary of the risk assessment processes is provided in this section.

The risk assessments may include analytical data for soil, groundwater, surface water, sediment, drinking water, and porewater collected as part of the RI field program. Grab groundwater data collected during the Prescriptive Phase are screening-level data that will not be used in the risk

assessments; however, soil data obtained during the Prescriptive Phase may be considered in the risk assessments, which will be compiled following the Adaptive Phase. These data will be considered representative of current facility conditions and will be collected to meet DQOs for use in conducting risk assessment. A habitat assessment will be conducted and considered in the SLERA.

Data selected for use in the risk assessments, including consideration of the sample locations, potential exposure media, exposure points, exposure pathways, land use(s), and receptors, as applicable, will be based on the preliminary CSM presented in **Worksheet #10**. Data selected for evaluation in the risk assessments will be grouped into exposure areas, including on-facility and off-facility exposure areas, as applicable, as described in further detail in **Appendix E**.

Human Health Risk Assessment

The primary objective of the HHRA is to evaluate whether chemicals attributable to facility activities have the potential to cause unacceptable adverse health effects to human receptors within the area under investigation. The HHRA will perform quantitative estimation of potential excess lifetime cancer risk (ELCR) and noncancer hazard (as a Hazard Index [HI]) to current and potential future human receptors that may come into contact with facility-related concentrations of chemicals of potential concern (COPCs) in soil, groundwater, surface water, and sediment. Toxicity values for use in the HHRA will be identified in accordance with USEPA guidance (USEPA, 2003) and DoD guidance (DoD, 2024) regarding the hierarchy of sources of human health dose-response values in risk assessment and the OSD website (Assistant Secretary of Defense, 2024b). For each associated exposure scenario (i.e., receptor/medium) with a cumulative potential ELCR greater than 1E-4 or a total potential HI per target organ greater than 1 (USEPA, 1991), risk-based Chemicals of Concern (COCs) will be selected from those COPCs significantly contributing to the cumulative ELCR or target organ HI.

The HHRA conclusions will inform risk management decisions. If remedial action of PFAS is determined to be necessary based upon the results of the HHRA, the HHRA will be used to inform the development of risk-based target levels to be considered in conjunction with federal and state-specific Applicable or Relevant and Appropriate Requirements (ARARs) in the selection of Preliminary Remediation Goals (PRGs) in the FS. The HHRA process is detailed in **Appendix E**.

Ecological Risk Assessment

The primary objective of the ERA is to evaluate the potential for adverse effects on ecological receptors due to exposures to PFAS detected in on-facility and off-facility media, including soil, sediment, and surface water, and to provide input to remedial decision-making that will protect the health of local populations and communities of biota. The USEPA (1997) and DA (2010) ERA process follows a tiered approach that incorporates different levels of assessment complexity and provides an opportunity to off-ramp from the ERA process prior to proceeding to the next tier based on the available findings. The tiered approach may be implemented in its entirety depending upon the level and magnitude of risk that is determined in prior tiers. This approach consists of the following two tiers as summarized below:

- Tier 1 – SLERA
- Tier 2 – BERA

The primary objective for a SLERA is to determine which, if any, exposure pathways and chemicals of potential ecological concern (COPECs) warrant immediate action or require further evaluation in a more refined ERA. The SLERA includes Steps 1 and 2 of the eight step USEPA ERA (USEPA, 1997) process:

- Identification and summarization of relevant datasets.

- Development of a preliminary CSM.
- Comparison of maximum detected concentrations to ecological SLs to identify COPECs.

Based on the outcome of the SLERA, certain media, COPECs, and pathways may be eliminated from further evaluation due to the level of conservatism built into the SLERA process. In cases where facilities are fully paved, there is no habitat present, soil contamination is below the reach of ecological receptors, or contaminated groundwater does not discharge to surface water habitats, documentation that the potential ecological exposure pathways are incomplete will be sufficient to address ecological concerns. In the event that potentially complete and significant ecological exposure pathways are identified, and maximum concentrations of certain COPECs exceed the generic SLs, additional evaluation may be recommended.

Prior to beginning problem formulation in the BERA (Step 3), the results of the SLERA may be refined in Step 3a, as described below. The decision to continue beyond the SLERA does not indicate that adverse effects are occurring or that risk reduction is necessary, rather it indicates that a more focused evaluation and characterization of the potential for risk and accompanying uncertainty is needed (DA, 2010).

The primary purpose of the BERA is to assess the potential for adverse effects on the focused list of ecological receptors due to exposure to the COPECs identified upon completion of the SLERA. The BERA includes Steps 3 through 7 of the eight step USEPA ERA (USEPA, 1997) process and uses facility-specific information whenever possible:

- Step 3a (SLERA refinement) provides a refinement of the conservative assumptions and resulting risk estimates identified in the SLERA. This step is conducted to refine some of the conservative assumptions used in the SLERA and assess whether more realistic assumptions would reduce the risk estimates to acceptable levels prior to implementing a facility-specific BERA with associated sampling and analyses. A weight-of-evidence evaluation that considers the Step 3a results, available habitat, wildlife management goals for the areas evaluated, and other relevant factors, as appropriate, will be conducted to determine whether a BERA is recommended.

- Steps 3b through 7 for pathways and COPECs retained after the completion of Step 3a include identifying endpoints to be evaluated, the laboratory and field methods to be used to collect additional data, the statistical analyses to be used for evaluating data, and the methods to be used for estimating and characterizing the potential for adverse effects on ecological receptors.

A BERA will only be warranted if the results of the SLERA and SLERA refinement indicate that adverse ecological effects are likely. In the event a BERA is warranted, the evaluation will be focused on the key receptors, pathways, and PFAS of potential concern identified following a weight-of-evidence assessment included in the SLERA refinement. The BERA considers more detailed aspects related to the COPECs, receptors, and exposure pathways retained at the end of Step 3a and could include food web modeling, tissue sampling, additional habitat assessments, or collection of other facility-specific data.

If the outcome of the ERA process indicates the need for risk management measures, ecological PRGs may be developed for PFAS that show the potential for adverse effects to guide remedial decision-making. PRGs may be based on available ecological screening values (ESVs), facility-specific background concentrations, calculated values based on food web modeling, and/or facility-specific toxicity data, if available.

The SLERA and BERA processes is detailed in **Appendix E**. Results from the HHRA and SLERA/BERA will be used to update and refine the preliminary RI CSM.

14.6 Report Preparation

Following the completion of data collection, laboratory analysis, and data validation for all RI phases of work, a comprehensive RI Report will be prepared per CERCLA guidance. The RI report will present the methods used for the RI, the refined CSM resulting from the investigation (including exposure pathways and receptors), the results of the site characterization and risk assessment, and a recommendation of whether further remedial action is needed.

The RI Report will include the following elements:

- Restatement of program goals;
- Facility background, environmental setting, previous investigations, current and reasonably expected future land use both on- and off-facility, and potential off-facility PFAS sources;
- Summary of field investigation conducted (e.g., sampling dates, soil samples collected, wells sampled, parameters analyzed, usage of screening-level data (if applicable), and field procedures);
- Physical characteristics of the study area, including soils, geology, hydrogeology, hydrology, and ecological setting;
- Natural, cultural, and historical items;
- Habitat characterization;
- Deviations from the initial QAPP and/or any QAPP modifications;
- Tables summarizing the samples collected and sample analytical data;
- Figures showing the layout of each sampling area, updated site features, results of geophysical surveys, soil boring locations, and summaries of pertinent analytical results;
- Discussion of data validation and PARCCS;
- Data evaluation;
- Refined CSM with focus on fate and transport, including potential routes of migration, contaminant persistence, and contaminant migration;
- Data uncertainties;
- Summary of the HHRA and SLERA/BERA with full HHRA and SLERA/BERA documentation included as appendices to the RI Report; and,
- Conclusions and summary of the RI findings.

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Worksheet #15: Project Data Quality Limits and Laboratory-Specific Detection/ Quantitation Limits

Worksheet #15 includes tables specifying the list of target analytes for groundwater, surface water, soil, and sediment and the associated DQLs and laboratory-specific detection/quantitation limits (QLs) for the target analytes. The analytical laboratory reference limits include the limits of detection (LODs), limits of quantitation (LOQs), and DLs. The objective is for the laboratory to achieve LOQs low enough to measure analytes at concentrations less than the DQLs to obtain a dataset of known quality and sufficient sensitivity to meet the project DQOs established in **Worksheet #11**. The DQLs represent the lowest of the relevant criteria that may be used in the RI and later stages of the CERCLA process (e.g., FS). These criteria include the applicable state-specific criteria, USEPA health advisories, and human health and ESVs, as further described below. Conservative assumptions were made when selecting screening values for use as DQLs for purposes of achieving an appropriate level of data quality. Facility-specific refinements may be made during application of screening values for use in the evaluation of analytical data. The DQLs are not intended to be used as cleanup levels. Concentrations above the DQLs would not automatically trigger a response action but would suggest further facility-specific consideration is appropriate. Details on the medium-specific DQL selection are provided in the notes below the following media-specific tables.

Target Analyte List for PFAS

A standard target list of 40 PFAS analytes has been established for this project for both the definitive method (USEPA Method 1633A) and screening method (ASTM D8421). A shortlist of compounds inclusive of those which OSD has established SLs (Assistant Secretary of Defense, 2023) will be applied to screening samples to expedite results for RSC from the analytical laboratory. The RSC surface soil grids will be analyzed for a shortlist of twelve PFAS, RSC soil and groundwater transect boring samples will be analyzed for a shortlist of fourteen PFAS. The RSC shortlists were selected to refine the extent of compounds with SLs in soil and groundwater.

RI Screening Levels for PFAS

The DoD has implemented a policy to retain facilities within the CERCLA process, comparing PFAS analytical results to SLs derived from the USEPA RSLs for soil and tap water (Assistant Secretary of Defense, 2023). The ARNG program under which this RI is being performed follows this DoD policy. The OSD policy instructs the use of USEPA RSLs based on a cancer risk level of 1E-06 and a hazard quotient of 0.1 for soil and groundwater. The OSD updated its website in March 2024 to direct the use of the November 2023 RSLs for specific PFAS (Assistant Secretary of Defense, 2024b). Sediment SLs are calculated as the residential soil RSLs multiplied by a factor of 10 to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario. The Mohawk River is a source of potable water for the Latham Water District. The exact location of the intake is not publicly available and it is not known if the intake is upstream or downstream of the facility. Therefore, the tap water RSLs will conservatively be used as SLs for surface water. **Table 11-1** summarizes the PFAS listed on the OSD website, which have USEPA RSLs derived from final, peer-reviewed toxicity values and are also included in the USEPA Method 1633A analytical list. The SLs will be used in the RI for delineation and to guide field investigations and will be used in the HHRA for COPC selection. The toxicity values in the RSL table posted to the OSD PFAS 101 website will be used to calculate site-specific human health risk for COPCs in the HHRA.

Ecological Screening Criteria for PFAS

With the exception of water quality criteria for PFOS and PFOA, ecological screening criteria for PFAS have not been developed by USEPA. Risk-based SLs for ecological receptors to be used in the SLERA are presented in this QAPP and will be included in the selection of DQLs. Ecological risk-based SLs for soil, surface water, and sediment will be identified primarily from the most recent publications from the Interagency Agreement between the U.S. Department of Energy, Air Force Civil Engineer Center (AFCEC), and Argonne National Laboratory (Grippo et al., 2024), Strategic Environmental Research and Development Program (SERDP) guidance documents (Conder, et al., 2020; Divine, et al., 2020), and USEPA water quality criteria (USEPA, 2024b). For screening purposes and DQL selection, the most conservative of these sources will be applied, as appropriate. The final selection of ecological SLs for PFAS will be reviewed during the ERA process to assess whether any new SLs are appropriate to consider.

Eurofins Lancaster Laboratories

Laboratory: Eurofins Lancaster Laboratories
Matrix: Groundwater
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.500	1.00	2.00
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	1.00	2.00	4.00
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	1.00	2.00	4.00
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	1.00	2.00	4.00
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	2.80	5.60	10.0
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	2.50	5.00	10.0
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	1.00	2.00	4.00
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.500	1.00	2.00
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.500	1.00	2.00
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	1.5	HH; Tap Water SL	0.500	0.750	1.50
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.500	1.00	2.00
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	2.50	5.00	10.0
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	2.50	5.00	10.0
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.500	1.00	2.00
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.500	1.00	2.00
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.500	1.00	2.00
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.500	1.00	2.00
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.500	1.00	2.00
Perfluorobutanesulfonic acid	PFBS	375-73-5	600	HH; Tap Water SL	0.500	1.00	2.00
Perfluorobutanoic acid	PFBA	375-22-4	1800	HH; Tap Water SL	1.10	2.20	4.00
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.500	1.00	2.00
Perfluorodecanoic acid	PFDA	335-76-2	--	--	0.500	1.00	2.00
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.600	1.20	2.00
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.500	1.00	2.00
Perfluoroheptanoic acid	PFHpA	375-85-9	--	--	0.800	1.60	2.00
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.500	1.00	2.00
Perfluorohexanesulfonic acid	PFHxS	355-46-4	39	HH; Tap Water SL	0.800	1.60	2.00
Perfluorohexanoic acid	PFHxA	307-24-4	990	HH; Tap Water SL	0.500	1.00	2.00

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
Perfluorononanoic acid	PFNA	375-95-1	5.9	HH; Tap Water SL	0.500	1.00	2.00
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.500	1.00	2.00
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.500	1.00	2.00
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4.0	HH; Tap Water SL	0.500	1.00	2.00
Perfluorooctanoic acid	PFOA	335-67-1	6.0	HH; Tap Water SL	0.900	1.80	2.00
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.600	1.20	2.00
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.500	1.00	2.00
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.500	1.00	2.00
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.500	1.00	2.00
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.500	1.00	2.00

Notes:
DQLs for groundwater were selected based on the following:

(a) The human health screening levels selected in accordance with the Memorandum from the OSD, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (Assistant Secretary of Defense. August 2023), as updated by the DoD in March 2024 (Assistant Secretary of Defense, 2024b). The screening levels are equal to the USEPA RSLs for tapwater (USEPA, November 2023) based on a target risk of 1E-06 and target HQ of 0.1. The RSLs used are consistent with DoD's list of 'RSLs included in DoD Investigations of PFAS'. (HH; Tap Water SL).

CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
ng/L = nanograms per liter
PFAS = per- and polyfluoroalkyl substances
RSL = regional screening level
SL = screening level
USEPA = United States Environmental Protection Agency

Laboratory: Eurofins Lancaster Laboratories
Matrix: Surface Water
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.500	1.00	2.00
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	1.00	2.00	4.00
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	1.00	2.00	4.00
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	1.00	2.00	4.00
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	2.80	5.60	10.0
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	4100	Eco; RWQ RBSL	2.50	5.00	10.0
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	1.00	2.00	4.00
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.500	1.00	2.00
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	69000	Eco; RWQ RBSL	0.500	1.00	2.00
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	1.5	HH; Tap Water SL	0.500	0.750	1.50
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.500	1.00	2.00
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	2.50	5.00	10.0
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	2.50	5.00	10.0
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.500	1.00	2.00
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.500	1.00	2.00
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.500	1.00	2.00
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.500	1.00	2.00
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.500	1.00	2.00
Perfluorobutanesulfonic acid	PFBS	375-73-5	600	HH; Tap Water SL	0.500	1.00	2.00
Perfluorobutanoic acid	PFBA	375-22-4	1800	HH; Tap Water SL	1.10	2.20	4.00
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.500	1.00	2.00
Perfluorodecanoic acid	PFDA	335-76-2	93.7	Eco; Wildlife ESV	0.500	1.00	2.00
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.600	1.20	2.00
Perfluorododecanoic acid	PFDoA	307-55-1	72000	Eco; RWQ RBSL	0.500	1.00	2.00
Perfluoroheptanoic acid	PFHpA	375-85-9	870000	Eco; RWQ RBSL	0.800	1.60	2.00
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.500	1.00	2.00
Perfluorohexanesulfonic acid	PFHxS	355-46-4	39	HH; Tap Water SL	0.800	1.60	2.00
Perfluorohexanoic acid	PFHxA	307-24-4	990	HH; Tap Water SL	0.500	1.00	2.00

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
Perfluorononanoic acid	PFNA	375-95-1	5.9	HH; Tap Water SL	0.500	1.00	2.00
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.500	1.00	2.00
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.500	1.00	2.00
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4.0	HH; Tap Water SL	0.500	1.00	2.00
Perfluorooctanoic acid	PFOA	335-67-1	6.0	HH; Tap Water SL	0.900	1.80	2.00
Perfluoropentanoic acid	PFPA	2706-90-3	140000	Eco; RWQ RBSL	0.600	1.20	2.00
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.500	1.00	2.00
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.500	1.00	2.00
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.500	1.00	2.00
Perfluoroundecanoic acid	PFUnA	2058-94-8	49000	Eco; RWQ RBSL	0.500	1.00	2.00

Notes:

DQLs for surface water were selected based on the lower of the following:

(a) For human health, the groundwater DQL was selected because the Mohawk River is used as a drinking water source. (HH; Tapwater SL).

(b) USEPA National Recommended Water Quality Criteria, Aquatic Life Criteria chronic freshwater value (Aquatic Life WQC) (USEPA, 2024b).

(c) Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites (Conder et al., 2020). Ecological aquatic life 5% hazardous concentration.

(d) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). The following values were used:

-Lowest NOAEL RBSL for surface water for aquatic wildlife (Wildlife RBSL).

-Freshwater chronic screening level for aquatic life (RWQ RBSL).

(e) Derivation of PFAS Ecological Screening Values. Argonne National Laboratory (Grippo, et al., 2024). The following values were used:

-Surface water ESV for aquatic-dependent wildlife (Wildlife ESV).

-Freshwater chronic ESV for aquatic life (Aquatic life ESV).

CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
Eco = ecological based DQL
ESV = ecological screening value
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
ng/L = nanograms per liter
PFAS = per- and polyfluoroalkyl substances
RBSL = risk based screening level
RWQ = recommended water quality
SL = screening level
USEPA = United States Environmental Protection Agency
WQC = water quality criteria

Laboratory: Eurofins Lancaster Laboratories
Matrix: Soil
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.200	0.400	0.800
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.200	0.400	0.800
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.350	0.800	1.00
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.350	0.800	1.00
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.00	2.50	5.00
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	1.00	2.50	5.00
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	0.250	0.500	1.00
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.200	0.400	0.800
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.200	0.400	0.800
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	23	HH; Residential Soil SL	0.100	0.400	0.800
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.0500	0.100	0.200
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	0.500	1.00	2.00
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.0500	0.100	0.200
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.0500	0.100	0.200
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.0500	0.100	0.200
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.104	0.200	0.400
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.100	0.200	0.400
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.100	0.200	0.400
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.100	0.200	0.100
Perfluorobutanesulfonic acid	PFBS	375-73-5	817	Eco; Wildlife ESV	0.0500	0.100	0.200
Perfluorobutanoic acid	PFBA	375-22-4	2980	Eco; Wildlife ESV	0.100	0.400	0.800
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.0500	0.100	0.200
Perfluorodecanoic acid	PFDA	335-76-2	67.7	Eco; Wildlife ESV	0.0500	0.100	0.200
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.0500	0.100	0.200
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.0500	0.100	0.200
Perfluoroheptanoic acid	PFHpA	375-85-9	1000	Eco; Invertebrate NOEC	0.0500	0.100	0.200
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.0500	0.100	0.200
Perfluorohexanesulfonic acid	PFHxS	355-46-4	130	HH; Residential Soil SL	0.0500	0.100	0.200
Perfluorohexanoic acid	PFHxA	307-24-4	3200	HH; Residential Soil SL	0.0590	0.120	0.200

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
Perfluorononanoic acid	PFNA	375-95-1	19	HH; Residential Soil SL	0.0500	0.100	0.200
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.0500	0.100	0.200
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.0500	0.100	0.200
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4	Eco; Wildlife ESV	0.0510	0.100	0.200
Perfluorooctanoic acid	PFOA	335-67-1	19	HH; Residential Soil SL	0.0510	0.100	0.200
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.100	0.200	0.400
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.0500	0.100	0.200
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.0500	0.100	0.200
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.0500	0.100	0.200
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.0500	0.100	0.200

Notes:

DQLs for soil were selected based on the lower of the following:

(a) The human health screening levels selected in accordance with the Memorandum from the OSD, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (Assistant Secretary of Defense. August 2023), as updated by the DoD in March 2024 (Assistant Secretary of Defense, 2024b). The screening levels are equal to the USEPA RSLs for residential soil (USEPA, November 2023) based on a target risk of 1E-06 and target HQ of 0.1. The RSLs used are consistent with DoD's list of 'RSLs included in DoD Investigations of PFAS'. (HH; Residential Soil SL)

(b) Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites (Conder et al., 2020). Recommended Toxicity Benchmarks for Terrestrial Plants and Invertebrates; based on NOECs (Plant Tox. and Invert. Tox.).

(c) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). The following values were used:
Lowest NOAEL-based RBSL for soil for terrestrial wildlife (Wildlife RBSL).
NOEC-based soil screening level for plants (Plant NOEC).
NOEC-based soil screening level for invertebrates (Invert. NOEC).

(d) Derivation of PFAS Ecological Screening Values. Argonne National Laboratory (Grippo, et al., 2024). The following values were used:
Lowest soil ESV for birds and mammals (Wildlife ESV).
Soil ESV for terrestrial plants (Plant ESV).
Soil ESV for terrestrial invertebrates (Invert. ESV).

µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
Eco = ecological based DQL
ESV = ecological screening value
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
NOAEL = no observed adverse effect level
NOEC = no observed effect concentration
OSD = Office of the Secretary of Defense
RBSL = risk based screening level
RSL = regional screening level
PFAS = per- and polyfluoroalkyl substances
SL = screening level
USEPA = United States Environmental Protection Agency

Laboratory: Eurofins Lancaster Laboratories
Matrix: Sediment
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.200	0.400	0.800
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.200	0.400	0.800
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.350	0.800	1.00
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.350	0.800	1.00
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.00	2.50	5.00
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	1.00	2.50	5.00
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	0.250	0.500	1.00
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.200	0.400	0.800
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.200	0.400	0.800
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	230	HH; Residential Soil SL x 10	0.100	0.400	0.800
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.0500	0.100	0.200
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	0.500	1.00	2.00
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.0500	0.100	0.200
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.0500	0.100	0.200
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	0.500	1.00	2.00
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.0500	0.100	0.200
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.104	0.200	0.400
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.100	0.200	0.400
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.100	0.200	0.400
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.100	0.200	0.100
Perfluorobutanesulfonic acid	PFBS	375-73-5	730	Eco; Wildlife RBSL	0.0500	0.100	0.200
Perfluorobutanoic acid	PFBA	375-22-4	1600	Eco; Wildlife RBSL	0.100	0.400	0.800
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.0500	0.100	0.200
Perfluorodecanoic acid	PFDA	335-76-2	--	--	0.0500	0.100	0.200
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.0500	0.100	0.200
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.0500	0.100	0.200
Perfluoroheptanoic acid	PFHpA	375-85-9	--	--	0.0500	0.100	0.200
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.0500	0.100	0.200
Perfluorohexanesulfonic acid	PFHxS	355-46-4	1300	HH; Residential Soil SL x 10	0.0500	0.100	0.200

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
Perfluorohexanoic acid	PFHxA	307-24-4	1800	Eco; Wildlife RBSL	0.0590	0.120	0.200
Perfluorononanoic acid	PFNA	375-95-1	10	Eco; Wildlife RBSL	0.0500	0.100	0.200
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.0500	0.100	0.200
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.0500	0.100	0.200
Perfluorooctanesulfonic acid	PFOS	1763-23-1	1.4	Eco; Wildlife RBSL	0.0510	0.100	0.200
Perfluorooctanoic acid	PFOA	335-67-1	6	Eco; Wildlife RBSL	0.0510	0.100	0.200
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.100	0.200	0.400
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.0500	0.100	0.200
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.0500	0.100	0.200
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.0500	0.100	0.200
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.0500	0.100	0.200

Notes:
DQLs for sediment were selected based on the lower of the following:
(a) For human health, the soil SL (see worksheet for soil) multiplied by a factor of 10 was used to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario (HH; Residential Soil SL x 10).
(b) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). Lowest NOAEL-based RBSL for sediment for aquatic wildlife (Wildlife RBSL).

µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
Eco = ecological based DQL
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
NOAEL = no observed adverse effect level
TBD = to be determined
PFAS = per- and polyfluoroalkyl substances
RBSL = risk-based screening level
SL = screening level
USEPA = United States Environmental Protection Agency

Laboratory: Eurofins Lancaster Laboratories
Matrix: Solid (Soil/ Sediment)
Analyte Groups: General Chemistry (TOC, pH, Grain Size)

Analyte	Method	Units	DQL	Achievable Laboratory Limits		
				DL	LOD	LOQ
Total Organic Carbon	USEPA 9060A	mg/kg	N/A	500	900	1000
pH	USEPA 9045D	STU	N/A	0.1	1.0	1.0
Grain Size	ASTM D422	% Passing	N/A	0.1	0.1	0.1

Notes:
% = percent
ASTM = American Society for Testing Materials
DL = detection limit
DQL = data quality limit
LOD = limit of detection
LOQ = limit of quantification
mg/kg = milligrams per kilogram
N/A = not applicable
STU = standard unit
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Pace South Carolina

Laboratory: Pace South Carolina
Matrix: Groundwater
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.94	2.0	4.0
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.63	2.0	4.0
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.95	2.0	4.0
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.54	2.0	4.0
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.9	6.0	25
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	2.6	10	25
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	1.5	3.0	5.0
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.57	2.0	4.0
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.73	2.0	4.0
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	1.5	HH; Tap Water SL	0.89	2.0	4.0
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.14	0.50	1.0
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	2.4	5.0	10
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.28	0.75	1.0
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.15	0.50	1.0
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	1.5	5.0	10
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.19	0.50	1.0
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.49	1.0	2.0
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.48	1.0	2.0
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.32	1.0	2.0
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.30	1.0	2.0
Perfluorobutanesulfonic acid	PFBS	375-73-5	600	HH; Tap Water SL	0.10	0.50	1.0
Perfluorobutanoic acid	PFBA	375-22-4	1800	HH; Tap Water SL	0.55	2.0	4.0
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.15	0.50	1.0
Perfluorodecanoic acid	PFDA	335-76-2	--	--	0.18	0.50	1.0
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.34	0.50	1.0
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.17	0.50	1.0
Perfluoroheptanoic acid	PFHpA	375-85-9	--	--	0.16	0.50	1.0
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.11	0.50	1.0
Perfluorohexanesulfonic acid	PFHxS	355-46-4	39	HH; Tap Water SL	0.17	0.50	1.0

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
Perfluorohexanoic acid	PFHxA	307-24-4	990	HH; Tap Water SL	0.13	0.50	1.0
Perfluorononanoic acid	PFNA	375-95-1	5.9	HH; Tap Water SL	0.17	0.50	1.0
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.22	0.50	1.0
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.15	0.50	1.0
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4.0	HH; Tap Water SL	0.26	0.75	1.0
Perfluorooctanoic acid	PFOA	335-67-1	6.0	HH; Tap Water SL	0.16	0.50	1.0
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.29	1.0	2.0
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.12	0.50	1.0
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.17	0.50	1.0
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.20	0.50	1.0
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.18	0.50	1.0

Notes:

DQLs for groundwater were selected based on the following:

(a) The human health screening levels selected in accordance with the Memorandum from the OSD, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (Assistant Secretary of Defense. August 2023), as updated by the DoD in March 2024 (Assistant Secretary of Defense, 2024b). The screening levels are equal to the USEPA RSLs for tapwater (USEPA, November 2023) based on a target risk of 1E-06 and target HQ of 0.1. The RSLs used are consistent with DoD's list of 'RSLs included in DoD Investigations of PFAS'. (HH; Tap Water SL)

CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
ng/L = nanograms per liter
PFAS = per- and polyfluoroalkyl substances
RSL = regional screening level
SL = screening level
USEPA = United States Environmental Protection Agency

Laboratory: Pace South Carolina
Matrix: Surface Water
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.94	2.0	4.0
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.63	2.0	4.0
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.95	2.0	4.0
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.54	2.0	4.0
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.9	6.0	25
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	4100	Eco: RWQ RBSL	2.6	10	25
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	1.5	3.0	5.0
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.57	2.0	4.0
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	69000	Eco; RWQ RBSL	0.73	2.0	4.0
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	1.5	HH; Tap Water SL	0.89	2.0	4.0
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.14	0.50	1.0
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	2.4	5.0	10
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.28	0.75	1.0
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.15	0.50	1.0
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	1.5	5.0	10
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.19	0.50	1.0
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.49	1.0	2.0
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.48	1.0	2.0
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.32	1.0	2.0
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.30	1.0	2.0
Perfluorobutanesulfonic acid	PFBS	375-73-5	600	HH; Tap Water SL	0.10	0.50	1.0
Perfluorobutanoic acid	PFBA	375-22-4	1800	HH; Tap Water SL	0.55	2.0	4.0
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.15	0.50	1.0
Perfluorodecanoic acid	PFDA	335-76-2	93.7	Eco; Wildlife ESV	0.18	0.50	1.0
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.34	0.50	1.0
Perfluorododecanoic acid	PFDoA	307-55-1	72000	Eco; RWQ RBSL	0.17	0.50	1.0
Perfluoroheptanoic acid	PFHpA	375-85-9	870000	Eco; RWQ RBSL	0.16	0.50	1.0
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.11	0.50	1.0
Perfluorohexanesulfonic acid	PFHxS	355-46-4	39	HH; Tap Water SL	0.17	0.50	1.0

Analyte	Abbreviation	CAS Number	DQL (ng/L)	DQL Source	Achievable Laboratory Limits		
					DL (ng/L)	LOD (ng/L)	LOQ (ng/L)
Perfluorohexanoic acid	PFHxA	307-24-4	990	HH; Tap Water SL	0.13	0.50	1.0
Perfluorononanoic acid	PFNA	375-95-1	5.9	HH; Tap Water SL	0.17	0.50	1.0
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.22	0.50	1.0
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.15	0.50	1.0
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4.0	HH; Tap Water SL	0.26	0.75	1.0
Perfluorooctanoic acid	PFOA	335-67-1	6.0	HH; Tap Water SL	0.16	0.50	1.0
Perfluoropentanoic acid	PFPA	2706-90-3	140000	Eco; RWQ RBSL	0.29	1.0	2.0
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.12	0.50	1.0
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.17	0.50	1.0
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.20	0.50	1.0
Perfluoroundecanoic acid	PFUnA	2058-94-8	49000	Eco; RWQ RBSL	0.18	0.50	1.0

Notes:

DQLs for surface water were selected based on the lower of the following:

(a) For human health, the groundwater DQL was selected because the Mohawk River is used as a drinking water source. (HH; Tapwater SL).

(b) USEPA National Recommended Water Quality Criteria, Aquatic Life Criteria chronic freshwater value (Aquatic Life WQC) (USEPA, 2024b).

(c) Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites (Conder et al., 2020). Ecological aquatic life 5% hazardous concentration.

(d) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). The following values were used:

-Lowest NOAEL RBSL for surface water for aquatic wildlife (Wildlife RBSL).

-Freshwater chronic screening level for aquatic life (RWQ RBSL).

(e) Derivation of PFAS Ecological Screening Values. Argonne National Laboratory (Grippo, et al., 2024). The following values were used:

-Surface water ESV for aquatic-dependent wildlife (Wildlife ESV).

-Freshwater chronic ESV for aquatic life (Aquatic life ESV).

CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
Eco = ecological based DQL
ESV = ecological screening value
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
ng/L = nanograms per liter
PFAS = per- and polyfluoroalkyl substances
RBSL = risk based screening level
RWQ = recommended water quality
SL = screening level
USEPA = United States Environmental Protection Agency
WQC = water quality criteria

Laboratory: Pace South Carolina
Matrix: Soil
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.11	0.40	0.80
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.15	0.40	0.80
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.14	0.40	0.80
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.13	0.40	0.80
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.1	2.5	5.0
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	0.10	2.5	5.0
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	0.21	0.50	1.0
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.10	0.40	0.80
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.081	0.40	0.80
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	23	HH; Residential Soil SL	0.10	0.40	0.80
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.059	0.15	0.20
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	0.44	1.0	2.0
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.026	0.10	0.20
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.034	0.10	0.20
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	0.40	1.0	2.0
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.049	0.10	0.20
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.060	0.20	0.40
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.048	0.20	0.40
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.042	0.20	0.40
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.038	0.20	0.40
Perfluorobutanesulfonic acid	PFBS	375-73-5	817	Eco; Wildlife ESV	0.027	0.10	0.20
Perfluorobutanoic acid	PFBA	375-22-4	2980	Eco; Wildlife ESV	0.14	0.40	0.80
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.033	0.10	0.20
Perfluorodecanoic acid	PFDA	335-76-2	67.7	Eco; Wildlife ESV	0.038	0.10	0.20
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.028	0.10	0..20
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.038	0.10	0.20
Perfluoroheptanoic acid	PFHpA	375-85-9	1000	Eco; Invertebrate NOEC	0.030	0.10	0.20
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.0249	0.10	0.20
Perfluorohexanesulfonic acid	PFHxS	355-46-4	130	HH; Residential Soil SL	0.0328	0.10	0.20

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
Perfluorohexanoic acid	PFHxA	307-24-4	3200	HH; Residential Soil SL	0.078	0.16	0.20
Perfluorononanoic acid	PFNA	375-95-1	19	HH; Residential Soil SL	0.044	0.10	0.20
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.040	0.10	0.20
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.047	0.10	0.20
Perfluorooctanesulfonic acid	PFOS	1763-23-1	4	Eco; Wildlife ESV	0.052	0.15	0.20
Perfluorooctanoic acid	PFOA	335-67-1	19	HH; Residential Soil SL	0.036	0.10	0.20
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.062	0.20	0.40
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.032	0.10	0.20
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.030	0.10	0.20
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.031	0.10	0.20
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.030	0.10	0.20

Notes:

DQLs for soil were selected based on the lower of the following:

(a) The human health screening levels selected in accordance with the Memorandum from the OSD, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (Assistant Secretary of Defense, 2023), as updated by the DoD in March 2024 (Assistant Secretary of Defense, 2024b). The screening levels are equal to the USEPA RSLs for residential soil (USEPA, November 2023) based on a target risk of 1E-06 and target HQ of 0.1. The RSLs used are consistent with DoD's list of 'RSLs included in DoD Investigations of PFAS'. (HH; Residential Soil SL)

(b) Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites (Conder et al., 2020). Recommended Toxicity Benchmarks for Terrestrial Plants and Invertebrates; based on NOECs (Plant Tox. and Invert. Tox.).

(c) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). The following values were used:
Lowest NOAEL-based RBSL for soil for terrestrial wildlife (Wildlife RBSL).
NOEC-based soil screening level for plants (Plant NOEC).
NOEC-based soil screening level for invertebrates (Invert. NOEC).

(d) Derivation of PFAS Ecological Screening Values. Argonne National Laboratory (Grippo, et al., 2024). The following values were used:
Lowest soil ESV for birds and mammals (Wildlife ESV).
Soil ESV for terrestrial plants (Plant ESV).
Soil ESV for terrestrial invertebrates (Invert. ESV).

µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
USEPA = United States Environmental Protection Agency

Laboratory: Pace South Carolina
Matrix: Sediment
Analyte Group: PFAS (40 Compound Target List)
Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11C1-PF3OudS	763051-92-9	--	--	0.11	0.40	0.80
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	--	--	0.15	0.40	0.80
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	--	--	0.14	0.40	0.80
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	--	--	0.13	0.40	0.80
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-493-3	--	--	1.1	2.5	5.0
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	--	--	0.10	2.5	5.0
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	--	--	0.21	0.50	1.0
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	--	--	0.10	0.40	0.80
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	756426-58-1	--	--	0.081	0.40	0.80
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	230	HH; Residential Soil SL x 10	0.10	0.40	0.80
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	--	--	0.059	0.15	0.20
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	--	--	0.44	1.0	2.0
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	--	--	0.026	0.10	0.20
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	--	--	0.034	0.10	0.20
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	--	--	0.40	1.0	2.0
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	--	--	0.049	0.10	0.20
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	--	--	0.060	0.20	0.40
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	--	--	0.048	0.20	0.40
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	--	--	0.042	0.20	0.40
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	--	--	0.038	0.20	0.40
Perfluorobutanesulfonic acid	PFBS	375-73-5	730	Eco; Wildlife RBSL	0.027	0.10	0.20
Perfluorobutanoic acid	PFBA	375-22-4	1600	Eco; Wildlife RBSL	0.14	0.40	0.80
Perfluorodecanesulfonic acid	PFDS	335-77-3	--	--	0.033	0.10	0.20
Perfluorodecanoic acid	PFDA	335-76-2	--	--	0.038	0.10	0.20
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	--	--	0.028	0.10	0..20
Perfluorododecanoic acid	PFDoA	307-55-1	--	--	0.038	0.10	0.20
Perfluoroheptanoic acid	PFHpA	375-85-9	--	--	0.030	0.10	0.20
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	--	--	0.0249	0.10	0.20

Analyte	Abbreviation	CAS Number	DQL (µg/kg)	DQL Source	Achievable Laboratory Limits		
					DL (µg/kg)	LOD (µg/kg)	LOQ (µg/kg)
Perfluorohexanesulfonic acid	PFHxS	355-46-4	1300	HH; Residential Soil SL x 10	0.0328	0.10	0.20
Perfluorohexanoic acid	PFHxA	307-24-4	1800	Eco; Wildlife RBSL	0.078	0.16	0.20
Perfluorononanoic acid	PFNA	375-95-1	10	Eco; Wildlife RBSL	0.044	0.10	0.20
Perfluorononanesulfonic acid	PFNS	68259-12-1	--	--	0.040	0.10	0.20
Perfluorooctanesulfonamide	PFOSA	754-91-6	--	--	0.047	0.10	0.20
Perfluorooctanesulfonic acid	PFOS	1763-23-1	1.4	Eco; Wildlife RBSL	0.052	0.15	0.20
Perfluorooctanoic acid	PFOA	335-67-1	6	Eco; Wildlife RBSL	0.036	0.10	0.20
Perfluoropentanoic acid	PFPA	2706-90-3	--	--	0.062	0.20	0.40
Perfluoropentanesulfonic acid	PFPS	2706-91-4	--	--	0.032	0.10	0.20
Perfluorotetradecanoic acid	PFTeDA	376-06-7	--	--	0.030	0.10	0.20
Perfluorotridecanoic acid	PFTriDA	72629-94-8	--	--	0.031	0.10	0.20
Perfluoroundecanoic acid	PFUnA	2058-94-8	--	--	0.030	0.10	0.20

Notes:
DQLs for sediment were selected based on the lower of the following:
(a) For human health, the soil SL (see worksheet for soil) multiplied by a factor of 10 was used to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario (HH; Residential Soil SL x 10).
(b) Approach for Assessing PFAS Risk to Threatened and Endangered Species (Divine et al., 2020). Lowest NOAEL-based RBSL for sediment for aquatic wildlife (Wildlife RBSL).

µg/kg = micrograms per kilogram
CAS = Chemical Abstracts Service
DL = detection limit
DQL = data quality limit
Eco = ecological based DQL
HH = human health based DQL
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantification
NOAEL = no observed adverse effect level
TBD = to be determined
PFAS = per- and polyfluoroalkyl substances
RBSL = risk-based screening level
SL = screening level
USEPA = United States Environmental Protection Agency

Laboratory: Pace South Carolina
Matrix: Groundwater
Analytical Group: PFAS (40 Compound Target List)
Analytical Method: ASTM D8421

Analyte	Acronym	CAS Number	Detection Limit (DL) ng/L	Limit of Quantitation (LOQ) ng/L
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OudS	763051-92-9	3.0	10
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	1.9	10
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	4.4	20
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	5.2	10
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3	4.9	40
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	2.7	40
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	5.0	40
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	1.7	10
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	756426-58-1	1.8	10
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	2.4	10
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	2.6	10
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	2.6	10
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	3.5	10
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	2.1	10
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	4.5	10
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	2.7	10
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	1.8	10
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	1.0	10
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	1.4	10
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	2.0	10
Perfluorobutanesulfonic acid	PFBS	375-73-5	3.5	10
Perfluorobutanoic acid	PFBA	375-22-4	8.3	50
Perfluorodecanesulfonic acid	PFDS	335-77-3	2.6	10
Perfluorodecanoic acid	PFDA	335-76-2	2.2	10
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	50[(1)]	50
Perfluorododecanoic acid	PFDoA	307-55-1	2.0	10
Perfluoroheptanoic acid	PFHpA	375-85-9	3.2	10
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	1.6	10

Analyte	Acronym	CAS Number	Detection Limit (DL) ng/L	Limit of Quantitation (LOQ) ng/L
Perfluorohexanesulfonic acid	PFHxS	355-46-4	1.6	10
Perfluorohexanoic acid	PFHxA	307-24-4	1.4	10
Perfluorononanoic acid	PFNA	375-95-1	2.2	10
Perfluorononanesulfonic acid	PFNS	68259-12-1	1.9	10
Perfluorooctanesulfonamide	PFOSA	754-91-6	1.6	10
Perfluorooctanesulfonic acid	PFOS	1763-23-1	1.6	10
Perfluorooctanoic acid	PFOA	335-67-1	4.1	10
Perfluoropentanoic acid	PFPA	2706-90-3	14	50
Perfluoropentansulfonic acid	PFPS	2706-91-4	2.9	10
Perfluorotetradecanoic acid	PFTeDA	376-06-7	50(1)	50
Perfluorotridecanoic acid	PFTriDA	72629-94-8	5.8	10
Perfluoroundecanoic acid	PFUnA	2058-94-8	1.4	10

Notes:
1.) A method detection limit for this compound could not be established. As such, the laboratory will report to the LOQ.

ASTM = American Society for Testing and Materials
CAS = Chemical Abstracts Service
DL = detection limit
LOQ = limit of quantification
ng/L = nanograms per liter

Laboratory: Pace South Carolina
Matrix: Soil
Analytical Group: PFAS (40 Compound Target List)
Analytical Method: ASTM D8421

Analyte	Acronym	CAS Number	Detection Limit (DL) µg/kg	Limit of Quantitation (LOQ)[2] µg/kg
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OudS	763051-92-9	0.0043	0.10
4:2 Fluorotelomer sulfonic acid	4:2 FTS	757124-72-4	0.010	0.10
6:2 Fluorotelomer sulfonic acid	6:2 FTS	27619-97-2	0.035	0.20
8:2 Fluorotelomer sulfonic acid	8:2 FTS	39108-34-4	0.023	0.10
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3	0.018	0.40
3-Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4	0.013	0.40
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5	0.014	0.40
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	0.0052	0.10
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	756426-58-1	0.0036	0.10
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	0.0040	0.10
N-ethyl perfluorooctanesulfonamide	N-Et-FOSA	4151-50-2	0.0042	0.10
N-ethyl perfluorooctanesulfonamidoethanol	N-Et-FOSE	1691-99-2	0.0038	0.10
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6	0.013	0.10
N-methyl perfluorooctanesulfonamide	N-Me-FOSA	31506-32-8	0.0058	0.10
N-methyl perfluorooctanesulfonamidoethanol	N-Me-FOSE	24448-09-7	0.013	0.10
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9	0.011	0.10
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	0.0079	0.10
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	0.0046	0.10
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	0.0034	0.10
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	0.0031	0.10
Perfluorobutanesulfonic acid	PFBS	375-73-5	0.0073	0.10
Perfluorobutanoic acid	PFBA	375-22-4	0.013	0.50
Perfluorodecanesulfonic acid	PFDS	335-77-3	0.0062	0.10
Perfluorodecanoic acid	PFDA	335-76-2	0.015	0.10
Perfluorododecanesulfonic acid	PFDoS	79780-39-5	0.50 (1)	0.50
Perfluorododecanoic acid	PFDoA	307-55-1	0.0061	0.10
Perfluoroheptanoic acid	PFHpA	375-85-9	0.0097	0.10
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	0.0063	0.10

Analyte	Acronym	CAS Number	Detection Limit (DL) µg/kg	Limit of Quantitation (LOQ)[2] µg/kg
Perfluorohexanesulfonic acid	PFHxS	355-46-4	0.0045	0.10
Perfluorohexanoic acid	PFHxA	307-24-4	0.0035	0.10
Perfluorononanoic acid	PFNA	375-95-1	0.0060	0.10
Perfluorononanesulfonic acid	PFNS	68259-12-1	0.0047	0.10
Perfluorooctanesulfonamide	PFOSA	754-91-6	0.0031	0.10
Perfluorooctanesulfonic acid	PFOS	1763-23-1	0.0040	0.10
Perfluorooctanoic acid	PFOA	335-67-1	0.013	0.10
Perfluoropentanoic acid	PFPA	2706-90-3	0.031	0.50
Perfluoropentansulfonic acid	PFPS	2706-91-4	0.0066	0.10
Perfluorotetradecanoic acid	PFTeDA	376-06-7	0.50 [(1)]	0.50
Perfluorotridecanoic acid	PFTriDA	72629-94-8	0.0083	0.10
Perfluoroundecanoic acid	PFUnA	2058-94-8	0.0079	0.10

Notes:
1.) A method detection limit for this compound could not be established. As such, the laboratory will report to the LOQ.
2.) ASTM 8421 is not a DoD/ELAP certified method. As such no quarterly LODs are performed, and two levels of reporting limits are used.

µg/kg = micrograms per kilogram
ASTM = American Society for Testing and Materials
CAS = Chemical Abstracts Service
DL = detection limit
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
LOD = limit of detection
LOQ = limit of quantification

Laboratory: Pace South Carolina
Matrix: Solid (Soil/ Sediment)
Analyte Groups: General Chemistry (TOC, pH, Grain Size)

Analyte	Method	Units	DQL	Achievable Laboratory Limits		
				DL	LOD	LOQ
Total Organic Carbon	USEPA 9060	mg/kg	N/A	50	100	100
pH	USEPA 9045D	STU	N/A	0.10	1.0	1.0
Grain Size	ASTM D422	% Passing	N/A	0.10	0.10	0.10

Notes:
% = percent
ASTM = American Society for Testing and Materials
DL = detection limit
DQL = data quality limit
LOD = limit of detection
LOQ = limit of quantification
mg/kg = milligrams per kilogram
N/A = not applicable
STU = standard unit
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Worksheets #17 & #18: Sampling Design and Rationale

Worksheets #17 & #18 provide the sampling design and rationale, in addition to the sampling locations and methods, for the Albany AASF #3 RI. The sampling program was designed to meet the DQOs established in **Worksheet #11**, while considering the CSM summarized in **Worksheet #10**. As discussed in **Worksheet #10**, three AOIs with SL exceedances were identified at the facility during the SI (AECOM, 2023):

- AOI 1: AASF#3 Hangar Release/ Fire Response Unit
- AOI 2: Garbage Truck Fire
- AOI 3: Stockpiled Soil

The RI field activities for the Albany AASF #3 will be conducted in three sequential phases:

- Prescriptive Phase: PFAS sampling and analyses will be conducted at biased sampling locations surrounding known impacts as identified during the SI. Data collected during the Prescriptive Phase will be used for CSM refinement and planning the Adaptive Phase scope.
- Adaptive Phase: Data will be collected to complete delineation and address remaining data gaps.
- Final Characterization/Monitoring Phase: will include the installation and quarterly sampling of additional permanent groundwater monitoring wells, if deemed necessary based on the results of the Adaptive Phase.

Analytical requirements to achieve project objectives and support the quantification of potential risks are detailed in **Worksheet #15**. Field activities will be completed in accordance with the procedures outlined in **Worksheet #14** and the SOPs in **Appendix D**.

The following subsections detail the sampling design and rationale for the Prescriptive Scope and summarize the technical approach that will or may be used during later phases of the investigation.

17.1 Prescriptive Phase Sampling Design and Rationale

The overall Prescriptive Phase approach has been designed to meet the RI objectives as presented in **Worksheet #11**. The proposed locations of samples to be collected are presented on **Figure 17-1**. The specific design rationale for each task, in addition to the sampling locations and methods for, are included in **Table 17-1** through **Table 17-5**.

The sampling program for the Prescriptive Phase, only occurring within facility boundaries, will include:

- Installation, sampling, and gauging of six new permanent monitoring wells along facility boundaries;
- Collection of RSC surface soil samples for analysis of the shortlist of twelve PFAS under rapid 48-hour TAT at AOI 1;
- Collection of RSC co-located grab soil and groundwater samples from transects of DPT borings for analysis of the shortlist of fourteen PFAS under rapid 48-hour TAT at AOI 1;
- Collection of co-located grab soil and groundwater samples from transects of DPT borings for analysis of PFAS (target list of 40 PFAS) at AOI 2 and AOI 3;

- Collection of surface water and sediment for analysis of PFAS (target list of 40 PFAS) from the drainage ditch along the southern boundary of the facility.

If field conditions make a proposed monitoring well location infeasible, an alternate location that aligns with the project's DQO's will be selected instead. In instances when deviations from this sampling design and rationale are made necessary due to unforeseen conditions, a Field Change Request Form will be generated to document the change and request feedback from the A2P JV Task Manager and Project Manager, USACE, and ARNG.

Monitoring Well Installation, Sampling, and Gauging

Groundwater level measurements collected during the SI show a westerly flow direction, differing from the anticipated northerly flow direction. It is possible that localized shallow groundwater flow is influenced by the nearby Shakers Creek, which lies to the west of the facility. SI groundwater level measurements were collected from temporary wells over a period of several days. Due to the lack of synoptically collected groundwater level measurements from permanent monitoring wells, the westerly flow direction of shallow groundwater requires verification. In the absence of any permanent monitoring wells at the facility, new permanent monitoring wells will be installed along the facility boundaries. The new monitoring wells will be used to confirm the direction of shallow groundwater flow via triangulation, and to capture potential up- and side-gradient off-facility sources.

Following the installation and development of the new monitoring wells, a synoptic groundwater level round will be performed. The groundwater gauging round will be conducted within as short a time period as reasonably feasible and will follow a period of little to no precipitation. Monitoring well installation will be prioritized as the first drilling field activity in order to confirm shallow groundwater flow direction early in the investigation. The locations of transect borings will then be checked against the updated groundwater flow direction to ensure transects are oriented perpendicular to the direction of groundwater flow. A PDT call will be held, if necessary, to review the updated groundwater flow direction and make decisions on the orientation of transect borings.

Low-flow groundwater samples will be collected from the new permanent monitoring wells and analyzed under standard TAT for the target list of PFAS by LC/MS/MS compliant with USEPA Method 1633A, as specified in **Worksheet #15**. The new monitoring well locations are shown on **Figure 17-1**. The rationale for the sample locations is provided in **Table 17-1**. Sampling activities will be conducted in accordance with the procedures established in **Worksheet #14** and in the SOPs (**Appendix D**).

PFAS RSC of Surface Soil

Based on the evaluation of available data in soil, as presented in **Section 10.5**, PFOS was detected above the SL of 13 µg/kg at two of nine boring locations in shallow soil at AOI 1. However, the exact locations of the PFAS releases to soil, the distribution due to construction activities, and the migration pathways between the release areas and boundaries are not fully understood.

RSC surface soil grids will be utilized to address these data gaps during the Prescriptive Phase. In accordance with the goals of the project outlined in **Worksheet #11**, the RSC methods will aid in the characterization and delineation of PFAS release areas, and in the placement of the soil SUs. These SUs will be used for the collection of surface and subsurface soil data, which will then be used in the risk assessments. RSC surface soil samples will be analyzed by the laboratory under a rapid TAT of 48 hours

RSC of surface soil will only be conducted at AOI 1 during the Prescriptive Phase. At AOI 2 PFOA, and PFBA were not detected in soil, and all other regulated PFAS detections were below SLs and below 0.5 µg/kg. At AOI 3 there were no detections of PFBS in soil, all other regulated PFAS detections were below SLs, additionally the stockpiled soil has since been removed by NYARNG

for disposal at an offsite facility. As such, RSC of surface soil is not recommended for the Prescriptive Phase at AOI 2 or AOI 3.

An initial total of 24 RSC surface soil samples (not counting QC samples) will be collected within AOI 1 in Proposed RSC Grids 01, 02, 03, and 04. The initial RSC surface soil sample grid locations are shown on **Figure 17-1**. The specific surface soil sample locations are shown on **Figure 17-2**. The rationale for the RSC surface soil sample locations is provided in **Table 17-2**. RSC surface soil samples will be analyzed for a shortlist of twelve PFAS by ASTM D8421 as specified in **Worksheet #15**, under rapid 48-hour TAT. The twelve PFAS included in the shortlist are the compounds for which OSD has established SLs (Assistant Secretary of Defense, 2023), in addition to four precursor compounds to aid in identification of PFAS release areas (NEtFOSAA, NMeFOSAA, 8:2 FTS, and 6:2 FTS). RSC surface soil samples will be collected in accordance with the procedures presented in **Worksheet #14** and further detailed in *SOP 3-21: Surface and Subsurface Soil Sampling Procedures* (**Appendix D**).

Based on the results of the designated RSC surface soil samples, additional RSC surface soil sampling may continue with “step-out” locations until the data are sufficient to allow for source area identification. RSC surface soil data is considered adequate when a local release area has been identified or decreasing concentrations in surface soil are observed in the four cardinal directions away from an area of elevated surface soil concentrations. Once the release areas are identified, the locations of the SUs will be selected for surface and subsurface soil characterization of the release areas, as defined in **Section 17.2**. Additionally, downgradient permanent monitoring wells will be selected, as defined in **Section 17.3**.

DPT Boring Transects

Transects of vertical subsurface borings oriented perpendicular to the direction of groundwater flow will be drilled via DPT at AOI 1, AOI 2, and AOI 3. The orientation of transects is subject to change based on the results of synoptic gauging on newly installed monitoring wells. Transects will be comprised of groundwater grab borings and multi-interval vertical profile borings. Groundwater grab borings will be drilled to the water table, multi-interval vertical profile borings will be drilled to a depth of either 50 feet bgs or refusal (whichever is reached first).Transect boring locations are show on **Figure 17-1**, the rationale for groundwater transect samples is provided in **Table 17-3**, the rationale for soil transect samples is provided in **Table 17-4**. If field conditions make a proposed transect boring location infeasible, an alternate location that aligns with the project's DQO's will be used instead.

Soil samples will be collected at every transect boring during the Prescriptive Phase. Macro-Core tooling (or equivalent) will be used to collect continuous soil cores to target depth; however, an air knife and hand auger will be used to clear the top 5 feet of the boring in accordance with AECOM utility clearance protocols. Up to three soil samples will be collected from each boring: one surface soil sample (0 to 2 feet bgs), one intermediate subsurface soil sample between 2 feet bgs and the groundwater table, and one intermediate subsurface sample approximately 2 feet above the groundwater table. The number of soil samples collected at each boring will be dependent upon depth to water at the boring. Soil samples will be collected in accordance with the procedures presented in **Worksheet #14** and further detailed in *SOP 3-21: Surface and Subsurface Soil Sampling Procedures* (**Appendix D**).

Groundwater grab borings will be drilled to the water table where one grab groundwater sample will be collected from the shallow groundwater. At multi-interval vertical profile borings three groundwater samples will be collected starting at the water table and advanced in 20-foot intervals to a depth of 50 feet or refusal. Groundwater samples will be collected in accordance with the procedures presented in **Worksheet #14** and further detailed in *SOP 3-37: Grab Groundwater Sampling Techniques* (**Appendix D**).

The boring transect at AOI 3 will be drilled immediately downgradient of the previous location of the stockpiled soil at the facility boundary. The AOI 3 boring transect will only contain groundwater grab borings and served to document if PFAS impacts are moving from AOI 3 off of the facility. The boring transect at AOI 2 will be drilled approximately 300 feet to the west of the SI sample locations and contain two groundwater grab borings and one multi-interval vertical profile boring. This transect will serve to document PFAS impacts leaving AOI 2, as well as to capture groundwater conditions upgradient of AOI 1. Soil and grab groundwater samples collected from AOI 2 and AOI 3 transect borings will be analyzed for PFAS by ASTM D8421.

A series of three boring transects will be drilled at AOI 1 starting in the grassy area west of the Aircraft Maintenance Hangar, moving west towards the western most facility boundary. These transects will serve to vertically and laterally delineate both soil and groundwater impacts originating in the Hangar Release area, refine plume geometry, and assess off-facility plume migration. All AOI 1 transect borings will be a combination of groundwater grab and multi-interval vertical profile borings. Multi-interval vertical profile borings are strategically placed in each transect to be directly downgradient from the highest PFOS concentration in observed groundwater during the SI. Soil and grab groundwater samples collected from AOI 1 transect borings will be collected using RSC methods.

RSC groundwater and soil samples will be analyzed for a shortlist of fourteen PFAS by ASTM D8421 as specified in **Worksheet #15**, under rapid 48-hour TAT. The fourteen PFAS included in the shortlist are the compounds for which OSD has established SLs (Assistant Secretary of Defense, 2023), in addition to four precursor compounds (NEtFOSAA, NMeFOSAA, 8:2 FTS, and 6:2 FTS) and two carboxylic acids frequently detected in SI groundwater data (PFPeA, and PFHpA).

The proposed RSC program at AOI 1 will begin at the eastern most transect, closest to the Aircraft Maintenance Hangar, and move downgradient one transect at a time. This iterative approach will allow for real time data driven adjustments of downgradient transect boring locations and sampling depths based on upgradient RSC results. The RSC groundwater sampling will accelerate plume refinement in the Prescriptive Phase and provide a quick assessment of whether off-facility sampling will be required in the Adaptive Phase. This in turn will allow for the Adaptive Phase ROE and FAA notification process to be started early.

Based on the results of the RSC samples at each boring, additional RSC sampling may continue with deeper samples at an existing boring location, or with "step-out' locations until the data are sufficient to allow release area identification and plume refinement within the facility boundaries.

Surface Water and Sediment Sampling

Surface water, and sediment samples will be collected from the drainage ditch along the southern boundary of the facility. The stormwater system at the leased portion of the facility directs surface runoff from the runway to a drainage ditch along the southern boundary. The runoff then travels south around ALB Runway 1, flows west-northwest, converges with Ann Lee Pond, Shaker's Creek, and finally discharges into the Mohawk River. Stormwater from the Aircraft Maintenance Hangar 1 and the vehicle parking area on the southeastern portion of the leased area is also routed to the drainage ditch along the southern boundary. Therefore, PFAS released at the Albany AASF #3 may be transported via stormwater or surface runoff to the drainage ditch.

Three co-located surface water and sediment sample locations within the drainage ditch will be collected during the Prescriptive Phase to evaluate potential off-facility, and facility impacts to the drainage ditch. If standing water is present in the drainage ditch along the southern boundary of the facility at the time of sampling, the two co-located surface water and sediment samples may be collected and analyzed for PFAS (USEPA Method 1633A). If standing water is not present,

then two soil (ephemeral sediment) samples will be collected from the ditch and analyzed for PFAS.

As discussed in the Risk Assessment Work Plan (**Appendix D**), the results of these Prescriptive Phase samples, if collected, will be used to assess the need for additional surface water and sediment sampling during the Adaptive Phase. If additional data are deemed necessary and collected during the Adaptive Phase, applicable USEPA Method 1633A data will be used in both the HHRA and the ERA.

The approximate locations of the surface water, and sediment samples are shown on **Figure 17-1**; however, the locations may be adjusted at the time of sampling based on field conditions. The rationale for the sample locations and sample depths are provided in **Table 17-5**. Surface water, and sediment samples will be analyzed under standard TAT for the target list of 40 PFAS by LC/MS/MS compliant with USEPA Method 1633A, as specified in **Worksheet #15**.The procedures for the collection of surface water, and sediment samples are presented in **Worksheet #14**. The sampling procedures are further detailed in *SOP 3-10: Surface Water Sampling*, *SOP 3-22: Sediment Sampling* (**Appendix D**).

17.2 Adaptive Phase Approach

The Adaptive Phase approach, following the Prescriptive Phase, will be designed to meet the RI objectives outlined in **Worksheet #11**. Data collected during the Prescriptive Phase will be used to refine the CSM and use a data driven approach to meet delineation needs and support risk assessment in the Adaptive Phase.

The primary objectives of the Adaptive Phase approach will include the following:

- Delineation of soil release areas and collection of necessary soil data for risk assessments through the establishment of Soil Sampling Units based on Prescriptive Phase RSC surface soil data;
- The closure of remaining on-facility data gaps not addressed during the Prescriptive Phase;
- Evaluation of the need for off-facility soil and groundwater data collection, and execution if necessary;
- Evaluation of the need for additional surface water and sediment sampling, and execution if necessary;

A Field Planning Request memo will be utilized to document the technical approach and rationale for the Adaptive Phase.

Soil Sampling Units

Surface soil characterization of the PFAS release areas will be completed using a sampling grid approach within SUs. The SUs were designed to refine the nature and extent of PFAS in soil at each release area, calculate robust exposure point concentrations (EPCs) during the human health and ecological risk assessments, and define more precise boundaries for potential response actions during the FS, if warranted. Representative exposure areas for all risk scenarios, human and ecological, will be considered in determining the size of the SUs.

Following completion of the RSC of groundwater and surface soil during the Prescriptive Phase, additional surface soil samples within the AOI 1 RSC grids will be located based on the data collected. The SU grids will be centered on the highest detected concentrations from the RSC

surface soil sampling results. If field conditions make a proposed SU boring location infeasible, an alternate location that aligns with the project's DQO's will be used instead.

Within each SU, an unbiased statistical soil sampling plan will be generated using VSP version 7 software (VSP Development Team, 2020). For each SU, samples will be collected from a total of 12 locations, as recommended by the ProUCL guidance document (USEPA, 2015) that recommends a minimum of 8 to 10 samples should be collected to provide a robust estimate of the 95% UCL. The 95% UCL is often used as an estimate of EPC for risk assessments or other environmental characterizations. The locations of these 12 samples are placed on a systematic triangular grid with a random start location to minimize bias and maximize spatial coverage and representativeness. The VSP software projected a sample size of 12 that provides at least 95% confidence level and 90% to 95% power of detection to detect an average of one standard deviation difference for a data set that follows a normal distribution (i.e., parametric). If a non-parametric distribution is assumed, the aforementioned statistical error rates are expected to be moderately reduced.

As discussed in the Risk Assessment Work Plan (**Appendix D**), SUs within an AOI may be evaluated as separate exposure areas in the risk assessment if PFAS concentrations within the SUs result in a higher EPC than the overall AOI and the exposure potential in the SU is different from the larger AOI. The soil sampling design was established such that the size and number of samples per SU shall be sufficient for calculation of a SU-specific 95% UCL in the case that an SU is determined to be the appropriate exposure area based on a review of the analytical data.

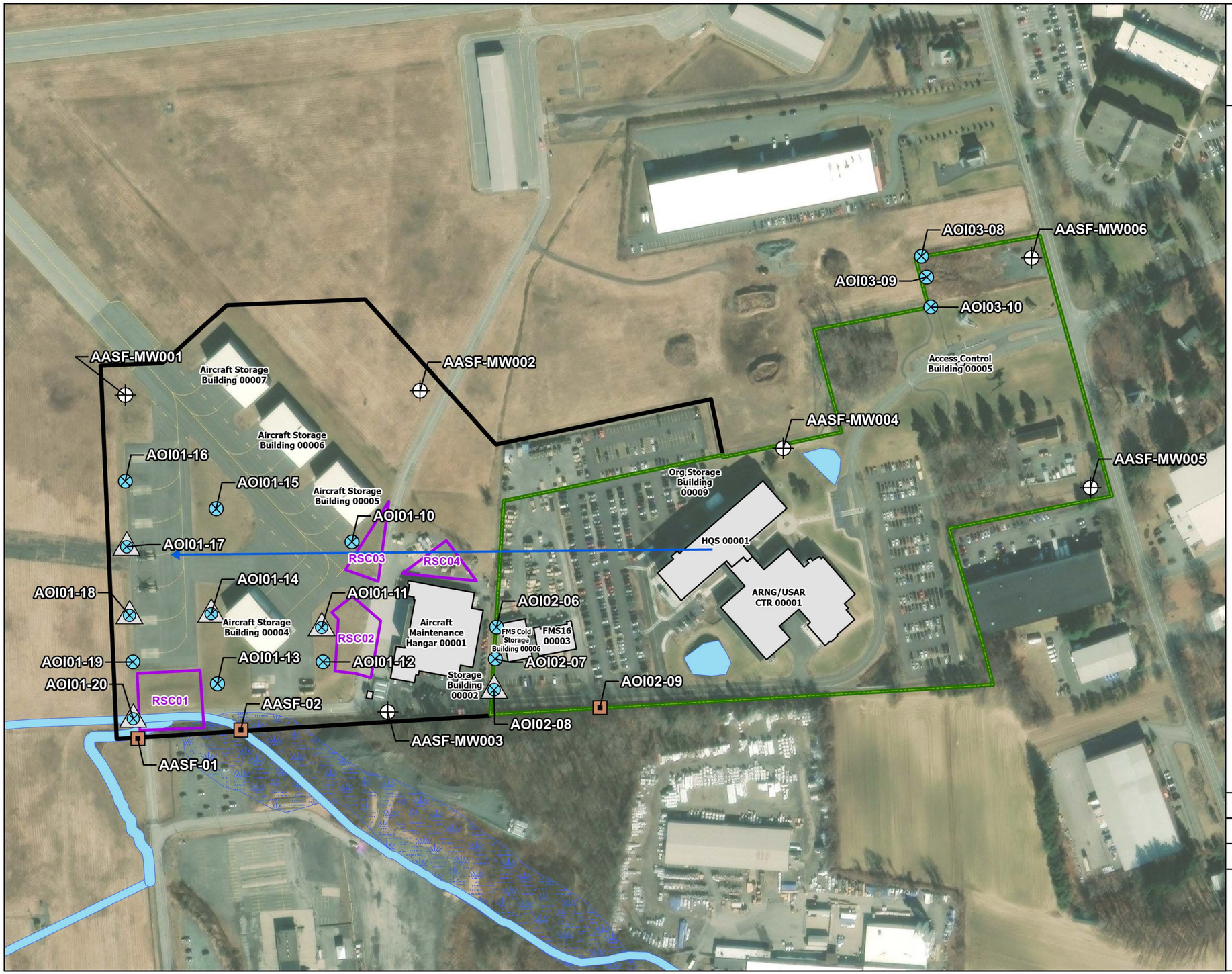
Borings will be advanced using hand augers and used to collect continuous soil cores to the target depth. A total of three soil samples will be collected from each boring: two surface soil samples (0 to 0.5 feet bgs; 0.5 to 2 feet bgs), and one subsurface soil sample (2 to 4 feet bgs). Soil samples will be collected in accordance with the procedures presented in **Worksheet #14**.

Specific sampling locations and counts will be detailed after analysis of the Prescriptive Phase data and presented in a subsequent Field Planning Request memo. Soil samples will be analyzed under standard TAT for the target list of 40 PFAS by LC/MS/MS compliant with USEPA Method 1633A, as specified in **Worksheet #15**. Additionally, other geochemical and physical parameters will be analyzed in a subset of samples to support evaluation of PFAS fate and transport, in addition to the remedial alternatives analysis.

17.3 Final Characterization and Monitoring Approach

The final Characterization and Monitoring approach, the last phase, will be designed to meet the RI objectives outlined in **Worksheet #11**. Data collected during the previous phases of work providing a local groundwater perspective, will be used to design and install a long-term groundwater monitoring well network. Hydraulic conductivity testing may be performed during this phase to estimate rates of groundwater flow, responses of aquifers to applied stresses, the rate of movement of PFAS in subsurface zones, and to construct and calibrate groundwater flow models.

A Field Planning Request memo will be utilized to document the technical approach and rationale for the Final Characterization and Monitoring Phase.



Legend

- Proposed Monitoring Well
- Proposed Soil Boring/Grab Groundwater
- Proposed Vertical Profiling Boring
- Proposed Surface Water/Sediment
- Proposed RSC Grids
- Leased Property Boundary
- New York State Owned Parcel
- Water Body
- Wetland
- River/Stream
- Groundwater Flow Direction

N

0 125 250 500 Feet

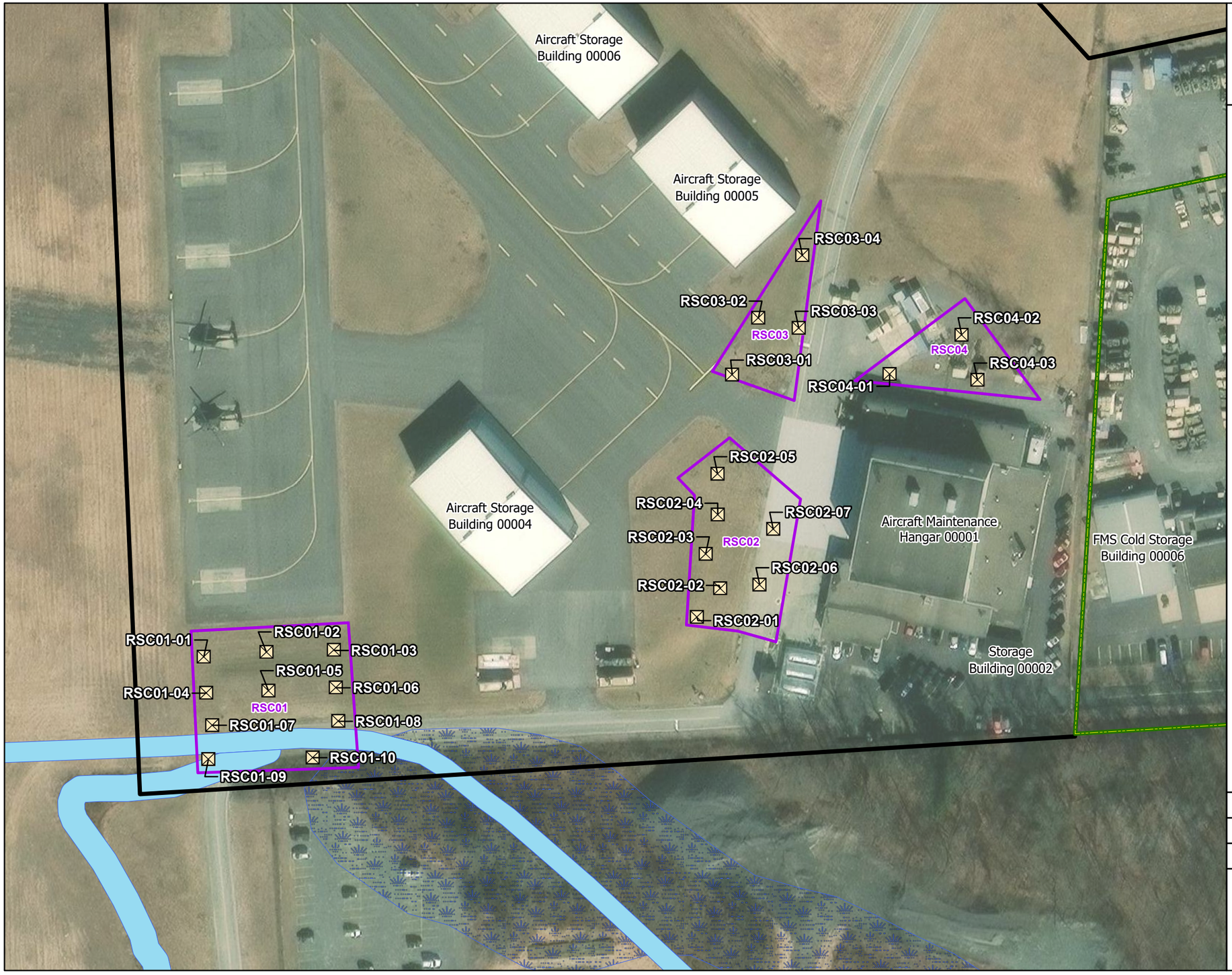
Service Credits: New York State, Maxar, Microsoft

ARNG

Remedial Investigation at Albany AASF #3, New York

Date: 2/20/2025

Figure 17-1
Prescriptive Phase Remedial Investigation
Proposed Sample Locations



Legend

- Proposed Surface Soil Sample
- Proposed RSC Grids
- Leased Property Boundary
- New York State Owned Parcel
- Water Body
- Wetland

N

0 50 100 200 Feet

Service Credits: New York State, Maxar, Microsoft

ARNG

Remedial Investigation at Albany AASF #3, New York

Date: 2/18/2025

Figure 17-2
Remedial Investigation Proposed RSC Surface Soil Sample Locations

Table 17-1 Prescriptive Phase Permanent Monitoring Well Design and Rationale

Location Identifier[1]	Monitoring Well Identifier	Well Status[2]	Target Screen Interval (feet bgs)[3]	Sample Identifier	Number of Samples	Matrix	Sampling Tool	Analyte Group	Rationale
AASF-MW001	AASF-MW001-[total depth]	Proposed	Top of Groundwater	AASF-MW001-[total depth]-[MMDDYY]	1	Groundwater	Peristaltic Pump or PFAS-Free Geotch Bladder Pump	PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	Proposed monitoring well locations will serve to document PFAS concentrations at the facility's boundaries providing valuable data on potential off-facility sources, provide a refined understanding of shallow groundwater flow at the facility via triangulation and provide long-term groundwater monitoring locations for the facility. Monitoring well locations have been strategically chosen for groundwater elevation triangulation, to capture impacts from suspected off-facility source areas, and to comply with the facility and FAA requests/requirements.
AASF-MW002	AASF-MW002-[total depth]	Proposed	Top of Groundwater	AASF-MW002-[total depth]-[MMDDYY]	1				
AASF-MW003	AASF-MW003-[total depth]	Proposed	Top of Groundwater	AASF-MW003-[total depth]-[MMDDYY]	1				
AASF-MW004	AASF-MW004-[total depth]	Proposed	Top of Groundwater	AASF-MW004-[total depth]-[MMDDYY]	1				
AASF-MW005	AASF-MW005-[total depth]	Proposed	Top of Groundwater	AASF-MW005-[total depth]-[MMDDYY]	1				
AASF-MW006	AASF-MW006-[total depth]	Proposed	Top of Groundwater	AASF-MW006-[total depth]-[MMDDYY]	1				
				Total (not including QC)	**6**				

Notes:
1. Proposed monitoring well locations are shown on **Figure 17-1**.
2. Proposed monitoring wells will be installed using a GeoProbe® 7822DT drill rig, or similar type of rig, capable of both DPT and HSA drilling.
3. The screen interval is approximate and may be adjusted based on field conditions at the time of monitoring well installation.

Abbreviations:
AASF = Army Aviation Support Facility
ASTM = American Society for Testing and Materials
bgs = below ground surface
DPT = Direct Push Technology
HSA = Hollow Stem Auger
MW = Monitoring Well
PFAS = per- and polyfluoroalkyl substances
QC = quality control
QSM = Quality Systems Manual
USEPA = United States Environmental Protection Agency

Table 17-2: Prescriptive Phase RSC Surface Soil Sampling Design and Rationale

Target Area[1,2]	Location Identifier[2]	Sample Identifier	Number of Samples	Target Sample Depth (feet bgs)	Matrix	Sampling Tool	Analyte Group	Rationale[4,5]
RSC01	RSC01-SB01	RSC01-SB01-00-02	10	0-2 feet bgs	Surface Soil	Hand Auger	PFAS, Target PFAS, Target 12 Compound List (ASTM D8421)[3] Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	Evaluate the horizontal extent of PFAS at AOI 1 SI location AOI01-01-SB, where PFOS was detected in surface soil at 7.45 µg/kg. Although this concentration does not exceed the SL of 13 µg/kg, the sample location is over 400 feet southwest of the estimated bounds of the AASF #3 Hangar release. The nearest SI sample location, AOI01-02-SB, approximately 400 feet east of AOI01-01-SB, has a PFOS concentration of 0.538J µg/kg in surface soil. Additionally, historical aerials show land surface disturbance, distressed soil, and vehicle activity near AOI01-01-SB. Given the PFOS concentrations at AOI01-01-SB, its isolated location, the concentration at the nearest SI soil sample, and historical aerials, further investigation at grid RSC01 is warranted.
	RSC01-SB02	RSC01-SB02-00-02						
	RSC01-SB03	RSC01-SB03-00-02						
	RSC01-SB04	RSC01-SB04-00-02						
	RSC01-SB05	RSC01-SB05-00-02						
	RSC01-SB06	RSC01-SB06-00-02						
	RSC01-SB07	RSC01-SB07-00-02						
	RSC01-SB08	RSC01-SB08-00-02						
	RSC01-SB09	RSC01-SB09-00-02						
	RSC01-SB10	RSC01-SB10-00-02						
RSC02	RSC02-SB01	RSC02-SB01-00-02	7	0-2 feet bgs				Evaluate the horizontal extent of PFAS in shallow soil at the presumed location of the AOI 1 AASF #3 Hangar releases onto the tarmac and nearby grass, guided by SI soil sample locations AOI01-04-SB and AOI01-08-SB, where surface soil results exceeded SLs for PFOS at 60.1 µg/kg and 14.1 µg/kg, respectively. The bounds of RSC grid RSC02 are defined by areas where soil was not reworked during hangar construction, as observed in aerial photography.
	RSC02-SB02	RSC02-SB02-00-02						
	RSC02-SB03	RSC02-SB03-00-02						
	RSC02-SB04	RSC02-SB04-00-02						
	RSC02-SB05	RSC02-SB05-00-02						
	RSC02-SB06	RSC02-SB06-00-02						
	RSC02-SB07	RSC02-SB07-00-02						
RSC03	RSC03-SB01	RSC03-SB01-00-02	4	0-2 feet bgs				Evaluate and confirm the horizontal extent of PFAS in shallow soil at and north of the presumed location of the AOI 1 AASF #3 Hangar releases onto the tarmac and nearby grass, driven by SI soil sample location AOI01-05-SB where PFOS was detected at a concentration of 6.4 µg/kg in surface soil. The bounds of RSC grid RSC03 are defined by areas where soil was not reworked during hangar construction, as observed in aerial photography.
	RSC03-SB02	RSC03-SB02-00-02						
	RSC03-SB03	RSC03-SB03-00-02						
	RSC03-SB04	RSC03-SB04-00-02						
RSC04	RSC04-SB01	RSC04-SB01-00-02	3	0-2 feet bgs				Evaluate and confirm the lateral extent of PFAS in shallow soil northeast of the presumed location of the AOI 1 AASF #3 Hangar releases, driven by driven by SI soil sample location AOI01-06-SB where PFOS was detected at a concentration of 6.33 µg/kg in surface soil. The bounds and size of RSC grid RSC04 are driven by surrounding structures and available permeable surfaces.
	RSC04-SB02	RSC04-SB02-00-02						
	RSC04-SB03	RSC04-SB03-00-02						
		Total (not including QC)	**24**					

Notes:

1. During the Perscriptive Phase, RSC surface soil samples are only proposed within AOI 1.
2. Proposed RSC grid locations (RSC01, RSC02, RSC03, RSC04) are shown on **Figure 17-1** and **17-2**. Individual RSC sample locations within each grid are only shown on **Figure 17-2**.
3. RSC surface soil samples will be analyzed for a shortlist of twelve PFAS (HFPO-DA, PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS, NEtFOSAA, 6:2 FTS, NMeFOSAA, and 8:2 FTS) by ASTM D8421 under rapid 48-hour TAT.
4. Additional RSC surface soil sampling may continue with "step-out" locations until data are sufficient for source area identification. Further details are provided in **Worksheet #17**.
5. Historical aerial photography was sourced from Google Earth (Google Earth Aerial Imagery).

Abbreviations:

AASF = Army Aviation Support Facility
AOI = area of interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
HFPO-DA = hexafluoropropylene oxide dimer acid
NEtFOSAA = N-ethyl perfluorooctane sulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctane sulfonamidoacetic acid
PFAS = per- and polyfluoroalkyl substances
PFBA = perfluorobutanoic acid
PFBS = perfluorobutane sulfonic acid
PFHxA = perfluorohexanoic acid
PFHxS = perfluorohexane sulfonic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonic acid
QC = quality control
QSM = Quality Systems Manual
RSC = rapid site characterization
SB = Soil
SI = Site Inspection
SL = Screening Level
TAT = turnaround time
USEPA = United States Environmental Protection Agency
µg/kg = microgram per kilogram
6:2 FTS = 6:2 fluorotelomer sulfonate
8:2 FTS = 8:2 fluorotelomer sulfonate

Table 17-3 Prescriptive Phase DPT Boring Groundwater Sampling Design and Rationale

Location Identifier[1]	Sample Identifier	Target Sample Depth (feet bgs)	Number of Samples	Matrix	Sampling Tool	Analyte Group[3,4]	Rationale[5]
AOI01-10	AOI01-10-GW-[total depth]	Top of Groundwater	1	Groundwater	DPT Screen-Point Sampler	RSC PFAS, Target 14 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	AOI01-10 will evaluate the lateral extent of PFAS in shallow groundwater downgradient of SI sample location AOI01-05-GW where PFOS concentrations, exceeding the SL, were observed at 1,190 ng/L. AOI01-11 will evaluate both the vertical and lateral extent of PFAS in groundwater downgradient of SI sample location AOI01-04-GW where PFOS concentrations, exceeding the SL, were observed at 15,000 ng/L, the highest PFOS concentration observed across the entire facility. AOI01-12 will evaluate the lateral extent of PFAS in shallow groundwater downgradient of SI sample location AOI01-03-GW where PFOS concentrations, exceeding the SL, were observed at 95.8 ng/L. Proposed locations AOI01-10, AOI01-11, and AOI01-12 have strategically been placed in a transect downgradient and oriented perpendicular to the understood direction of shallow groundwater flow in order to vertically and laterally capture PFAS impacts directly downgradient of the AOI 1 AASF #3 Hangar release area. The use of RSC analytical groundwater methods at these locations will allow for the rapid assessment and execution of vertical or lateral step-outs, if warranted. Additionally, within AOI 1 these three locations will be completed first as they are the closest to the AOI 1 AASF #3 Hangar release area, and will inform the placement and movement of the subsequent transects which are further downgradient of the AOI 1 AASF #3 Hangar release area.
AOI01-11	AOI01-11- GW-[total depth]	Top of Groundwater	3				
	AOI01-11- GW-[total depth]	20 feet below Top of Groundwater					
	AOI01-11- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI01-12	AOI01-12- GW-[total depth]	Top of Groundwater	1				
AOI01-13	AOI01-13- GW-[total depth]	Top of Groundwater	1			RSC PFAS, Target 14 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	AOI01-13, AOI01-14, and AOI01-15 have been placed in a transect downgradient and oriented perpendicular to the understood direction of shallow groundwater flow of the initial upgradient AOI01-10/AOI01-11/AOI01-12 transect. This transect will provide downgradient lateral and vertical step-outs from the AOI01-10/AOI01-11/AOI01-12 transect providing further delineation of PFAS in groundwater. This transect will be completed second, after the completion of the AOI01-10/AOI01-11/AOI01-12 transect. RSC results from the AOI01-10/AOI01-11/AOI01-12 will be used to refine the locations and sample intervals of the AOI01-13/AOI01-14/AOI01-15 transect borings as needed.
AOI01-14	AOI01-14- GW-[total depth]	Top of Groundwater	3				
	AOI01-14- GW-[total depth]	20 feet below Top of Groundwater					
	AOI01-14- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI01-15	AOI01-15- GW-[total depth]	Top of Groundwater	1				
AOI01-16	AOI01-16- GW-[total depth]	Top of Groundwater	1			RSC PFAS, Target 14 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	AOI01-16, AOI01-17, AOI01-18, AOI01-19, and AOI20 have strategically been placed in a transect perpendicular to groundwater flow at the eastern most edge of the facility boundary, and downgradient of all previously installed transects at AOI 1. The AOI01-16/AOI01-17/AOI01-18/AOI01-19 transect will be the last transect installed at AOI 1 and will act in tandem with monitoring well AASF-MW001 to create a transect that covers the entire eastern most boundary of the facility. This transect will capture vertical and lateral impacts of PFAS leaving the facility, refine understand of the plume core, provide a transect downgradient of the two upgradient at AOI 1, and capture impacts from other parts of the facility or other source areas that may be reaching groundwater at the facility boundary. Additionally, AOI01-20 will vertically delineate SI PFOS exceedances observed in shallow groundwater at AOI01-01 of 533 ng/L.
AOI01-17	AOI01-17- GW-[total depth]	Top of Groundwater	3				
	AOI01-17- GW-[total depth]	20 feet below Top of Groundwater					
	AOI01-17- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI01-18	AOI01-18- GW-[total depth]	Top of Groundwater	3				
	AOI01-18- GW-[total depth]	20 feet below Top of Groundwater					
	AOI01-18- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI01-19	AOI01-19- GW-[total depth]	Top of Groundwater	1				
AOI01-20	AOI01-20- GW-[total depth]	Top of Groundwater	3				
	AOI01-20- GW-[total depth]	20 feet below Top of Groundwater					
	AOI01-20- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI02-06	AOI02-06- GW-[total depth]	Top of Groundwater	1			PFAS, Target 40 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	AOI02-06, AOI02-07, and AOI02-08 have strategically been placed in a transect downgradient and oriented perpendicular to the understood direction of shallow groundwater flow in order to vertically and laterally capture PFAS impacts directly downgradient of the AOI 2 Garbage Truck Fire release area. In addition to capturing PFAS impacts directly downgradient of the AOI 2 Garbage Truck Fire, the AOI02-06/AOI02-07/AOI02-08 transect will capture PFAS concentrations in groundwater upgradient of the AOI 1 AASF #3 Hangar release area, providing insight into relative source contribution the facility's PFAS groundwater plume. Proposed boring locations in this transect have been chosen to avoid utilities as AOI 2 is in a relatively densely developed part of the facility.
AOI02-07	AOI02-07- GW-[total depth]	Top of Groundwater	1				
AOI02-08	AOI02-08- GW-[total depth]	Top of Groundwater	3				
	AOI02-08- GW-[total depth]	20 feet below Top of Groundwater					
	AOI02-08- GW-[total depth]	40 feet below Top of Groundwater[2]					
AOI03-08	AOI03-08- GW-[total depth]	Top of Groundwater	1				
AOI03-09	AOI03-09- GW-[total depth]	Top of Groundwater	1				AOI03-08, AOI03-09, AOI03-10 have strategically been placed in a transect downgradient and oriented perpendicular to the understood direction of shallow groundwater flow at the soil stockpile's eastern facility boundary. This transect will evaluate the lateral extent of PFAS leaving the facility boundary in shallow groundwater.
AOI03-10	AOI03-10- GW-[total depth]	Top of Groundwater	1				
		Total (not including QC)	**29**				

Notes:
1. Proposed boring locations are shown on **Figure 17-1**.
2. The deepest groundwater sampling interval will be collected from 40 feet below the top of the groundwater surface or at the depth of DPT refusal, whichever is reached first.
3. RSC groundwater samples are only proposed within AOI 1. Groundwater samples collected from AOI 2, and AOI 3 will be analyzed under standard turnaround times.
4. RSC groundwater samples will be analyzed for a shortlist of fourteen PFAS (HFPO-DA, PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS, PFPeA, PFHpA,NEtFOSAA, 6:2 FTS, NMeFOSAA, and 8:2 FTS) by ASTM D8421 under rapid 48-hour TAT.
5. SI sample locations are shown on **Figure 10-7**.

Abbreviations:
AASF = Army Aviation Support Facility
AOI = area of interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
GW = groundwater
HFPO-DA = hexafluoropropylene oxide dimer acid
NEtFOSAA = N-ethyl perfluorooctane sulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctane sulfonamidoacetic acid
PFAS = per- and polyfluoroalkyl substances
PFBA = perfluorobutanoic acid
PFBS = perfluorobutane sulfonic acid
PFHpA = perfluoroheptanoic acid
PFHxA = perfluorohexanoic acid
PFHxS = perfluorohexane sulfonic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonic acid
PFPeA = perfluoropentanoic acid
QC = quality control
QSM = Quality Systems Manual
RSC = rapid site characterization
SB = Soil
SI = Site Inspection
SL = Screening Level
TAT = turnaround time
USEPA = United States Environmental Protection Agency
µg/kg = microgram per kilogram
6:2 FTS = 6:2 fluorotelomer sulfonate
8:2 FTS = 8:2 fluorotelomer sulfonate

Table 17-4 Prescriptive Phase DPT Boring Soil Sampling Design and Rationale

Location Identifier[1]	Sample Identifier	Target Sample Depth (feet bgs)[2]	Number of Samples[3]	Matrix	Sampling Tool[4]	Analyte Group[5,6]	Rationale[7]
AOI01-10	AOI01-10- SB-00-02	0 - 2	3	Subsurface Soil	Hand Auger	RSC PFAS, Target 14 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	Define the horizontal and vertical extent of PFAS in the vadose zone at AOI 1. Soil samples are co-located with groundwater samples in transect borings. For further rationale on placement of each boring refer to Table 17-2.
	AOI01-10- SB-[start depth]-[end depth]	Intermediate			DPT Macro-Core Sampler		
	AOI01-10- SB-[start depth]-[end depth]	Above Water Table					
AOI01-11	AOI01-11- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-11- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-11- SB-[start depth]-[end depth]	Above Water Table					
AOI01-12	AOI01-12- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-12- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-12- SB-[start depth]-[end depth]	Above Water Table					
AOI01-13	AOI01-13- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-13- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-13- SB-[start depth]-[end depth]	Above Water Table		Subsurface Soil			
AOI01-14	AOI01-14- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-14- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-14- SB-[start depth]-[end depth]	Above Water Table					
AOI01-15	AOI01-15- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-15- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-15- SB-[start depth]-[end depth]	Above Water Table					
AOI01-16	AOI01-16- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-16- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-16- SB-[start depth]-[end depth]	Above Water Table					
AOI01-17	AOI01-17- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-17- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-17- SB-[start depth]-[end depth]	Above Water Table					
AOI01-18	AOI01-18- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-18- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-18- SB-[start depth]-[end depth]	Above Water Table					
AOI01-19	AOI01-19- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-19- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-19- SB-[start depth]-[end depth]	Above Water Table					
AOI01-20	AOI01-20- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI01-20- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI01-20- SB-[start depth]-[end depth]	Above Water Table					

Table 17-4 Prescriptive Phase DPT Boring Soil Sampling Design and Rationale

Location Identifier[1]	Sample Identifier	Target Sample Depth (feet bgs)[2]	Number of Samples[3]	Matrix	Sampling Tool[4]	Analyte Group[5,6]	Rationale[7]
AOI02-06	AOI02-06- SB-00-02	0 - 2	3	Subsurface Soil	Hand Auger	PFAS, Target 40 Compound List (ASTM D8421) Limited Sample Selection (10% of samples): PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24)	Define the horizontal and vertical extent of PFAS in the vadose zone at AOI 2. Soil samples are co-located with groundwater samples in transect borings. For further rationale on placement of each boring refer to Table 17-2.
	AOI02-06- SB-[start depth]-[end depth]	Intermediate			DPT Macro-Core Sampler		
	AOI02-06- SB-[start depth]-[end depth]	Above Water Table					
AOI02-07	AOI02-07- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI02-07- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI02-07- SB-[start depth]-[end depth]	Above Water Table					
AOI02-08	AOI02-08- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI02-08- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI02-08- SB-[start depth]-[end depth]	Above Water Table					
AOI03-08	AOI03-08- SB-00-02	0 - 2	3	Subsurface Soil	Hand Auger		Define the horizontal and vertical extent of PFAS in the vadose zone at AOI 3. Soil samples are co-located with groundwater samples in transect borings. For further rationale on placement of each boring refer to Table 17-2.
	AOI03-08- SB-[start depth]-[end depth]	Intermediate			DPT Macro-Core Sampler		
	AOI03-08- SB-[start depth]-[end depth]	Above Water Table					
AOI03-09	AOI03-09- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI03-09- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI03-09- SB-[start depth]-[end depth]	Above Water Table					
AOI03-10	AOI03-10- SB-00-02	0 - 2	3	Surface Soil	Hand Auger		
	AOI03-10- SB-[start depth]-[end depth]	Intermediate		Subsurface Soil	DPT Macro-Core Sampler		
	AOI03-10- SB-[start depth]-[end depth]	Above Water Table					
		Total (not including QC)	**51**				

Notes:
1. Proposed boring locations are shown on **Figure 17-1**.
2. The intermediate soil sample will be collected at the midway point between 2 feet bgs and the water table soil sample.
3. Up to 3 soil samples will be collected from each boring, this will be dependent on the depth to water at each boring location. At locations where the water table is very shallow, it is likley that all 3 soil samples won't be collected.
4. All borings will be hand-cleared to 5 feet bgs using a hand auger in accordance with the A2P JV's utility clearance procedures. As such, at locations where the water table is very shallow, the intermediate sample may also be collected via hand auger.
5. RSC soil samples are only proposed within AOI 1. Soil samples collected from AOI 2, and AOI 3 will be analyzed under standard turnaround times.
6. RSC soil samples will be analyzed for a shortlist of fourteen PFAS (HFPO-DA, PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, PFOS, PFPeA, PFHpA,NEtFOSAA, 6:2 FTS, NMeFOSAA, and 8:2 FTS) by ASTM D8421 under rapid 48-hour TAT.
7. For further rationale on placement of each boring refer to **Table 17-2**.

Abbreviations:
AASF = Army Aviation Support Facility
AOI = area of interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
HFPO-DA = hexafluoropropylene oxide dimer acid
NEtFOSAA = N-ethyl perfluorooctane sulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctane sulfonamidoacetic acid
PFAS = per- and polyfluoroalkyl substances
PFBA = perfluorobutanoic acid
PFBS = perfluorobutane sulfonic acid
PFHpA = perfluoroheptanoic acid
PFHxA = perfluorohexanoic acid
PFHxS = perfluorohexane sulfonic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonic acid
PFPeA = perfluoropentanoic acid
QC = quality control
QSM = Quality Systems Manual
RSC = rapid site characterization
SB = Soil
SI = Site Inspection
SL = Screening Level
TAT = turnaround time
USEPA = United States Environmental Protection Agency
6:2 FTS = 6:2 fluorotelomer sulfonate
8:2 FTS = 8:2 fluorotelomer sulfonate

Table 17-5: Surface Water and Sediment Sampling Design and Rationale

Target Area	Location Identifier	Surface Water Sample Identifier	Sediment Sample Identifier	Number of Sample Locations	Target Sample Depth (feet bgs)	Matrix	Sampling Tool	Analyte Group	Rationale
AO101	AASF-01	AASF-01-SW-[start depth]-[end depth]	AASF-01-SD-[start depth]-[end depth]	1	**Surface Water:** middle of water column **Sediment: 0-0.5**	Surface Water & Sediment	**Surface Water:** Peristaltic Pump or Dip Sampler **Sediment:** Coring Device	**Surface Water:** PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24) **Sediment:** PFAS, Target 40 Compound List (USEPA Method 1633, QSM 5.4 Table B-24) Limited Sample Selection (Estimated 1 Total; Location TBD): TOC (USEPA Method 9060A) pH (USEPA Method 9045D) Grain Size/Clay Content (ASTM D-422)	Evaluate surface water and sediment within the drainage feature at the southeastern portion of the facility, if water is present. Final locations will be selected based on field observations to identify the low points and visible stream pathways at the time of sampling.
AO101	AASF-02	AASF-02-SW-[start depth]-[end depth]	AASF-02-SD-[start depth]-[end depth]	1					
AO102	AOI02-09	AOI02-09-SW-[start depth]-[end depth]	AOI02-09-SD-[start depth]-[end depth]	1					
			Total (not including QC)	**3**					

Abbreviations:
AASF = Army Aviation Support Facility
AOI = area of interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
PFAS = per- and polyfluoroalkyl substances
QC = quality control
QSM = Quality Systems Manual
SE = sediment
SW = surface water
TOC = Total Organic Carbon
USEPA = United States Environmental Protection Agency

Worksheets #19 & #30: Sample Containers, Preservation, and Hold Times

Laboratory: Eurofins Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17601
856-534-3953
List any required accreditations/certifications: DoD ELAP
Back-up Laboratory: Pace South Carolina
Sample Delivery Method: FedEx

Analyte/ Analyte Group	Matrix	Method/SOP	Accreditation Expiration Date	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Data Package Turnaround
PFAS	Aqueous	USEPA Method 1633A, QSM 6.0 Table B-24 / WI72427	DoD-ELAP: 11/30/2024	(2) 125-mL unpreserved, HDPE	Cool, 0-6°C Freeze, ≤ -20°C	28 days* 90 days*	28 days	Project Specific
PFAS	Solid	USEPA Method 1633A, QSM 6.0 Table B-24/ WI72427	DoD-ELAP: 11/30/2024	4 oz. PP specimen containers with polyethylene screw caps	None, 0-6°C	90 days*	28 days	Standard
Total Organic Carbon	Solid	SW-846 9060A/ WI11627	DoD-ELAP: 11/30/2024	4-oz glass jar	Cool, 0-6°C	NA	28 days	28 days
pH	Solid	SW-846 9045C modified; 29-22 WI11518	DoD-ELAP 11/30/2024	4-oz glass jar	Cool, 0-6°C	NA	NA	28 days
Grain Size	Solid	ASTM D422; WI11514	DoD-ELAP: 11/30/2024	16-oz glass jar	Cool, 0-6°C	NA	NA	28 days

Notes:

°C = degrees Celsius
ASTM = American Society for Testing and Materials
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
HDPE = high-density polyethylene
mL = milliliter
NA = not applicable
oz = ounce
PFAS = per- and polyfluoroalkyl substances
PP = polypropylene
QSM = Quality Systems Manual
SOP = standard operating procedure
USEPA = United States Environmental Protection Agency

Laboratory: Pace South Carolina
106 Vantage Point Drive
West Columbia, SC 29172
803-791-9700
List any required accreditations/certifications: DoD ELAP
Back-up Laboratory: NA
Sample Delivery Method: FedEx

Analyte/ Analyte Group	Matrix	Method/SOP	Accreditation Expiration Date	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Data Package Turnaround
PFAS	Aqueous	USEPA Method 1633A/ ENV-SOP-WCOL-0165	11/18/2025	HDPE w/ PP linerless cap 2 x 500 mL 1 x 125 mL	Cool, 0-6°C Freeze, ≤ -20°C	28 days* 90 days	90 days	28 days
PFAS	Aqueous	D8421/ D7968/ ENV-SOP-WCOL-0164	N/A (1)	PP w/PP linerless cap 3 x 15 mL PP (2)	Cool, 0-6°C Freeze, ≤ -20°C	28 days 90 days	28 days	48-hour upon agreement
PFAS	Solid	USEPA Method 1633A/ ENV-SOP-WCOL-0165	11/18/2025	1 x 2 oz	Cool, 0-6°C Freeze, ≤ -20°C	90 days*	90 days	21 days
PFAS	Solid	D8421/ D7968/ ENV-SOP-WCOL-0164	N/A (1)	90 mL PP	Cool, 0-6°C Freeze, ≤ -20°C	90 days	28 days	48-hour upon agreement
pH	Solid	9045D/ENV-SOP-WCOL-0149	11/18/2025	Polyethylene, Glass 1 x 2 oz	None, ≤6°C	NA	ASAP	21 days
Grain Size (Schnabel Engineering)	Solid	Standard Operating Procedure Grain Size Determined by Sedimentation Analysis (Hydrometer)/ ASTM D7928	N/A	1 – Gallon Ziploc	None, ≤6°C	6 Months	6 Months	28 days
TOC	Solid	Walkley-Black/ENV-SOP-WCOL-0149	11/18/2025	1 – 4 oz. Amber Glass	None, ≤6°C	N/A	28 days	21 days

Notes:

1) Validated in inter-laboratory study
2) For aqueous samples, do NOT fill the entire 15 mL tube. Each 15 mL container should contain 5 mL (± 1 mL) of sample volume.

°C = degrees Celsius
≤ = less than or equal to
< = less than
ASTM = American Society for Testing and Materials
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
HDPE = high-density polyethylene
LC/MS/MS = liquid chromatography tandem mass spectrometry
mL = milliliter
NA = not applicable
oz = ounce
PFAS = per- and polyfluoroalkyl substances
PP = polypropylene
QAPP = Quality Assurance Project Plan
QSM = Quality Systems Manual
SOP = standard operating procedure
TOC = total organic carbon

* In accordance with the recommendations from the DoD Environmental Data Quality Workgroup, as outlined in the memorandum dated March 27, 2025, results for analytes with shortened holding times will be qualified as follows: detects will be reported as estimated (J) and non-detects as estimated non-detects (UJ) if the 7-day holding time from sampling to preparation is exceeded for NMeFOSE, NEtFOSE, NMeFOSAA, and NEtFOSAA in aqueous matrices when samples are not stored at -20°C, and if the 3-day holding time is exceeded for NFDHA in solid matrices. Although exceeding the holding times introduces additional uncertainty, these results are suitable for decision-making purposes.

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Worksheet #20: Field Quality Control Summary

The table below provides a summary of the quantities of field QC samples to be collected. The remaining tables in **Worksheet #20** establish the Measurement Performance Criteria.

Matrix	Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Reagent Blanks	Equipment Rinsate Blanks[3]	Total Samples
Prescriptive Phase Samples								
Groundwater	PFAS, Screening[1]	29	3	1	1	1	1	36
	PFAS, Definitive[2]	9	1	1	1	0	1	13
Soil	PFAS, Screening[1]	78	8	4	5	1	3	99
	PFAS, Definitive[2]	8	1	1	1	0	1	12
	pH, TOC[4]	0	0	0	0	0	0	0
	Grain Size[4]	0	0	0	0	0	0	0
Surface Water	PFAS, Definitive[2]	2	1	1	1	0	1	6
Sediment	PFAS, Definitive[2]	2	1	1	1	0	1	6
	pH, TOC	1	1	1	1	0	1	5
	Grain Size	1	1	1	1	0	1	5
Decontamination Water	PFAS, Definitive[2]	1	0	0	0	0	0	1

Notes:
1.) Screening samples will be collected per ASTM D8421 method and may be analyzed for a shortlist of PFAS analytes, as specified in **Worksheet #15**.
2.) Definitive samples will be collected per USEPA 1633A method. Additionally, 10% of the screening samples will also be analyzed via USEPA 1633A method.
3.) ERBs apply only if use of non-dedicated sampling equipment is necessary. ERBs for solid matrices are aqueous samples.
4.) Grain Size, pH, and TOC will be collected from soil in subsequent phases of work.

ERB = equipment rinsate blank
PFAS = per- and polyfluoroalkyl substances
TOC = total organic carbon

Measurement Performance Criteria Table — Field Quality Control Samples				
QC Sample	**Analytical Group**	**Frequency**	**Data Quality Indicators**	**MPC**
Matrix: Aqueous (Groundwater/ Surface Water/ Porewater/ Potable Wells)				
Field Duplicate	PFAS	One per 10 field samples	Precision	Values > 5X LOQ: RPD must be ≤ 30% Values ≤ 5X LOQ: Absolute difference ≤ 2x the LOQ
Matrix Spike/Matrix Spike Duplicate[5]	PFAS	One per 20 field samples[1]	Bias/Accuracy/Precision (lab)	RPD ≤ 30%; Refer to **Worksheet #28** for recovery criteria
Equipment Rinsate Blank	PFAS	One per 20 field samples per type of reusable equipment used[2]	Accuracy/ Bias	No target analytes ≥ ½ LOQ, unless target analytes in field samples are > 10x those in rinsate blank. Laboratory-certified PFAS-free water will be used to collect ERBs.
Field Reagent Blank	PFAS	One per sampling event[3]	Accuracy/ Bias	No target analytes ≥ ½ LOQ, unless target analytes in field samples are > 10x those in rinsate blank
Cooler Temperature Blank	PFAS	One per cooler	Representativeness	Temperature must be above freezing and ≤ 6 ºC
Confirmation sample	PFAS	10% of screening-level samples analyzed by USEPA Method 1633A	Representativeness/ Field Decision Quality	Percent Decision Match >90%
Matrix: Solid (Soil and Sediment)				
Field Duplicate	PFAS, TOC	One per 10 field samples	Precision	Values > 5X LOQ: RPD must be ≤ 30% Values ≤ 5X LOQ: Absolute difference ≤ 2x the LOQ
Matrix Spike/Matrix Spike Duplicate[5]	PFAS, TOC	One per 20 field samples[1]	Bias/Accuracy/Precision (lab)	RPD ≤ 30%; Refer to **Worksheet #28** for recovery criteria
Field Reagent Blank	PFAS	One per sampling event[3]	Accuracy/ Bias	No target analytes ≥ ½ LOQ, unless target analytes in field samples are > 10x those in rinsate blank
Equipment Rinsate Blank	PFAS	One per 20 field samples per type of reusable equipment used[2]	Accuracy/ Bias	No target analytes ≥ ½ LOQ, unless target analytes in field samples are > 10x those in rinsate blank

Measurement Performance Criteria Table — Field Quality Control Samples				
QC Sample	**Analytical Group**	**Frequency**	**Data Quality Indicators**	**MPC**
Cooler Temperature Blank	PFAS	One per cooler	Representativeness	Temperature must be above freezing and ≤ 6 °C
Confirmation sample	PFAS	10% of screening-level samples analyzed by USEPA Method 1633A	Representativeness/ Field Decision Quality	Percent Decision Match >90%

Notes:
1.) Analyzed more frequently than one per twenty samples or per sample delivery group.
2.) Only for re-usable equipment, not for disposable equipment/ supplies.
3.) Regardless of matrix.
4.) Field Reagent Blank – An aliquot of reagent water that is placed in a sample container in the laboratory and treated as a sample in all respects, including shipment to the sampling site, exposure to sampling site conditions, storage, preservation, and analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.
5) MS/MSD samples are not required for the ASTM D8421 samples analyses, as per the laboratory specification included in **Appendix C**.

> = greater than
≥ = greater than or equal to
≤ = less than or equal to
% = percent
°C = degrees Celsius
ERB = equipment rinsate blank
LOQ = limit of quantitation
MPC = measurement performance criteria
PFAS = per- and polyfluoroalkyl substances
QC = quality control
RPD = relative percent difference

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Worksheet #21: Field Standard Operating Procedures

A summary of SOPs is provided in the table below which can be found in **Appendix D**. The JV partner firms will follow their respective SOPs as noted in the table below. Field staff will be trained through internal PFAS sampling training prior to performing any sampling activities.

Reference Number	Title, Revision Date, and/or Number	Originating Organization	Modified for Project Work?	Comments
3-01	*Utility Clearance*	AECOM	Y	Modified for programmatic details
3-02	*Logbooks*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-03	*Recordkeeping, Sample Labeling and Chain of Custody*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-04	*Sample Handling, Storage, and Shipping*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-05	*Investigation-Derived Waste Management*	AECOM	Y	Modified for programmatic details
3-06	*Equipment Decontamination*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-07	*Land Surveying*	AECOM	Y	Modified for programmatic details
3-09	*Geophysics*	AECOM	Y	Modified for programmatic details
3-10	*Surface Water Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-12	*Monitoring Well Installation*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-13	*Monitoring Well Development*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-14	*Monitoring Well Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-15	*Monitoring Well Abandonment*	AECOM	Y	Modified for programmatic details
3-16	*Soil and Rock Classification*	AECOM	Y	Modified for programmatic details
3-17	*Direct Push Sampling Techniques*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-20	*Operation and Calibration of Photoionization Detector*	AECOM	Y	Modified for programmatic details
3-21	*Surface and Subsurface Soil Sampling Procedures*	AECOM	Y	Modified for PFAS sampling and programmatic details

Reference Number	Title, Revision Date, and/or Number	Originating Organization	Modified for Project Work?	Comments
3-22	*Sediment Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-24	*Water Quality Parameter Testing for Groundwater Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-33	*Subsurface Soil Sampling by Split Spoon*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-35	*In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-37	*Grab Groundwater Sampling Techniques*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-41	*Per- and Polyfluoroalkyl Substance Field Sampling Protocol*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-42	*Potable Well Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
3-43	*Porewater Sampling*	AECOM	Y	Modified for PFAS sampling and programmatic details
None	*Inadvertent Discoveries of Cultural or Historical Resources while Conducting Restoration Activities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*	ARNG I&E	Y	Describes response procedure for discovery of cultural or historical resources. Modified for facility-specific information

Notes:
PFAS = per- and polyfluoroalkyl substances
Y = yes

Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection

Worksheet #22 addresses procedures for calibrating, maintaining, testing, and/or inspecting field equipment (e.g., tools, pumps, gauges, pH meters, water-level measurement devices). **Equipment that will come into contact with sample media will be evaluated for PFAS-containing components prior to use.**

Field Equipment	Calibration Activity	Maintenance Activity	SOP Reference	Testing Activity	Inspection Activity	Title or Position of Responsible Person	Frequency	Calibration Acceptance Criteria	Corrective Action
Water Quality Meter (i.e., YSI®, Horiba, or equivalent) (pH, ORP, DO, conductivity, temperature, turbidity)	Calibrate with standard solutions	Per page 8 of SOP 3-24	SOP 3-24	Operational equipment check and calibration	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	pH: ± 0.01 pH units Conductivity: ± 0.01 µS/cm Turbidity: ± 0.01 NTU DO: ± 0.01 mg/L Temperature: ± 0.01 °C	Minor: Repair Major: Replace instrument
MiniRAE 2000 (PID)	Calibrate with fresh air and isobutylene calibration gas	Per page 4 of SOP 3-20	SOP 3-20	Operational equipment check and calibration	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	0-99 ppm ± 0.1 ppm 100-1,999 ppm ± 1.0 ppm 2000-10,000 ppm ± 10 ppm	Minor: Repair Major: Replace instrument
QED MP10 Controller (Bladder Pump Controller Box)	NA	NA	SOP 3-14	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument
QED SamplePro (Stainless Steel Submersible Bladder Pump)	NA	Per page 7 of SOP 3-14	SOP 3-14	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument

Field Equipment	Calibration Activity	Maintenance Activity	SOP Reference	Testing Activity	Inspection Activity	Title or Position of Responsible Person	Frequency	Calibration Acceptance Criteria	Corrective Action
Solinst 101 (Water Level Meter)	NA	Per page 5 of SOP 3-14	SOP 3-14	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument
Geotech GeoPump (Peristaltic Pump)	NA	NA	SOP 3-14	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument
Well Development Equipment (Surge Block, Bailer, Electric Submersible Pump, Waterra® System)	NA	NA	SOP 3-13	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument
Handheld GNSS Receiver (Arrow 100®, Trimble Geo-XT, or equivalent) (sub-meter GIS data)	NA	NA	SOP 3-07	Operational equipment check	Visually inspect for cleanliness and obvious defects (broken/missing parts)	Field Technician Lead	Prior to use	NA	Minor: Repair Major: Replace instrument

Notes:
°C = degrees Celsius
DO = dissolved oxygen
mg/L = milligrams per liter
NA = not applicable
NTU = nephelometric turbidity unit
ORP = oxidation-reduction potential
PFAS = per- and polyfluoroalkyl substances
PID = photoionization detector
ppm = parts per million
SOP = standard operating procedure
µS/cm = micro Siemens per centimeter

Worksheet #23: Analytical Standard Operating Procedures

Lab SOP Number	Title, Revision Date, and / or Number	Definitive or Screening Data1	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
WI72427	Aqueous PFAS Prep by SPE and Analysis by LC-MS-MS by EPA 1633A/QSM 6.0 Table B-24, Ver 1, Eff 25-Jun-2024, Rev. 1, 06-25-24	Definitive	Aqueous/PFAS	LC/MS/MS	Eurofins	N
WI72428	Solid PFAS Prep by Sonication and Analysis by LC-MS-MS by EPA 1633A/QSM 6.0 Table B-24, Rev. 1, 06-25-24	Definitive	Solid/PFAS	LC/MS/MS	Eurofins	N
WI21568	Environmental Monitoring in the PFAS Lab, Rev. 8, 03-06-24	N/A	N/A	LC/MS/MS	Eurofins	N
WI23588	Preventative and Corrective Maintenance for the AB Sciex Liquid Chromatograph Mass Spectrometers (LC/MS/MS), Rev. 5, 06/18/24	N/A	Maintenance	LC/MS/MS	Eurofins	N
WI11627	TOC and TC in Solids and Sludges by Combustion by SW-846 9060/9060A, Lloyd Kahn, Rev. 20, 03/12/24	Definitive	TOC	TOC Analyzer	Eurofins	N
WI11518	pH by EPA 9045C, 9045D and Corrosivity by SW-846 Chap 7 of Solids, Soils, and Solvents using Electrometric Methods, Rev. 15, 11/15/23	Definitive	pH	pH meter	Eurofins	N
WI11514	Particle Size Distribution of Soils and Solids/Grain Size Classification by ASTM D-422-63, Rev 10, 01/24/19	Definitive	Grain Size	Hydrometer	Eurofins	N
ENV-SOP-WCOL-0165	PFAS by Method 1633A, Rev. 1, 10/10/24	Definitive	Water/PFAS Solid/PFAS	Sciex 5500 Triple Quad LC/MS/MS	Pace South Carolina	N
ENV-SOP-WCOL-0164	PFAS by D8421-ID, Rev. 2, 07/23/23	Screening	PFAS	Sciex 5500 Triple Quad LC/MS/MS	Pace South Carolina	N
ENV-SOP-WCOL-0149	Total Organic Carbon (TOC) Walkley-Black, Rev.3, 04/18/24	Definitive	Solid/TOC	NDIR	Pace South Carolina	N

Lab SOP Number	Title, Revision Date, and / or Number	Definitive or Screening Data1	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
ENV-SOP-WCOL-0138	pH by Electrometric Measurement / pH Paper Method SM4500-H B-2011 / 9040C / 150.1 / 9041A / 9045D, Rev.3, 06/16/23	Definitive	Inorganic Non-Metals – Aqueous/Solid	Meter	Pace South Carolina	N
Grain Size Determined by Sedimentation Analysis	Grain Size Determined by Sedimentation Analysis (Hydrometer), 01/21/22	Definitive	Solid/Grain Size	Hydrometer	Pace South Carolina (sub)	N

Notes:

1.) Definitive or screening data are defined per the Part 2B, Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities (IDQTF, 2005c):
Screening data can support an intermediate or preliminary decision but should eventually be supported by definitive data before a project is complete.
Definitive data should be suitable for final decision-making (of the appropriate level of precision and accuracy, as well as legally defensible).

Eff = effective
EPA = Environmental Protection Agency
LC/MS/MS = liquid chromatography tandem mass spectrometry
N = no
N/A = not applicable
NDIR = Nondispersive infrared
PFAS = per- and polyfluoroalkyl substances
QSM = Quality System Manual
Rev = revision
SOP = standard operating procedure
SPE = solid phase extraction
TC = total carbon
TOC = total organic carbon

Worksheet #24: Analytical Instrument Calibrations

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis. Mass calibration is verified after each mass calibration, prior to ICAL.	Calibrate the mass scale of the MS with calibration compounds and procedures described by the manufacturer. Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for every acquisition in an analytical run. Mass calibration must be verified to be ± 0.5 amu of the true value, by acquiring a full scan continuum mass spectrum of a PFAS stock standard.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	Mass Spectral Acquisition Rate	Each analyte, EIS Analyte.	A minimum of 10 spectra scans are acquired across each chromatographic peak.	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	CCV and Spiking Standards	All analytes.	Standards containing both branched and linear isomers must be used when commercially available. PFAS method analytes may consist of both branched and linear isomers, but quantitative standard that contain the linear and branched isomers do not exist for all method analytes. For PFAS that do not have a quantitative branched and linear standard, identify the branched isomers by analyzing a qualitative standard that includes both linear and branched isomers and determine RTs, transitions, and transition ion ratios. Quantitate samples by integrating the total response (i.e., accounting for peaks that are identified as linear and branched isomers) and relying on the initial calibration that uses the linear isomer quantitative standard.	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	Bile Salt Interference Check	After an initial calibration and during each analytical sequence	The RT of the bile salts in the standard in Section 7.5 must fall at least one minute outside the RT window for any of the linear or branched PFOS isomers	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	Non-Extracted Internal Standard	All calibration standards, batch QC, and field samples	The NIS areas in the field samples and QC samples must be within 50 to 200% of the mean area of the corresponding NIS in the most recent initial calibration	Reanalysis. If the areas are low for all the field samples and QC samples in the batch, it suggests a loss of instrument sensitivity, while low areas in only some field or QC samples suggests a possible bad injection.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Sample PFAS Identification	All analytes detected in a sample.	The chemical derivation of the ion transitions must be documented. A minimum of two ion transitions (Precursor → quant ion and precursor → confirmation ion) and the ion transitions ration per analyte are required for confirmation. Exception is made for analytes where two transitions do not exist (PFBA and PFPeA). Documentation of the primary and confirmation transitions and the ion ratio is required. In-house acceptance criteria for evaluation of ion ratios must be used and must not exceed 50-150%. Signal to Noise Ratio (S/N) must be ≥ 10 for all ions used for quantification and must be ≥ 3 for all ions sued for confirmation. Quant ion and confirmation ion must be present and must maximize simultaneously (± 2 seconds). For all positive results, the Ion Abundance Ratio (IAR) must fall within ±50% of the IAR observed in the mid-point of the initial calibration standard (or if below the LOQ, ±50% of the initial calibration verification)	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Ion Transitions (Precursor → Product)	Every field sample, standard, blank, and QC sample.	In order to avoid biasing results high due to known interferences for some transitions, the following transitions must be used for the quantification of the following analytes: PFOA: 413 → 369 PFOS: 499 → 80 PFHxS: 399 → 80 PFBS: 299 → 80 4:2 FTS: 327 → 307 6:2 FTS: 427 → 407 8:2 FTS: 527 → 507 NEtFOSAA: 584 → 419 NMeFOSAA: 570 → 419 If these transitions are not used, the reason must be technically justified and documented (e.g., alternate transition was used due to observed interferences).	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Ion Ratio	Every field sample, standard, blank, and QC sample.	For concentrations at or above the LOQ, the ion abundance ratio must fall within ±50% of the ion abundance ratio observed in the mid-point initial calibration standard. For sample concentrations below the LOQ, the ion abundance ratio must fall within ±50% of the ion abundance ratio observed in either the mid-point initial calibration standard or the initial calibration verification. The total response of all isomers (branched and linear) in the quantitative standards must be used to define the ion abundance ratio (USEPA 1633A Section 15.1.3)	Ratio requirement does not apply to PFBA, PFPeA, N-Me-FOSE, N-Et-FOSE, PFMPA, and PFMBA because suitable secondary transitions are not available Typical Ion Ratios are identified in Table 10 of Method 1633A Apply "I" flag to data with ion ratio outside criteria.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	ICAL	At instrument set-up and after ICV or CCV failure, prior to sample analysis.	The isotopically labeled analog of an analyte (EIS Analyte) must be used for quantitation if commercially available. (Isotope Dilution Quantitation). Commercial PFAS standards available as salts are acceptable providing the measured mass is corrected to the neutral acid concentration. Results shall be reported as the neutral acid with appropriate CAS number. If a labeled analog is not commercially available, the Extracted Internal Standard Analyte with the closest (RT or chemical similarity to the analyte must be used for quantitation. (Internal Standard Quantitation). Analytes must be within 70-130% of their true value for each calibration. ICAL must meet one of the two options below: Option1: The RSD of the RFs for all analytes must be ≤ 20%. Option 2: Linear or non-linear calibrations must have $r^2 \geq 0.99$ for each analyte.	Correct problem, then repeat ICAL.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	RT window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA	Analyst, Supervisor, QA Manager	Eurofins: W172427 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	RT window width	Every field sample, standard, blank, and QC sample.	RT of each analyte and EIS analyte must fall within 0.4 minutes of the predicted RTs from the daily calibration verification or, on days when ICAL is performed, from the midpoint standard of the ICAL. Analytes must elute within 0.1 minutes of the associated EIS. This criterion applies only to analyte and labeled analog pairs.	Correct problem and reanalyze samples.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	ISC	Prior to analysis	Analyte concentrations must be at LOQ; concentrations must be within ± 30% of their true value. S/N must be greater than 3:1 Ion Abundance Ratio (IAR) must fall within ±50% of the IAR observed in the mid-point of the initial calibration standard	Correct problem, rerun ISC. If problem persists, repeat ICAL.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All analyte concentrations must be within ± 30% of their true value.	Correct problem, rerun ICV. If problem persists, repeat ICAL.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Instrument Blank	At the beginning of the analytical sequence and after the analysis of high concentration samples and standards (e.g., customer samples, highest calibration standard, calibration verification standard).	No analytes detected > ½ the LOQ	If acceptance criteria are not met after the highest calibration standard, calibration shall be performed using a lower concentration for the highest standard until acceptance criteria is met. If field sample analyte concentrations exceed the highest calibration standard and the same analytes in the following field sample or in consecutive following field samples also exceed the IB acceptance criteria (i.e., > ½ LOQ), the affected samples shall be reanalyzed using a fresh aliquot of the sample extract. If the extract cannot be reanalyzed and re-extraction is not possible, apply qualifier to affected results and explain in the case narrative.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	CCV	Prior to sample analysis, after every 10 field samples, and at the end of the analytical sequence.	Concentration of analytes must range from the LOQ to the mid-level calibration concentration. Analyte concentrations must be within ± 30% of their true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, or if two consecutive CCV's cannot be run, perform corrective action(s) and repeat CCV and all associated samples since last successful CCV. Alternatively, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Tune check	Daily, prior to sample analysis, only once per analytical batch. No time constraints.	Manufacturer recommended criteria which includes delta and FWHM tolerance checks of 6 m/z's over the spectrum of the detector.	Retune instrument and repeat check tune. Maintenance may be required.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
LC/MS/MS	MDL/LOD/LOQ verification	Quarterly	LOD meets method qualitative requirements or is at least 3x higher than noise; LOQ is recovered within LCS criteria. Per 40 CFR 136 Appendix B Rev 2.0. Goes through all preparative methods. Meets qualitative detection criteria. May be combined with the LOD verifications.	Perform instrument maintenance and repeat failed LOD or LOQ study passing two consecutive tests or perform new DL study. Re-prep and re-analyze the MDL standard. If needed, a new initial MDL study is performed with a higher concentration.	Analyst, Supervisor, QA Manager	Eurofins: W172427, WI72428 PSC: ENV-SOP-WCOL-0165
TOC Analyzer	Initial calibration with a minimum 4 points	Monthly or after continuing calibration fails	r^2 ≥0.995	Perform more aggressive instrument maintenance and recalibrate	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149
TOC Analyzer	ICB Standard	After each initial calibration	No analytes detected > LOQ	Perform more aggressive instrument maintenance and recalibrate	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149
TOC Analyzer	ICV Standard	After each initial calibration	Within +/- 10% of the nominal concentration	Reanalyze the ICV. If ICV fails again do system maintenance and recalibrate.	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149
TOC Analyzer	MDL Standard	Yearly	All compounds must be detected	Repeat ICAL procedure prior to analyzing samples. Repeat maintenance if needed.	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
TOC Analyzer	CCV Standard	If instrument is idle > 4 hours, after every 10 field samples, and at the end of the sequence	Within +/- 10% of the nominal concentration	All affected samples are reanalyzed	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149
TOC Analyzer	CCB Standard	If instrument is idle > 4 hours, after every 10 field samples, and at the end of the sequence	All affected samples are reanalyzed	All affected samples are reanalyzed	Analyst, Supervisor, QA Manager	Eurofins: WI11627 PSC: ENV-SOP-WCOL-0149
pH solid	3-point calibration	Each new run and continuing calibration per 10 samples	Independent and continuing calibration verification CCV within ±10%. CCB < RL.	Recalibrate, perform instrument maintenance if calibration cannot conform to criteria, recalibrate	Analyst, Supervisor, QA Manager	Eurofins: WI11518 PSC: ENV-SOP-WCOL-0138
LC/MS/MS	Mass Calibration	Instrument must have a valid mass calibration prior to any sample analysis. Mass calibration is verified after each mass calibration, prior to ICAL.	Calibrate the mass scale of the MS with calibration compounds and procedures described by the manufacturer. Mass calibration range must bracket the ion masses of interest. The most recent mass calibration must be used for every acquisition in an analytical run. Mass calibration must be verified to be ±0.5 amu of the true value, by acquiring a full scan continuum mass spectrum of a PFAS stock standard.	If the mass calibration fails, then recalibrate. If it fails again, consult manufacturer instructions on corrective maintenance.	Analyst, Supervisor, QA Manager	PSC: ENV-SOP-WCOL-0164[1]

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Calibration, CCV, and Spiking Standards	All analytes. Note: Standards containing both branched and linear isomers are to be used during method validation and when reestablishing RTs, to ensure the total response is quantitated for that analyte. Technical grade standards cannot be used for quantitative analysis.	PFAS method analytes may consist of both branched and linear isomers, but quantitative standards that contain the linear and branched isomers do not exist for all method analytes. For PFAS that do not have a quantitative branched and linear standard, identify the branched isomers by analyzing a qualitative standard that includes both linear and branched isomers and determine RT, transitions and transition ion ratios. Quantitate samples by integrating the total response (i.e., accounting for peaks that are identified as linear and branched isomers) and relying on the initial calibration that uses the linear isomer quantitative standard.	NA	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]
LC/MS/MS	Mass Spectral Acquisition Rate	Each analyte, EIS analyte.	A minimum of 10 spectra scans should be acquired across each chromatographic peak.	NA	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]
LC/MS/MS	ICAL; Calibration can be linear (minimum of 5 standards); weighting is allowed.	Prior to sample analysis: at instrument set-up and after major maintenance and/or ICV or CCV failure.	ICAL must meet one of the two options below: Option 1: The %RSD of the RFs for all analytes must be ≤20%. Option 2: Linear or non-linear calibrations must have r2 ≤0.99 for all compounds. The isotopically labeled analog of an analyte (EIS Analyte) must be used for quantitation if commercially available (Isotope Dilution Quantitation).	Perform maintenance, if necessary, and repeat calibration if criterion is not met. No samples shall be analyzed until ICAL has passed.	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person(s) Responsible	SOP Reference
LC/MS/MS	Instrument blank (IBLK)	Immediately following the highest standard analyzed during ICAL and daily, prior to sample analysis.	Concentration of each analyte must be ≤½ the LOQ. Instrument Blank must contain EIS to enable quantitation of contamination.	If acceptance criteria are not met after the highest calibration standard, calibration must be performed using a lower concentration for the highest standard until acceptance criteria is met.	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]
LC/MS/MS	ICV	Only required if ICAL is not prepared using a Certified Reference Standard.	Analyte concentrations must be within ± 30% of their true value.	Correct problem and verify second source standard; rerun second source verification. If that fails, correct problem and repeat ICAL.	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]
LC/MS/MS	CCV	An opening CCV at the LOQ on days when the ICAL is not analyzed and a CCV the end of each batch of 20 or fewer field samples.	All analytes recovered within ±30% of the expected concentration for mid-level CCVs and ±50% for the LOQ level-CCV.	Correct the problem, reanalyze the CCV. If the problem persists, repeat the ICAL. Reprepare and reanalyze all samples associated with the failing CCV.	Analyst, supervisor	PSC: ENV-SOP-WCOL-0164[1]

Notes:

1) Modifications to the acceptance criteria and corrective actions are applied as per the ASTM D8421 laboratory specification that has been developed for this work. Full specification details are provided in **Appendix C**.

> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
% = percent
amu = atomic mass unit
CCB = continuing calibration blank
CCV = continuing calibration verification
CFR = Code of Federal Regulations
DL = detection limit
EIS = extracted internal standard
ESI-L = Environmental Standards International – Low Concentration Tuning Mix
FTS = fluorotelomer sulfonic acid
FWHM = Full width at half maximum
IAR = Ion Abundance Ratio
IB = instrument blank
ICAL = initial calibration
ICB= Initial Calibration Blank
ICV = initial calibration verification
ISC = instrument sensitivity check
LC/MS/MS = liquid chromatography tandem mass spectrometry
LOD = limit of detection
LOQ = limit of quantitation
MDL= Method Detection Limit
m/z = mass-to-change ratio
NA = not applicable
NIS = non-extracted internal standards
N-Et-FOSE = N-ethyl perfluorooctanesulfonamidoethanol
N-Me-FOSE = N-methyl perfluorooctanesulfonamidoethanol
NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
PFAS = per- and polyfluoroalkyl substances

PFOA = perfluorooctanoic acid
PFOS = perfluorooctanesulfonic acid
PFHxS = perfluorohexanesulfonic acid
PFBA = perfluorobutanoic acid
PFBS = perfluorobutanesulfonic acid
PFMBA = perfluoro-4-methoxybutanoic acid
PFMPA = perfluoro-3-methoxypropanoic acid
PFPeA = perfluoropentanoic acid
PSC = Pace South Carolina
QA = quality assurance
QC = quality control
RF = response factor
RSD = relative standard deviation
RT = retention time
S/N = signal to noise ratio
SOP = standard operating procedure
TBD = to be determined
TOC = total organic carbon

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Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

Laboratory: Eurofins Lancaster Laboratories

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
LC/MS/MS	Backflush of column, injection port and pre-columns, cleaning of ion spray cone, adjustment of collision energies, others as needed	Calibration Check	Visual	As Needed	Initial calibration or calibration verification passes method specifications	Perform additional maintenance prior to instrument calibration or calibration verification	Analysts	WI72427 WI72428
TOC Analyzer	Change injection needle, change catalyst	TOC	Monitor instrument performance via CCV	As needed or replace as necessary, loss of sensitivity or failing resolutions, erratic response	No maintenance is required as long as instrument QC meets criteria	Perform instrument maintenance, clean injection needle, change catalyst	Analyst, Supervisor, QA Manager	WI11627
Orion 720 pH Meter	Check electrode	pH	Flush and refill electrode; clean electrode with methanol	As needed	No instrument error message	Clean or replace as necessary	Analyst, Supervisor QA Manager	WI11518

Notes:
CCV = continuing calibration verification
LC/MS/MS = liquid chromatography tandem mass spectrometry
QC = quality control
QA = quality assurance
SOP = standard operating procedure
TOC = total organic carbon

Laboratory: Pace South Carolina

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
LC/MS/MS	Check column pressure and mobile phase levels/expirations daily. Perform the following as needed: prepare aqueous mobile phase, clean/replace injection needle, replace guard cartridge, backflush/replace column, replace injector seat, clean curtain/orifice plate, retune MS.	PFAS	Inspect all tubing connections at time of maintenance to assure no leaks present. Monitor instrument performance via calibrations, CCVs, and blanks.	Initially, after major maintenance, CCV not meeting 2X	Same as initial calibration and CCV	Same as initial calibration and CCV	Analyst/ Supervisor	ENV-SOP-WCOL-0165
pH Meter	Daily Calibration	pH	initial/continuing calibration/blank	daily	10%	recalibrate	Group Leader	ENV-SOP-WCOL-0138
TOC Analyzer	Change injection needle, change catalyst	TOC	Monitor instrument performance via CCV	As needed or replace as necessary, loss of sensitivity or failing resolutions, erratic response	No maintenance is required as long as instrument QC meets criteria	Perform instrument maintenance, clean injection needle, change catalyst	Analyst, Supervisor, QA Manager	ENV-SOP-WCOL-0149
LC/MS/MS	Clean ESI chamber Replace guard cartridge	NA	NA Visible blockage and/or dirt on frit	Weekly or as needed	NA	NA	Analyst	ENV-SOP-WCOL-0165
LC/MS/MS	Replace delay or analytical column	NA	Peak shape and resolution; liquid chromatography pressure profiles; initial calibration or sensitivity problems	Biannually or as needed	NA	NA	Analyst	ENV-SOP-WCOL-0165

Notes:
% = percent
CCV = continuing calibration verification
ESI = electrospray ionization
LC/MS/MS = liquid chromatography tandem mass spectrometry
NA = not applicable
PFAS= per- and polyfluoroalkyl substances
QA = quality assurance
QC = quality control
SOP = standard operating procedure
TOC = total organic carbon

Worksheets #26 & #27: Sample Handling, Custody, and Disposal

Sampling Organization: A2P JV
Laboratory: Various (see below)
Method of sample delivery (shipper/carrier): FedEx
Number of days from reporting until sample disposal: 60 Days

Activity	Organization and title or position of person responsible for the activity	SOP reference
Sample labeling	A2P JV	*SOP 3-03 Recordkeeping, Sample Labeling, and Chain of Custody*
CoC form completion	A2P JV	
Packaging	A2P JV	*SOP 3-04 Sample Handling, Storage, and Shipping*
Shipping coordination	A2P JV	
Sample receipt, inspection, and log-in	Eurofins Lancaster Laboratories Sample Custodian	S-SA-WI10725: Environmental Sample Receipt and Unpacking
Sample custody and storage	Eurofins Lancaster Laboratories Sample Custodian	S-SS-WI12042: Automated Storage Retrieval and Discarding of Samples
Sample disposal	Eurofins Lancaster Laboratories Sample Custodian	S-SS-WI12042: Automated Storage Retrieval and Discarding of Samples
Sample receipt, inspection, and log-in	Pace South Carolina Sample Custodian	SAD-001: Sample Receiving and Laboratory Information Management System Log-In
Sample custody and storage	Pace South Carolina Sample Custodian	SAD-002: Sample Chain of Custody and Sample Integrity
Sample disposal	Pace South Carolina Sample Custodian	GEN-009: Waste Collection, Storage, Disposal

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
CoC = chain of custody
SOP = standard operating procedure

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Worksheet #28: Analytical Quality Control and Corrective Actions

Worksheet #28 includes laboratory preparation information as per USEPA Method 1633A and DoD QSM B-24. Requirements will be updated when new requirements are promulgated and laboratories will update to the appropriate certified method when applicable. QC requirements will be consistent between laboratories.

Matrix: Solid & Aqueous
Analytical Group: PFAS by QSM 5.4
Analytical Method: PFAS by LC/MS/MS compliant with USEPA Method 1633A
Certification Status: DoD ELAP/NELAP Certification

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
EIS Analytes	Every field sample, standard, blank, and QC sample	Isotopically labeled analogs of analytes shall be used when they are commercially available. As per Table 6 and Table 8 of Method 1633A Where Method 1633A does not provide EIS recovery acceptance criteria for the sample matrix under evaluation, a laboratory shall use laboratory-developed recovery acceptance criteria no wider than any acceptance criteria provided by the customer. Preliminary laboratory-developed acceptance criteria of 20-150% shall be used until laboratory acceptance criteria are developed in accordance with Method 1633A. Where Method 1633A does not provide EIS recovery acceptance criteria for the sample matrix under evaluation, the lower limit of the laboratory-developed acceptance criteria cannot be < 20%.	For all PFAS if EIS recovery is <50%, check for laboratory error and correct if identified. If no laboratory error is identified, additional corrective action will be performed if EIS recovery is <10%. If EIS recovery is >10% and samples have detections above the reporting limit, no additional corrective action is performed. If EIS recovery is >10% and samples have no detections for associated native analytes, the native analyte response will be evaluated to confirm the validity of the reporting limit. Reporting limits will be proportionately increased as necessary and appropriate to ensure that reported values accurately reflect the sensitivity of the analysis. For all PFAS, if EIS recovery is >150%, check for laboratory error and correct if identified. If no laboratory error is identified, additional corrective action will be performed only when field samples have detections above the reporting limits for the associated native target analytes and EIS recovery is >200%. If persistent matrix effects are observed for multiple samples from a given project that necessitate a high rate of additional corrective actions, these matrix effects will be mitigated prior to sample preparation and analysis, typically by processing a smaller sample mass or volume.	Analyst, Supervisor, QA Manager	Accuracy/Bias

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
MB	One per preparatory batch	No analytes detected > 1/2 LOQ	Correct problem. If required, re-extract and reanalyze MB and all QC samples and field samples processed with the contamination blank. If the samples cannot be reprepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.	Analyst, Supervisor, QA Manager	Bias/Contamination
LCS and Low-Level Laboratory Control Sample (LLLCS)	One set per preparatory batch. Shall contain all EIS, NIS, and all analytes to be reported. These are equivalent to 1633A Ongoing Precision and Recovery Standard (OPR) and Low-Level OPR	Preliminary acceptance criteria of 40-150% shall be used until acceptance criteria are developed by the laboratory in accordance with Method 1633A Tables 5 and 7 Where Method 1633A does not provide LCS and LLLCS recovery acceptance criteria for the sample matrix under evaluation, the laboratory-developed acceptance criteria shall not be < 40%.	Correct problem. If required, reprepare and analyze the LCS and/or LLLCS and all affected QC samples and field samples in the associated preparatory batch for failed analytes if sufficient sample material is available. If the samples cannot be reprepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.	Analyst, Supervisor, QA Manager	Accuracy/Bias
MSD or MD	For MSD: One per preparatory batch. For MD: Each aqueous sample prepared by serial dilution instead of SPE.	For MSD: Sample spiked with all analytes at a concentration ≥ LOQ and ≤ mid-level calibration standard. Recovery limits are the same as the LCS limits. RPD ≤ 30% (between MS and MSD or sample and MD).	Examine the project specific requirements. Contact the client as to additional measures to be taken.	Analyst, Supervisor, QA Manager	Accuracy/Bias

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
Sample PFAS Identification	All analytes detected in a sample	The chemical derivation of the ion transitions must be documented. A minimum of two ion transitions (Precursor → quant ion and precursor → confirmation ion) and the ion transitions ratio per analyte are required for confirmation. Exception is made for analytes where two transitions do not exist (PFBA and PFPeA). Documentation of the primary and confirmation transitions and the ion ratio is required. In-house acceptance criteria for evaluation of ion ratios must be used and must not exceed 50-150%. S/N must be ≥ 10 for all ions used for quantification and must be ≥ 3 for all ions used for confirmation. Quant ion and confirmation ion must be present and must maximize simultaneously (±2 seconds).	NA	Analyst, Supervisor, QA Manager	Comparability

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Notes:
> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
% = percent
AAAF = aqueous film forming foam
CCV = continuing calibration verification
DoD = Department of Defense
EIS = extracted internal standards
ELAP = Environmental Laboratory Accreditation Program
ICAL = initial calibration
LC/MS/MS = liquid chromatography tandem mass spectrometry
LCS = laboratory control spike
LOQ = limit of quantitation
MD = matrix duplicate
MS = matrix spike
MSD = matrix spike duplicate
NA = not applicable
NELAP = National Environmental Laboratory Accreditation Program
OPR = ongoing precision and recovery standard
QA = quality assurance
QC = quality control
QSM = Quality Systems Manual
PFAS = per- and polyfluoroalkyl substances
PFBA = perfluorobutanoic acid
PFPeA = perfluoropentanoic acid
RPD = relative percent difference
SOP = standard operating procedure
S/N = signal to noise ratio
SPE = solid phase extraction
USEPA = United States Environmental Protection Agency

Laboratory: Eurofins Lancaster Laboratories
Matrix: Solid & Aqueous
Analytical Group: PFAS by QSM 6.0
Analytical Method: PFAS by LC/MS/MS complaint with USEPA Method 1633A
SOP Reference: W172427 & W172428
Certification Status: DoD ELAP/NELAP Certification

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
MB	One per extraction batch of no more than 20 field samples	No analytes detected >1/2 LOQ.	Correct problem. Re-prepare and analyze MB and all QC samples and affected field samples processed with the contaminated blank if sufficient sample material is available. If the samples cannot be re-prepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.	Analyst	Accuracy/Lab Contamination
LLCS	One per extraction batch of no more than 20 field samples	Acceptance criteria defined in Tables 5 and 6 of Method 1633A For analytes not listed in Method 1633A, the laboratory must use statistically-derived limits. The lower limit cannot be <40%. Preliminary limits of 40-150% may be used until sufficient data is available.	Correct problem. If required, re-prepare and analyze the LLCS and all affected QC samples and field samples in the associated preparatory batch for failed analytes if sufficient sample material is available. If the samples cannot be re-prepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.	Analyst	Accuracy/Bias/Precision

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
Mid-Level LCS and, if needed, LCSD	One per extraction batch of no more than 20 field samples When no MS/MSD, and LCSD is required	Acceptance criteria defined in Tables 5 and 6 of Method 1633A For analytes not listed in Method 1633A, the laboratory must use statistically-derived limits. The lower limit cannot be <40%. Preliminary limits of 40-150% may be used until sufficient data is available.	Correct problem. If required, re-prepare and analyze the LCS and all affected QC samples and field samples in the associated preparatory batch for failed analytes if sufficient sample material is available. If the samples cannot be re-prepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.	Analyst	Accuracy/Bias/Precision
MS/MSD	at client request, one set per extraction batch of no more than 20 field samples	Acceptance criteria defined in Tables 5 and 6 of Method 1633A For analytes not listed in Method 1633A, the laboratory must use statistically-derived limits. The lower limit cannot be <40%. Preliminary limits of 40-150% may be used until sufficient data is available. RPD less than 30%	If outside the acceptance windows, consult a supervisor to determine the appropriate course of action based on batch and sample results.	Analyst	Accuracy/Bias/Precision
EIS or IDA, added prior to extraction	per sample (including MB, LCS, LCSD) prior to extraction	Acceptance criteria defined in Table 6 of Method 1633A For analytes not listed in Method 1633A, the laboratory must use statistically-derived limits. The lower limit cannot be <20%. Preliminary limits of 20-150% may be used until sufficient data is available.	Apply qualifier to affected analyte results and explain in the case narrative.	Analyst	Accuracy

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
NIS added following extraction and prior to analysis	per sample (including MB, LCS, LCSD) prior to extraction	NIS areas 50-200% of the area of the continuing calibration standard in undiluted sample extracts and sample extracts that require NIS to be added.	If fails high, check for errors and report. If fails low, re-analyze fresh aliquot of sample. If in control, report. If the failure confirms report the initial analysis and narrate.	Analyst	Accuracy

Notes:

> = greater than
< = less than
≥ = greater than or equal to
≤ = less than or equal to
% = percent
AAAF = aqueous film forming foam
CCV = continuing calibration verification
DoD = Department of Defense
EIS = extracted internal standards
ELAP = Environmental Laboratory Accreditation Program
ICAL = initial calibration
IDA = Isotope Dilution Analyte
LC/MS/MS = liquid chromatography tandem mass spectrometry
LCS = laboratory control spike
LCSD = laboratory control spike duplicate
LLCS = low-level laboratory control spike
LOQ = limit of quantitation
MD = matrix duplicate
MS = matrix spike
MSD = matrix spike duplicate
MB = method blank
NA = not applicable
NELAP = National Environmental Laboratory Accreditation Program
NIS = non-extracted internal standards
QA = quality assurance
QC = quality control
QSM = Quality Systems Manual
RPD = relative percent difference
SOP = standard operating procedure
S/N = signal to noise ratio
USEPA = United States Environmental Protection Agency

Matrix: Solid
Analytical Group: TOC
Analytical Method: 9060 or Walkley-Black
Certification Status: DoD ELAP/NELAP Certification

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
MB	One per digestion batch of 20 or fewer samples	≤ ½ LOQ	Reanalyze, and/or stop the run and determine the source of contamination, or document why the data are acceptable.	Analyst, Supervisor, QA Manager	Bias/ Contamination
LCS or BS	One for each batch of up to 20 samples	Laboratory-specific limits	Evaluate and reanalyze if possible. If LCS recoveries are high but the sample results are < LOQ, narrate. Otherwise, re-prepare and reanalyze.	Analyst, Supervisor, QA Manager	Accuracy/Bias
MS/MSD	10% of matrix	Laboratory-specific limits	Determine and correct the problem, reanalyze samples and MS/MSD, or document why data are acceptable	Analyst, Supervisor, QA Manager	Accuracy/Bias

Notes:
< = less than
≤ = less than or equal to
% = percent
BS = blank spike
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
LCS = laboratory control spike
LOQ = limit of quantitation
MB = method blank
MS/MSD = matrix spike/matrix spike duplicate
NELAP = National Environmental Laboratory Accreditation Program
QA = quality assurance
QC = quality control
RPD = relative percent difference
SOP = standard operating procedure
TOC = total organic carbon

Matrix: Solid
Analytical Group: pH
Analytical Method: 9045D/SM4500
Certification Status: DoD ELAP/NELAP Certification

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator
Sample Dup	One per preparation batch of 20 samples of similar matrix	Within 0.1 pH su	Determine and correct cause of the poor reproducibility	Analyst, Department Manager	Bias/ Contamination

Notes:
DoD = Department of Defense
Dup = duplicate
ELAP = Environmental Laboratory Accreditation Program
NELAP = National Environmental Laboratory Accreditation Program
QC = quality control
SOP = standard operating procedure

Laboratory: Pace South Carolina
Matrix: Solid & Aqueous
Analytical Group: PFAS
Analytical Method: ASTM D8421
SOP Reference: ENV-SOP-WCOL-0164
Certification Status: DoD ELAP/NELAP Certification

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator	Measurement Performance Criteria
Sample PFAS Identification	All analytes detected in a sample	A minimum of two ion transitions (Precursor →quant ion and precursor →confirmation ion) and the ion transitions ratio per analyte are required for confirmation. Exception is made for analytes where two transitions do not exist (PFPrA, PFBA, PFOSA, N-Me-FOSE, N-Et-FOSE, PFMPA, PFMBA, FHUEA, and FOUEA). Ion ratio within 50-150% of the average ion ratio calculated for each initial calibration. Signal to Noise Ratio (S/N) must be ≥3 for all ions used for quantification and must be ≥3 for all ions used for confirmation.	Apply "I" flag to data with ion ratio outside criteria.	Analyst	Sample PFAS Identification	All analytes detected in a sample
RT window position establishment	Once per ICAL	Position shall be set using the midpoint standard of the ICAL curve	NA	NA	NA	NA
RT window width	Every field sample standard, blank, and QC sample.	RT of each analyte and EIS analyte must fall within 0.4 minutes or 5% (whichever is greater) of the predicted RTs from the midpoint standard of the ICAL. Analytes must elute within 0.1 minutes of the associated EIS; this criterion applies only to analyte and labeled analog pairs.	Correct problem and reanalyze samples	Analyst	NA	NA

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator	Measurement Performance Criteria
EIS Analytes (aka SUR)	Every field sample, standard, blank, and QC sample	Basic procedure for aqueous samples: Add EIS standards to a 5 mL sample aliquot, add 5 mL MeOH, shake, optional carbon cleanup, filter, adjust pH with acetic acid for analysis. Basic procedure for solid samples: Add EIS to 2 g sample, add 10 mL 50% H20/50% MeOH, tumble 1 hour, centrifuge, optional carbon cleanup, filter adjust pH with acetic acid for analysis. All analytes recovered within 70-130% of expected concentration.	Qualify data associated with EIS if recovery exceeds 70-130%. If EIS recovery is below 20% or above 150%, identify and correct the problem. Reprepare and re-analyze if sufficient sample volume is available, contact the client as to additional measures to be taken.	Analyst, supervisor	Apply "Q" flag to the specific associated analyte if recovery exceeds 70-130%. Non-compliant EIS recoveries must be discussed in the case narrative.	Failing analytes shall be thoroughly documented in the Case Narrative
MB	One per batch of 20 or fewer field samples	No analytes detected > ½ LOQ	Correct problem. If required, re-prepare and reanalyze MB and all QC samples and field samples processed with the contaminated blank. Contact the client as to additional measures to be taken.	Analyst, supervisor	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply “B” flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid MB. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

QC Sample	Frequency	Method/SOP Acceptance Limits	Corrective Action	Person(s) Responsible	Data Quality Indicator	Measurement Performance Criteria
LCS	One per batch of 20 or fewer field samples	Blank spiked with all analytes at a concentration near the mid-level calibration concentration. All analytes recovered within 40-150% of expected concentration. Laboratory established recovery limits based upon historical data may be used if more stringent than 40-150%.	Correct problem, then re-prepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available. Contact the client as to additional measures to be taken.	Analyst, supervisor	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply “Q” flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all target compounds.
LCSD	One per batch of 20 or fewer field samples.	Aqueous: LCS/LCSD RPD ≤ 30 Solid: LCS/LCSD RPD ≤ 50	Investigate and correct the problem. Reprepare and reanalyze all samples associated with the failing LCS if sufficient material is available.	Analyst, supervisor	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply a "Q" flag to all results for the specific analyte(s) in all samples associated with the failing LCSD.	Must contain all target compounds. Spike concentration must be identical to LCS. .
MS/MSD	NA	NA	NA	NA	NA	NA

Notes:
1) Method acceptance limits and corrective actions are based on the ASTM D8421 laboratory specification included in **Appendix C.**

> = greater than
≥ = greater than or equal to
≤ = less than or equal to
% = percent
EIS = extracted internal standard
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
FHUEA = 2H-perfluoro-2-octenoic acid
FOUEA = 2H-perfluoro-2-decenoic Acid
ICAL = initial calibration for all analytes
LCS = laboratory control spike
LCSD = laboratory control spike duplicate
LOQ = limit of quantitation
MB = method blank
MS = matrix spike
MSD = matrix spike duplicate
NA = not applicable
NELAP = National Environmental Laboratory Accreditation Program
N-Et-FOSE = N-ethyl perfluorooctanesulfonamidoethanol
N-Me-FOSE = N-methyl perfluorooctanesulfonamidoethanol
PFAS = per- and polyfluoroalkyl substances
PFBA = perfluorobutanoic acid
PFMBA = perfluoro-4-methoxybutanoic acid
PFMPA = perfluoro-3-methoxypropanoic acid
PFOSA = perfluorooctanesulfonamide
PFPeA = perfluoropentanoic acid
PFPrA = perfluoropropanoic acid
QC = quality control
RPD = relative percent difference
RT = retention time
S/N = signal to noise
SOP = standard operating procedure

Worksheet #29: Project Documents and Records

Sample Collection Documents and Records	On-facility Analysis Documents and Records	Offsite Analysis Documents and Records	Data Assessment Documents and Records
Field Logbook	Field Logbook	Sample receipt, custody, and tracking records	Field sampling audit records
CoC Records	Field Sampling Forms	Sample prep logs	Laboratory audit records
Air Bills	Equipment Inspection Forms	Equipment calibration logs	Data validation reports
Custody Seals	Boring Logs	Run logs	Data usability assessment reports
Corrective Action Forms	Corrective Action Forms	Equipment maintenance test, and inspection logs	Corrective Action Forms
Field Sampling Forms	Daily Tailgate SH&E Sign In Sheet	Corrective Action Forms	Field Change Request Form
Sample location and depth data	APP/SSHP Acknowledgement	Reported analytical results	Non-Conformance Reports
Field equipment calibration logs	Dig Permits	Data package completeness checklists	Field Planning Request Form
Utility Clearance Checklist		Sample disposal records	
		Extraction/cleanup records	
		Raw data	
		EQuIS™	
		ROE Agreements	
		Photographic Logs	

Notes:
APP = Accident Prevention Plan
CoC = chain of custody
EQuIS = Environmental Quality Information System
NA = not applicable
ROE = right of entry
SH&E = Safety, Health, and Environment
SSHP = Site Safety and Health Plan
Other project documents and records may be produced as the need is identified.

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Worksheets #31, #32 & #33: Assessments and Corrective Action

This worksheet is used to document responsibilities for conducting project assessments, responding to assessment findings, and implementing corrective action. Appropriately scheduled assessments allow management to implement corrective action in a timely manner, thereby correcting non-conformances and minimizing their impact on DQOs/Project Quality Objectives.

Assessments:

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (A2P JV)	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Action	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
PM Review	Monthly (for field efforts that are longer than one month)	Internal	A2P JV	PM	Field Sampling Team Leader	Field Sampling Team Leader	Project Manager
Review of CoC forms	Daily	Internal	A2P JV	Project Chemist	Field Sampling Team Leader	Field Sampling Team Leader	Project Chemist
Laboratory Data Assessment (validation)	Once	Internal	A2P JV	Data Validator	Laboratory Chemist	Laboratory QA Manager	Project Chemist
Daily QC Audits	Daily	Internal	A2P JV	Field Sampling Team Leader	Field Sampling Team Leader	Field Sampling Team Leader	QA Officer
Field TSAs	Daily	Internal	A2P JV	Field Sampling Team Leader	Field Sampling Team Leader/ A2P JV	Field Sampling Team Leader/ A2P JV	QA Officer
Field Performance Audits	Weekly	Internal	A2P JV	PM	Field Sampling Team Leader	Field Sampling Team Leader/ A2P JV	Project Manager

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
CoC = chain of custody
PM = project manager
QA = quality assurance
QC = quality control
TSA = technical system audit

Assessment Response and Corrective Action:

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (A2P JV)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Field Sampling Audit	Email	Field Sampling Team Leader/ PM	Immediate	Daily QC Report/ Email	Project Quality Manager/ PM	24 hours after notification
PM Review	Email	Field Sampling Team Leader/ PM	Immediate	Daily QC Report/ Email	PM	24 hours after notification
Review of CoC forms	Email	Field Sampling Team Leader/ PM	Immediate	Daily QC Report/ Email	Project Chemist	24 hours after notification
Laboratory Data Assessment (validation)	Written Audit Report	Laboratory QA Manager; A2P JV Project Chemists	Within 24 hours after audit	Email	Data Validator; A2P JV Project Chemists	Up to 1 week after notification
Daily QC Audits	Email/ Daily QC Report	Field Sampling Team Leader/ PM	Immediate	Daily QC Report/ Email	PM	24 hours after notification
Field TSAs	Email/ Daily QC Report	Field Sampling Team Leader/ PM	Immediate	Daily QC Report/ Email	PM	24 hours after notification
Field Performance Audits	Email	Field Sampling Team Leader	Immediate	Daily QC Report/ Email	PM	24 hours after notification

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
CoC = chain of custody
PM = project manager
QA = quality assurance
QC = quality control
TSA = technical system audit

Laboratory Assessments

Assessment Type	Responsible Party & Organization	Number/ Frequency	Estimated Dates	Assessment Deliverable	Deliverable Due Date
DoD/ELAP Accreditation	Accreditation body	Every 2 Years	NA	Certification	NA
Performance testing samples	Laboratory QA Manager	Accreditation	Per Accrediting Authority	Per Accrediting Authority	Per Accrediting Authority
Data Review	Naoum Tavantzis and Dennis Capria, A2P JV	Once	45 days after receipt of data	Validation Report	45 days after receipt of data
External Laboratory Audit	Accreditation Body	Bi-annually	NA	Written Audit Report	NA
Internal Laboratory Audit	Contracted Laboratory	Annually	NA	Written Audit Report	NA

Notes:
A2P JV = AECOM Arcadis PFAS Joint Venture
DoD = Department of Defense
ELAP = Environmental Laboratory Accreditation Program
NA = not applicable
QA = quality assurance

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Worksheet #34: Data Verification and Validation Inputs

Item	Description	Verification (Completeness)	Validation (Conformance to Specifications)
Planning Documents/Records			
1	Approved QAPP	X	
2	Contract	X	
3	Field planning request forms	X	
4	Field SOPs	X	
5	Laboratory SOPs	X	
Field Records			
6	Field logbooks	X	
7	Equipment calibration records	X	
8	CoC Forms	X	X
9	Sampling diagrams/surveys	X	
10	Drilling logs	X	
11	Relevant correspondence	X	
12	Change orders/deviations	X	
13	Field audit reports	X	
14	Field change request forms / non-conformance corrective action reports	X	
15	Non-conformance corrective action reports	X	
Analytical Data Package			
16	Cover sheet (laboratory identifying information)	X	X
17	Case narrative	X	X
18	Internal laboratory CoC	X	X
19	Sample receipt records	X	X
20	Sample chronology (i.e., dates and times of receipt, preparation, and analysis)	X	X
21	Communication records	X	X
22	LOD/LOQ establishment and verification	X	X
23	Standards traceability	X	X
24	Instrument calibration records	X	X
25	Definition of laboratory qualifiers	X	X
26	Results reporting forms	X	X
27	QC sample results	X	X
28	Corrective action reports	X	X
29	Raw data	X	X
30	Electronic data deliverable	X	X

Notes:
CoC = chain of custody
LOD = limit of detection
LOQ = limit of quantitation
QAPP = Quality Assurance Project Plan
QC = quality control
SOP = standard operating procedure

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Worksheet #35: Data Verification Procedure

This worksheet documents procedures that will be used to verify project data. The procedures apply to both field and laboratory records. Data verification is a completeness check to confirm that all required activities are conducted, all specified records are present, and the contents of the records are complete. As illustrated in the following example, verification often is performed at more than one step by more than one person.

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
CoC forms and shipping forms	CoC, Shipping Documents	CoC forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the CoC should be initialled by the reviewer, a copy of the CoC retained in the site file, and the original and remaining copies taped inside the cooler for shipment.	Appropriate Field Sampling Team Leaders for the individual medias
Review of field logbooks	Field Logbooks	Review for completeness and accuracy.	Appropriate field Sampling Team Leaders
Field sampling TSAs	TSA Reports	Assessment of field sampling process prior to start of, or as close to the start of sampling as possible.	QA Manager or designee
Fixed laboratory analytical data review	Laboratory Data Package	Data controls are compared to this QAPP and DoD QSM 5.4 (Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-24) in a Three-Tiered process using a minimum 100% peer review.	PM or QA Manager
Fixed laboratory TSAs	Laboratory Data Package	ELAP audit and internal quality audits.	QA Manager
Fixed laboratory data verification	Data Validation Reports	100% data verification/validation for water and soil.	A2P JV Project Chemists
Fixed laboratory data validation	Data Validation Reports	Calculate and assess laboratory DQIs.	QA Manager, or designee

Notes:
% = percent
A2P JV = AECOM Arcadis PFAS Joint Venture
CoC = chain of custody
DoD = Department of Defense
DQI = data quality indicator
ELAP = Environmental Laboratory Accreditation Program
PFAS = per- and polyfluoroalkyl substances
PM = Project Manager
QA = quality assurance
QAPP = Quality Assurance Project Plan
QSM = Quality Systems Manual
TSA = technical system audit
USEPA = United States Environmental Protection Agency

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Worksheet #36: Data Validation Procedures

Data Validator: A2P JV

Analytical Group/Method	PFAS Definitive Analytical Data	RSC PFAS Data and all other Analytical Methods
Analytical specifications	**Worksheet #24**, **Worksheet #28** & Laboratory SOPs	
Measurement performance criteria	**Worksheet #12**, **Worksheet #15**, and **Worksheet #28**	
Percent of data packages to be validated	100%	100%
Percent of raw data reviewed	10%*	0%
Percent of results to be recalculated	10%*	0%
Validation procedure and qualification	General Data Validation Guidelines (DoD, 2019), Data Validation Guidelines Module 6: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-24 (DoD, 2022), this QAPP, DoD QSM Version 6.0 (DoD, 2023), and the laboratory SOPs. Data validation reports are produced for each sample delivery group incorporating all sample analyses.	
Validation code	S2bVEM/S2bVM (10% S4VM)	S2aVM (100% Stage 2a prior to any use followed by 10% Stage 2b for ASTM D8421)
Electronic validation program/version	A2P JV EarthSoft EQuIS™ Automated Validation Assistant and Data Quality Module A2P JV will also complete manual data validation	

Notes:
% = percent
A2P JV = AECOM Arcadis PFAS Joint Venture
DoD = Department of Defense
EQuIS = Environmental Quality Information System
PFAS = per- and polyfluoroalkyl substances
QAPP = Quality Assurance Project Plan
SOP = standard operating procedure
USEPA = United States Environmental Protection Agency

*Raw data review will be done per DoD Guidance, Module 6 Sections 6.0 and 7.0 for recalculations and Appendix B Recalculations. Excel spreadsheets will be appended to the DVR(s) where recalculation is performed and the raw excel files will be provided upon request. The 10% recalculation is planned for all data e.g. 10% of all samples will be subjected to Stage IV validation.

The following data validation flags will be used for the project:

Flag	Interpretation
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
J	The reported result was an estimated value with an unknown bias.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X *	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

* “R” flag or “UJ” flag applied by project team to replace X-flag in a final decision

When a result is initially X-flagged, data reviewer will first see if there is a more acceptable result that can be recommended for data use. In many instances a result that has the potential to be X-flagged is associated with failing QC that per the QAPP would require re-extraction or reanalysis. In these instances, the other non-X flagged result will be selected. In instances where this is not an option, the result will remain "X" flagged and the project team will decide if the point is usable during the DUA process

Worksheet #37: Data Usability Assessment

The DUA is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment will determine whether project execution and the resulting data the DQOs established in **Worksheet #11** were achieved. Both sampling and analytical activities will be considered with the ultimate goal to assess whether the final, qualified results support the decisions to be made with the data.

The following personnel are responsible for participating in the DUA:

- Project Manager: Claire Mitchell
- Project Chemist: Naoum Tavantzis
- Human Health Risk Assessor: Kelly Vosnakis
- Ecological Health Risk Assessor: Heather Patterson
- RI Task Manager: Colin Wasteneys

The DUA will be documented as a discussion within the RI Report and refer to the Data Validation Report that will appear in an appendix of the RI Reports. The Data Validation Report will follow the procedures given in **Worksheet #36**.

The following steps summarize the processes used to determine whether the collected data are of the right type, quality, and quantity to support the environmental decision-making for ARNG related to PFAS contamination at certain facility's and describe how data quality issues will be addressed and how limitations on the use of the data will be handled.

Step 1	**Review the project's objectives and sampling design** The key components established in the DQOs (**Worksheet #11**) will be reviewed to ensure that they are still applicable. Also, the sampling design and how it was implemented in the field will be reviewed for consistency with the stated objectives. For example, this step in the DUA will: • Reevaluate whether comparison criteria (i.e., SL; **Worksheet #15**) were updated since PQAPP generation and if laboratory QLs were sensitive enough for those changes (e.g., QLs remain lower than new criteria). It is important to note several states are in various stages of developing or finalizing limits for PFAS for different media; therefore, it is critical that SLs are regularly evaluated over the course of the project to ensure the SLs remain current. Additionally, project data must meet the MPC for sensitivity and project QLs specified in **Worksheets #15** and **#28**. • Discuss the limitations and impact on the use of project data if validation reports indicate that project specific sensitivity goals or QLs were not achieved for a specific sampling or laboratory group, dataset or sample delivery group (SDG), matrix, analytical group, or concentration level. • Evaluate the impact of any Field Change Request Forms and Nonconformance and Corrective Action Reports against established DQOs in **Worksheet #11** and usability of data. Examples of deviations that may impact usability of data include: o Sampling Locations Deviation: Determine if alterations to sample locations continue to satisfy the project objectives. o Chain-of-Custody Deviation: Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose. o Holding Times Deviation: Determine the acceptability of data where holding times were exceeded. o Damaged Samples Deviation: Determine whether the data from damaged samples are usable. If the data cannot be used, determine whether resampling is necessary. o SOPs and Methods Deviation: Evaluate the impact of deviations from SOPs and specified methods on data.
Step 2	**Review the data verification and data validation outputs** Available QA reports, including both field and laboratory generated forms, will be reviewed for deviations from planned activities identified in Step 1 (e.g., number and locations of samples, holding time exceedances, damaged samples, non-compliant proficiency testing sample results, and SOP deviations) and determine their impacts on the data usability. Validated data will be summarized and/or compiled to identify patterns, trends, and anomalies as they relate to the data quality indicators (DQIs) precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity. Descriptions of each DQI and examples of how each may be incorporated into the usability report follow.
	Precision Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance, percent difference, or range, in either absolute or relative terms. QC measures for precision include field duplicates, laboratory duplicates, MSDs, analytical replicates, and surrogates. To meet the needs of the data users, RI project data must meet the MPC for precision specified in **Worksheet #12** of this PQAPP. Precision errors may be the result of one or more of the following: PFAS cross-contamination, field instrument variation, analytical measurement variation, poor sampling technique, sample transport problems, or spatial variation (heterogeneous sample matrices). To identify the cause of imprecision, the field sampling design rationale and sampling techniques will be evaluated by the reviewer, and both field and analytical duplicate/replicate sample results will be compared. For example, if poor precision is indicated in both the field and analytical duplicates/replicates, then the laboratory may be the source of error. If poor precision is limited to the field duplicate/replicate results, then the sampling technique, PFAS contamination, field instrument variation, sample transport, medium inhomogeneity, or spatial variability may be the source of error. If data validation reports indicate that analytical imprecision exists for a particular dataset or SDG, then the impact of that imprecision on usability will be discussed in the usability report.

Step 2 (cont.)	**Accuracy/Bias** Accuracy is the degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) due to sampling and analytical operations. Examples of QC measures for accuracy include MSs, Laboratory Control Samples, and equipment rinsate blanks (ERBs). A measurement is accurate when the reported value does not differ from the true value or known concentration of the spike or standard. To meet the needs of the data users, project data must meet the MPC for accuracy/bias specified in **Worksheet #12** of this PQAPP. The usability report for each facility will: • Discuss and compare data on contamination and accuracy/bias (when bias is observable) for each matrix, analytical group, and concentration level. • Describe the limitations on the use of project data if extensive contamination, inaccuracy, or bias exists, or when inaccuracy is limited to a specific sampling or laboratory group, dataset or SDG, matrix, or concentration level. • Discuss the impact of any qualitative and quantitative trends in bias on the sample data. • Discuss if inaccuracy due to field equipment calibration exists and its impact on groundwater chemistry.
	Representativeness Representativeness is the measure of the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at a sampling point, a process condition, or an environmental condition, and it is achieved through a well-designed sampling program and by using standardized sampling strategies, techniques, and analytical procedures. To meet the needs of the data users, project data must meet the MPC for sample representativeness specified in **Worksheet #12** of this PQAPP. **Worksheet #28** and **Worksheet #35** discusses how the QA/QC activities (e.g., review of sampling design and SOPs, field sampling Technical System Audits (TSAs), and analysis audits) and QC sample data will be reviewed to assess sample representativeness. For example, if field duplicate precision checks indicate potential spatial variability, additional scoping meetings and subsequent resampling may be needed to collect data that are more representative of a nonhomogeneous site. The usability report for each facility will: • Discuss the impact of field duplicate imprecision onsite representativeness. For example, when data variability is high among field duplicate datasets (i.e., high relative standard deviation), calculation of the 95% UCL of the population mean is more likely to overestimate the true mean and therefore achieve better statistical coverage. • Discuss the impact of laboratory and field sampling methods, sampling personnel, and field equipment on sampling results and how they reflect site conditions. • If screening data will be confirmed by definitive methods, document the specific method and percent difference formula that will be used to assess comparability for individual data points. • Discuss the effect of site heterogeneity on sampling results in light of sampling methods used. • Describe the limitations on the use of project data when sampling results are non-representative for all data or for a specific sampling, group, dataset or SDG, matrix, analytical group, or concentration level.
	Comparability Comparability is the degree to which different methods, datasets, and decisions agree or can be represented as similar. Comparability describes the confidence (expressed qualitatively or quantitatively) that two datasets can contribute to a common analysis and interpolation. The RI results will be used as benchmarks for determining comparability for data collected during any future sampling events at the various facilities using the same or similar field sampling and analytical SOPs. At this time, data will not be compared to other datasets or data using different sampling or analytical SOPs.

Step 2 (cont.)	Screening Data Assessment: Screening-level analyses may be used for informing field decisions regarding adaptive sampling and analytical strategies. Assessment of the screening-level data will be based on a percent decision match (USACE, 2013) assessment, also referred to as "a reliability assessment", of the screening level results and confirmation split sample results, as established in the ASTM D8421 DMA Work Plan (AECOM, 2024c) and outlined in **Worksheet #12**. To ensure future comparability of data generated for the facilities, standard sample collection procedures and approved analytical methods will be used. Sample analyses will be performed by the laboratory using approved methods and procedures. Comparability criteria will be considered met for the project if, based on data reviewed, the sample collection and analytical procedures (such as use of alternate preparation if indicated by a positive field shake test) are determined to have been followed or defined to show that variations did not affect the values reported. Deviations to sampling scope will be documented in sampling nonconformance reports which may contain some of the discussion of comparability. As applicable, the usability report may also: • Describe the limitations on the use of project data when project-required data comparability is not achieved for the overall project or is limited to a specific sampling or laboratory group, dataset or SDG, matrix, analytical group, or concentration level. • Document the failure to meet screening/confirmatory comparability criteria and discuss the impact on usability. • Discuss anomalies detected in the data that may reflect a changing environment or indicate sampling and/or analytical error.
	Completeness Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct, normal circumstances. To meet the needs of the data users, project data must meet the MPC for data completeness. Completeness criteria will be considered met if 95% of all planned PFAS sample data are collected. As applicable, the usability report may also: • Describe how the amount of valid data will be determined as a percentage of the number of valid measurements for each matrix, analytical group, and concentration level. • Describe how critical data were assessed for completeness when certain sample locations or analytes and matrices are more critical than others in making project decisions. • Evaluate the impact of missing information. Ensure that enough information was obtained for the data to be usable to meet the DQOs (**Worksheet #11**).
	Sensitivity Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory fortified blanks, a DL study, LOD/LOQ Verifications, and Instrument Sensitivity Checks (ISC). To meet the needs of the data users, project data must meet the MPC for sensitivity and project QLs specified in **Worksheets #15** and **#28** of this PQAPP. If appropriate, the usability report may also: • Discuss and compare sensitivity and DL/LOD/LOQ from the datasets collected for the project for each matrix, analytical group, and concentration level. • Discuss the impact of a lack of sensitivity or higher DL/LOD/LOQ on data usability, if validation reports indicate that sensitivity goals or DL/LOD/LOQ goals were not achieved. • Describe the limitations on the use of project data when sampling results are non-representative for all data or for a specific sampling, group, dataset or SDG, matrix, analytical group, or concentration level.

Step 3	**Verify the assumptions of the selected statistical method** The use of statistical methods for data assessment for this project may include, but are not limited to, estimating a 95% UCL (or mean as appropriate for the analyte) for the assessment of risks. The 95% UCL is defined as the exposure point concentration (EPC) in USEPA guidance (Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA 2002). The UCL represents the upper-bound concentration of a chemical to which a receptor may be exposed. The value represents the upper bound arithmetic average of the concentration that is contacted over the exposure period, accounting for uncertainty and variability in the dataset. The UCL is calculated using USEPA's ProUCL software. ProUCL tests the distribution of the data sets and computes a conservative UCL based on the appropriate distribution of the data. For those data sets that do not fit the normal, lognormal, or gamma distributions, several parametric and distribution-free non-parametric methods are available to calculate an appropriate UCL (e.g., bootstrap methods). The ProUCL program uses several statistical methods to handle data sets with and without non-detected results. Based on data distribution ProUCL recommends the best fit UCL for the dataset.
Step 4	**Implement the statistical method** Where statistical methods are used, the underlying assumptions will be assessed during the DUA. The consequences of selecting the incorrect alternative will be discussed, and uncertainty tolerances will be considered.
Step 5	**Document data usability and draw conclusions** The DUA will determine and document whether the data can be used as intended given any deviations and corrective actions that may have occurred. Limitations on data use will be considered and discussed as appropriate, and the performance of the sampling design assessed. Conclusions will be drawn taking any data limitations into consideration and documented in the RI Report.

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Appendix A
Technical Project Planning Meeting Minutes

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Meeting Minutes
Albany Army Aviation Support Facility #3, NY
Technical Project Planning (TPP) – Meeting 1
Remedial Investigations (RI), Feasibility Studies (FS), Decision Documents (DD), and Time Critical / Non-Time Critical Removal Actions (TCRA/NTCRA) for Per-and Polyfluoroalkyl Substances (PFAS) Impacted Sites
Army National Guard (ARNG) Installations, Nationwide
Contract No. W912DR-23-D-0007, Task Order W912DR23F0388
Monday, 11 March 2024
1300-1430

Participants			
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**Notes: A2P JV – AECOM-Arcadis PFAS Joint Venture, ALB – Albany International Airport, ARNG-G9 - Army National Guard-G9, NYARNG – New York Army National Guard, NYSDEC – New York State Department of Environmental Conservation, NYSDOH – New York State Department of Health, USACE – United States Army Corps of Engineers*

Mr. Colin Wasteneys (AECOM Arcadis PFAS Joint Venture [A2P JV]) welcomed participants and reviewed the purpose of the meeting, outlined the agenda, and led a roundtable of introductions for everyone on the virtual Technical Project Planning (TPP) 1 meeting. The purpose of the meeting was to introduce project teams members and stakeholders to the Army National Guard (ARNG) Per- and Polyfluoroalkyl Substance (PFAS) Remedial Investigation (RI)/Feasibility Study (FS) program, discuss the overall planned RI approaches, discuss the project schedule, and gain input on stakeholder preferences.

Presentation slides were provided to participants prior to the meeting and are included in **Attachment A**. Key points that supplement the presentation are summarized below.

A safety moment was provided to the participants. Mr. Wasteneys discussed the health impacts of gas stove emissions, including preventative measures and key statistics.

Programmatic Discussion (Slides 5–8):

- The United States Army Corps of Engineers (USACE) Baltimore District is the Project Contracting Lead and technical support office for Albany AASF #3. ARNG G-9 is the Federal Project Lead.
- The A2P JV Project Management Office (PMO) is based out of Germantown, MD; the entire project is supported by a nationwide network.
- The program follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.
- The first step in the CERCLA process is the Preliminary Assessment (PA), which has been finalized for this facility. The ARNG has performed PAs at approximately 200 facilities across the country to determine the likelihood of release and whether any complete pathways existed to drinking water receptors. The final results of the PAs determine whether a specific site would move to the SI-phase or be recommended for No Further Action, per the CERCLA process.
- The second step in the CERCLA process is the Site Investigation (SI), which has been finalized for this facility. Presence or absence of PFAS at the source areas and facility boundary during the SI (results discussed in detail in later slides) were used to determine whether there was a need for a RI.

- Albany Army Aviation Support Facility (AASF) #3 is currently in the RI step of the CERCLA process. While the CERCLA framework follows a step-wise approach, an interim removal action or No Further Action determination can be made at any phase during the process.
- Participants for TPP 1 included ARNG, USACE, New York Army National Guard (NYARNG), New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), Albany International Airport (ALB) and the A2P JV; participants for the future TPP and/or planning meetings will include the addition of any other local stakeholders to be determined.

Albany AASF #3 SI Overview (Slides 9-13):

- The SI findings for Albany AASF #3 were presented. Much of this information had been discussed during the TPP 3 meeting for the SI and was discussed in brief.
    - Hexafluoropropylene oxide dimer acid (HFPO-DA; commonly referred to as GenX) was not analyzed at the time of the SI.
    - Since the SI, there have been updates to the screening levels (SLs); each mobilization will use SLs that are in effect and most current with the Department of Defense (DoD) guidance at the time of the mobilization and/or reporting.
- Area of Interest (AOI) 1 encompasses the AASF#3 Hangar Release and Fire Response Unit
    - In 2012, a firefighting foam release occurred at the AASF#3 Hangar during initial testing of the fire suppression system.
    - In 2021, an accidental release of the fire suppression system spilled onto the tarmac and grassy area immediately west of AASF #3 Hangar.
    - The Fire Response Unit (active from 1983-1992) operated from a room attached to the northern part of the hangar.
    - The Fire Response Unit housed an aqueous film forming foam (AFFF) containing fire truck. There are no documented spills or releases but AFFF handling practices are unknown.
- AOI 2, the Garbage Truck Fire consists of a ~0.05-acre area where a fire occurred in the back of a garbage truck southeast of the AASF #3 Hangar in May 2017.
    - The Colonie Fire Department responded to the incident using an unknown type of foam.
- AOI 3, Stockpiled Soil includes the ~0.07-acre area containing ~ 80 cubic yards of stockpiled soil removed from AOI 1.

Albany AASF #3 SI Overview – Results (Slides 14-22):

- SI soil results were reviewed.
    - Exceedances of SLs in shallow soil for perfluorooctanesulfonic acid (PFOS), no other exceedances in soil results.
    - Exceedances in soil limited to one location at AOI 1, no other exceedances at any other AOI.
- SI groundwater results were reviewed.
    - Perfluorooctanoic acid (PFOA), PFOS, perfluorohexanesulfonic acid (PFHxS), and perfluorononanoic acid (PFNA) exceedances were detected within AOI boundaries.
    - Perfluorobutanesulfonic acid (PFBS) was detected in GW at all 3 AOIs, but at concentrations below SLs.
    - PFOS exceedances at AOI 1 were the highest by several orders of magnitude.
- All three AOIs are proceeding to RI based on the results of the SI.

RI Technical Approach (Slides 23-27):

- A2P JV provided additional detail on the data objectives of the Prescriptive phase, but noted that proposed sample locations, methods, and other specifics would be discussed in later planning stages.
- Three primary phases of field work are planned to be carried out:
    - Prescriptive
        - Develop characterization strategy using PA/SI data and preliminary conceptual site model.
        - Evaluate source areas contributing to observed groundwater impacts.
        - Evaluate the role of utility structures in the fate and transport of PFAS.

        - Identify potential drinking water receptors, a well survey underway under separate task.
        - Use a fixed laboratory with systematic sample sequencing to balance cost and timing of decision making.
        - Tentative use of a screening level analytical method for PFAS (American Society for Testing and Materials [ASTM] D8421).
        - Mr. Brian Jankauskas (NYSDEC) inquired about the status of the well survey, requesting a copy of the final survey, and expressing concern about identifying private well owners in the area around Albany AASF #3; Mr. Colin Wasteneys (A2P JV) confirmed that the well survey would be provided to NYSDEC and NYSDOH upon completion of a final draft.
    - Adaptive
        - Based on findings of predictive phase, use rapid site characterization techniques to delineate sources and define geometry of plume(s).
    - Final Characterization & Monitoring
        - Install complete groundwater well network.
        - Complete well development, slug testing, and perform quarterly monitoring.
- The most current SLs are the November 2023 EPA RSLs which have been accepted by the DoD; DoD's accepted SLs at the time of the RI field activities will be used.
    - The addition of two additional PFAS (perfluorobutanoic acid [PFBA] and perfluorohexanoic acid [PFHxA]) in the current SLs (August 2023) have not changed the final decisions determined during the SI.
- Rights of Entry (ROE) will need to be secured to complete anticipated off-site sampling.
    - Critical to start ROE process as early as possible to avoid any field work delays.
    - Mr. Colin Wasteneys (A2P JV) noted that Federal Aviation Administration (FAA) notifications are anticipated for the RI field work.
        - Mr. Robert Braunlin (ARNG G-9) asked Mr. Connor Haskin (ALB) to clarify whether the Albany Airport would submit the FAA notification of if that was an ARNG responsibility.
        - Mr. Connor Haskin (ALB) stated that Mr. Braunlin would have to submit the FAA notifications, but that Mr. Haskin and his team would support and guide Mr. Braunlin through the process.

RI Community Involvement (Slide 28):

- A2P JV reviewed the Community Involvement Plan (CIP), the formal plan for community involvement activities. The CIP will be conducted in tandem with RI activity – it is meant to reach out to the community surrounding the facility and identify key concerns, gauge interest in the remedial investigation, and identify the best modes of communication for outreach activities.

Schedule (Slide 29):

- Rough estimate for the Prescriptive phase of the RI was presented. The Prescriptive phase is slated to begin in quarter 3 of 2024 and wrap up at the end of 2024. The next phase of work (Adaptive) is slated to begin in 2025.

Open Discussion (Slide 30):

- Mr. Brian Jankauskas (NYSDEC) inquired about a submission date for the Quality Assurance Project Plan (QAPP) and CIP; Mr. Colin Wasteneys (A2P JV) stated that an exact date will be provided as the completion of the Draft Final RI QAPP and CIP approaches.
- Mr. Brian Jankauskas (NYSDEC) asked for additional information on the use of ASTM D8421 as a PFAS screening method, including labs that will be used, DoD accreditation, and NYSDOH Environmental Laboratory Approval Program (ELAP) certification for the method. Ms. Claire Mitchell (A2P JV) discussed the efforts to get approval for ASTM D8241 as the screening analytical method for PFAS through a Demonstration of Method Applicability (DMA).

  - All definitive data for the RI will be analyzed using Draft EPA Method 1633; however, this method can have limiting factors for rapid characterization, including slow laboratory turnaround time. ASTM D8421 can provide a faster turnaround time and is slightly less expensive.
  - DoD approval will occur through the acceptance of the DMA results by a DoD chemist.
  - Currently the A2P JV is planning on using Pace South Carolina as the primary analytical lab for ASTM D8421 analysis, as they have already completed method detection limit studies. However, the A2P JV also has other labs scoped out such as Eurofins Lancaster Laboratories (Eurofins). Earlier sites in the program will likely use Pace South Carolina. When Eurofins has completed their method detection limit studies for ASTM D8421, both Eurofins and Pace South Carolina are planned to be used.
  - The A2P JV is unsure about NYSDOH ELAP certification but will investigate the topic and provide a timely response.
- Mr. John Swartwout (NYSDEC) stated that the Town of Colonie Library located near the site would be a good option for the document repository.
- Mr. John Swartwout and Mr. Brian Jankauskas (NYSDEC) inquired and raised concerns about New York State (NYS) PFAS screening levels, specifically, the soon to be promulgated protection of groundwater number for soil. Mr. Swartwout and Mr. Jankauskas advocated for early consideration of NYS PFAS screening levels, especially in regard to delineation and site figures; Mr. Colin Wasteneys and Ms. Claire Mitchell (A2P JV) respond that OSD screening levels will be used during the RI phase of work and state levels will be looked at during the FS ARARs evaluation.
- Mr. Brian Jankauskas (NYSDEC) inquired about a scoping call, and the absence of surface water sampling during the SI; Mr. Colin Wasteneys (A2P JV) stated that the next TPP meeting would be held to present the RI QAPP including planned approaches and implementation.

The presentation ended at 1402 and the phone line was closed.

Attachment A - TPP 1 Meeting Slides

Technical Project Planning Meeting 1
Albany AASF Support Facility #3, NY

11 March 2024

Remedial Investigations (RI), Feasibility Studies (FS), Decision Documents (DD), and Time Critical / Non-Time Critical Removal Actions (TCRA/NTCRA) for Per-and Polyfluoroalkyl Substances (PFAS) Impacted Sites Army National Guard (ARNG) Installations, Nationwide

Contract No. W912DR-23-D-0007
Task Order W912DR23F0388

Agenda

Introductions

Safety Moment

Technical Project Plan (TPP) Meeting Goals

Program Overview

Program Organization and Communication

Site Inspection (SI) Overview

RI Technical Approach

RI Community Involvement

Schedule

Questions and Open Discussion

Introductions

ARNG G-9

Jennifer Solomon, PFAS Program Manager

Bonnie Packer, Nationwide Technical Lead

Robert Braunlin, Project Manager

New York State Department of Environmental Conservation (NYSDEC)

Rick Mustico, Bureau Director, Division of Environmental Remediation

John Swartwout, Section Chief, Remedial Bureau A, Division of Environmental Remediation

Brian Jankauskas, Technical Project Manager

United States Army Corp of Engineers (USACE)

Emily Cline, Nationwide Program Manager, Baltimore District

Josiah Fernandez, Project Manager, Baltimore District

Genna Huston Rohleder, Clifford Opdyke, Technical Support, Baltimore District

New York State Department of Health (NYSDOH)

Renata Ockerby, Bureau of Environmental Exposure Investigation

Sarita Wagh, Bureau of Environmental Exposure Investigation

New York Army National Guard (NYARNG)

James Williamson, Environmental Branch Chief

1LT Steves Vanderpool, Deputy Branch Chief

Gregory Austin, Environmental Compliance

Albany International Airport

Connor Haskin, Chief Airport Planner

AECOM Arcadis PFAS JV (A2P JV)

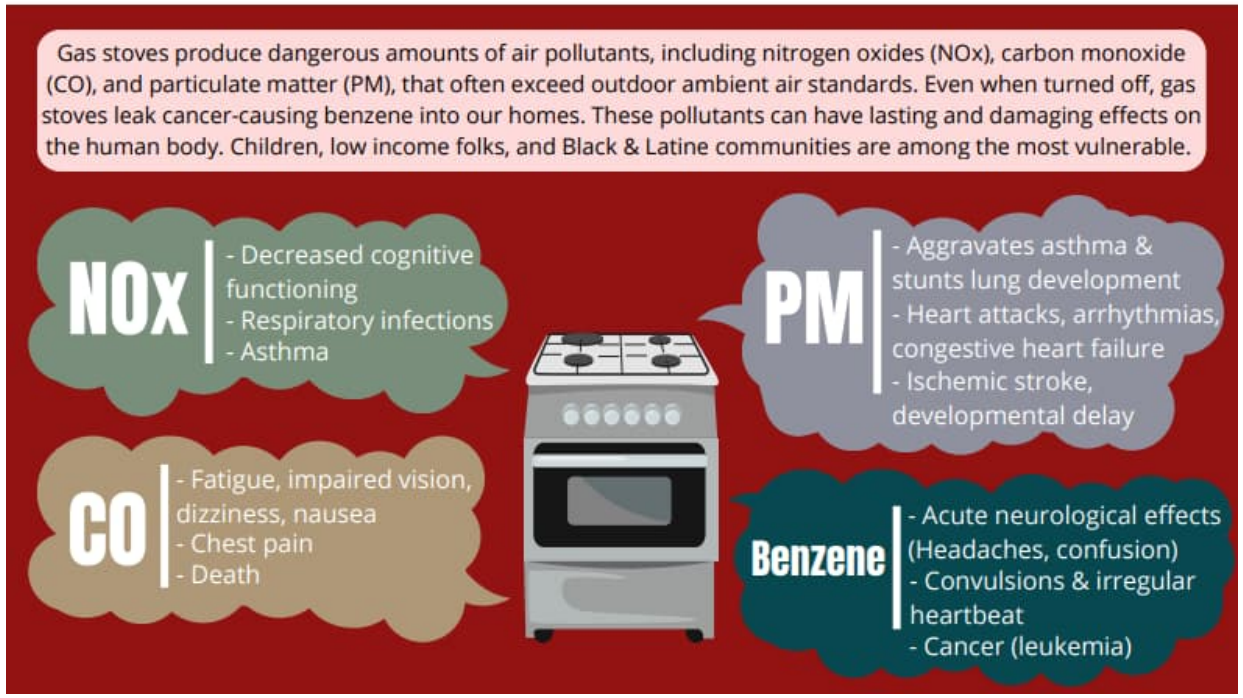
Claire Mitchell, Project Manager

Colin Wasteneys, RI Facility Task Leader

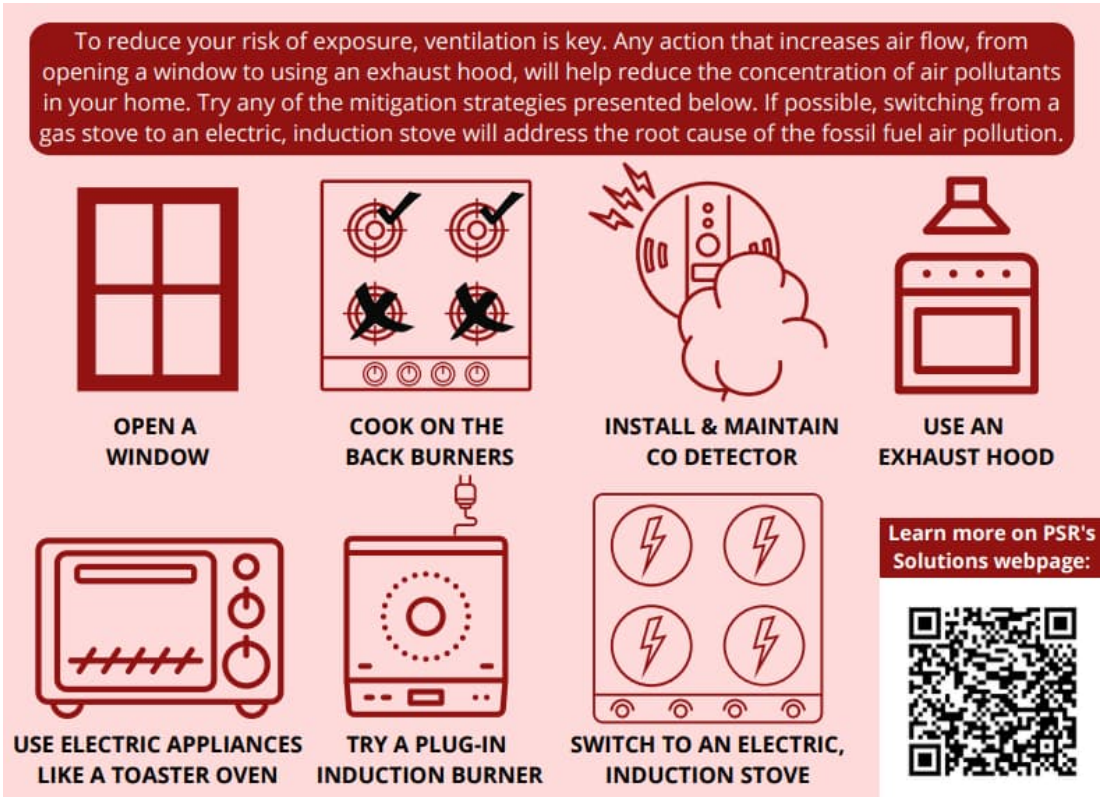
Agnes Link-Harrington, RI Deputy Task Leader

Safety Moment – Indoor Air Quality and Gas Burning Stoves

Gas Stove Emissions



Preventative Measures



Reference: *Physicians For Social Responsibility. 2023.Gas Stove Pollution Fact Sheet.*

TPP 1 Meeting Goals

- Provide an overview of the ARNG RI/FS Program
- Review CERCLA Work Phases
- Discuss SI Findings
- Review purpose of RI/FS
- Encourage stakeholder involvement
- Review project schedule
- Capture action items

Program Overview – CERCLA Work Phases



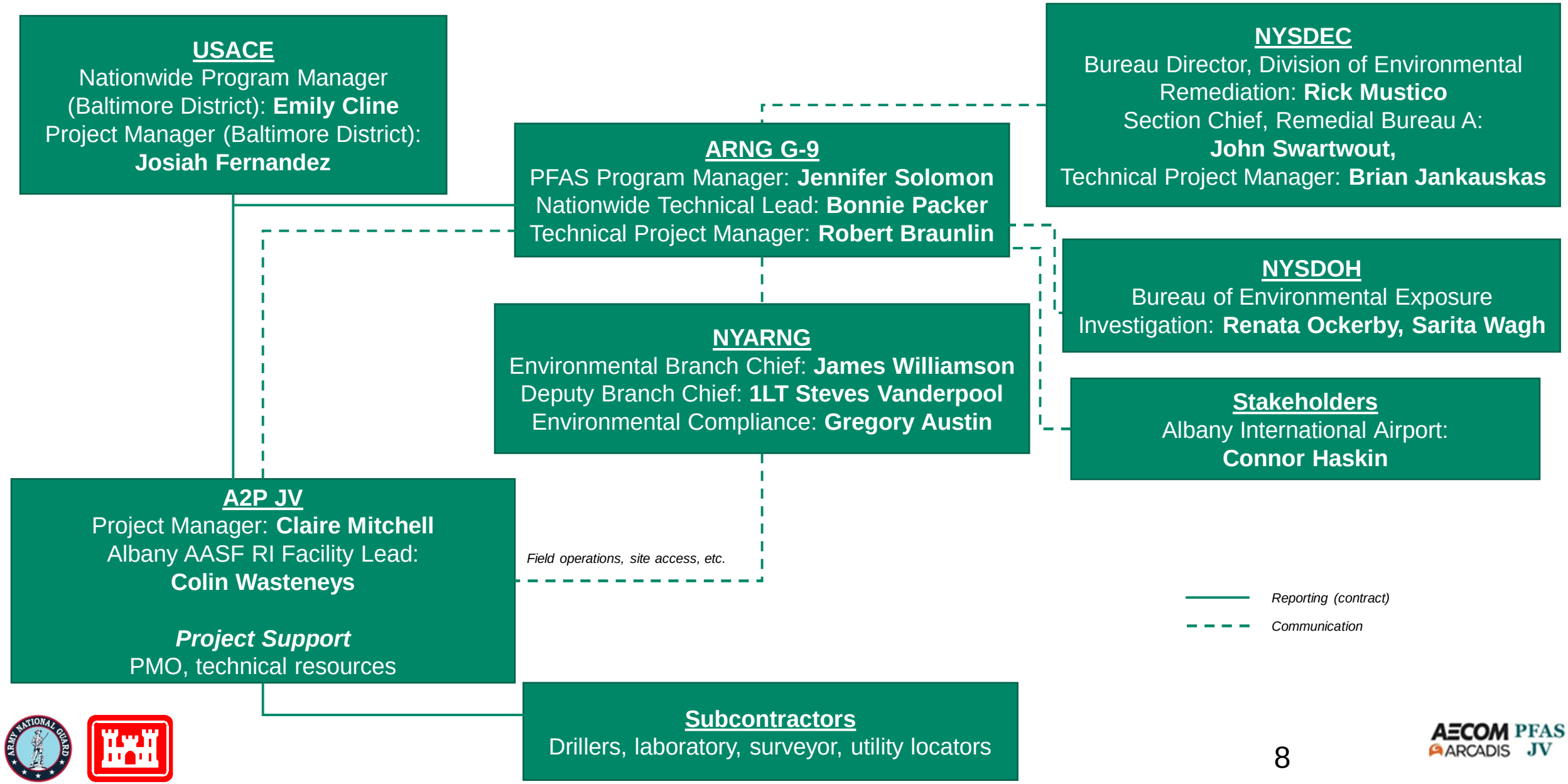
Notes: *Current stage of activity

- Follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process
- Preliminary Assessment (PA) and Site Inspection are complete
- An interim removal action (e.g., TCRA or NTCRA) can be conducted or a No Further Action determination can be made at any phase

Program Organization and Communication

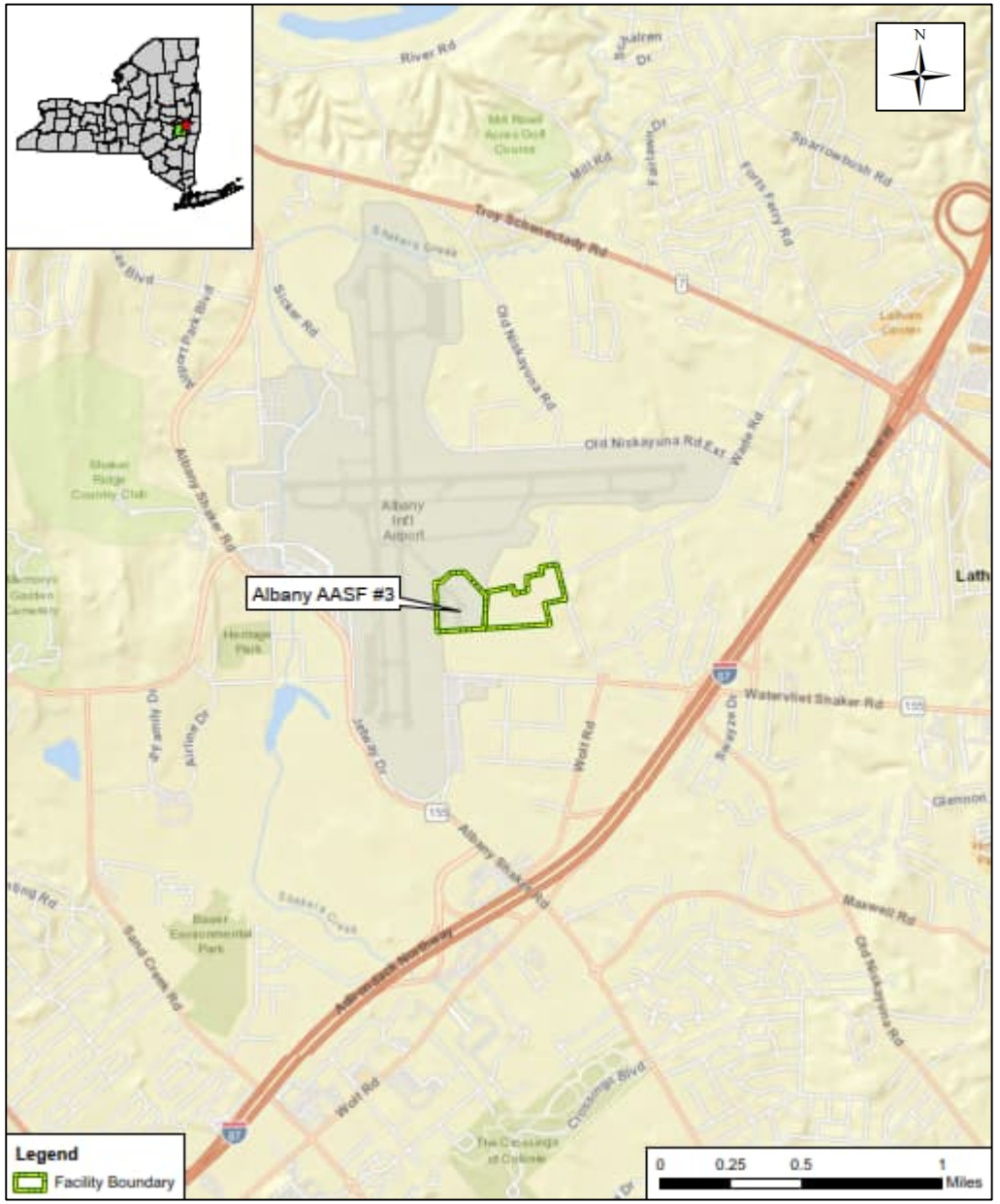
- USACE Baltimore is the Project Contracting Lead
- Technical support provided by regional USACE offices:
  - ✓ USACE Baltimore for Albany AASF #3
- ARNG G-9 is the Federal Project Lead
- A2P JV Project Management Office (PMO) is based out of Germantown, MD and supported through a nationwide network
- A2P JV to execute RIs over multiple task orders and report up through PMO
  - Currently 2 task orders awarded for 21 total RIs
  - RI/ FS including supporting tasks (e.g., community outreach, TCRAs, bottled water supply, etc.)

Program Overview - Organization and Communication



SI Overview

- SI field work completed: April 2022
- SI report finalized: June 2023
- Primary data quality objective: presence or absence of relevant compounds above screening levels:
  - Perfluorooctanoic acid (PFOA)
  - Perfluorooctanesulfonic acid (PFOS)
  - Perfluorohexanesulfonic acid (PFHxS)
  - Perfluorononanoic acid (PFNA)
  - Perfluorobutanesulfonic acid (PFBS)



SI Overview - Screening Levels

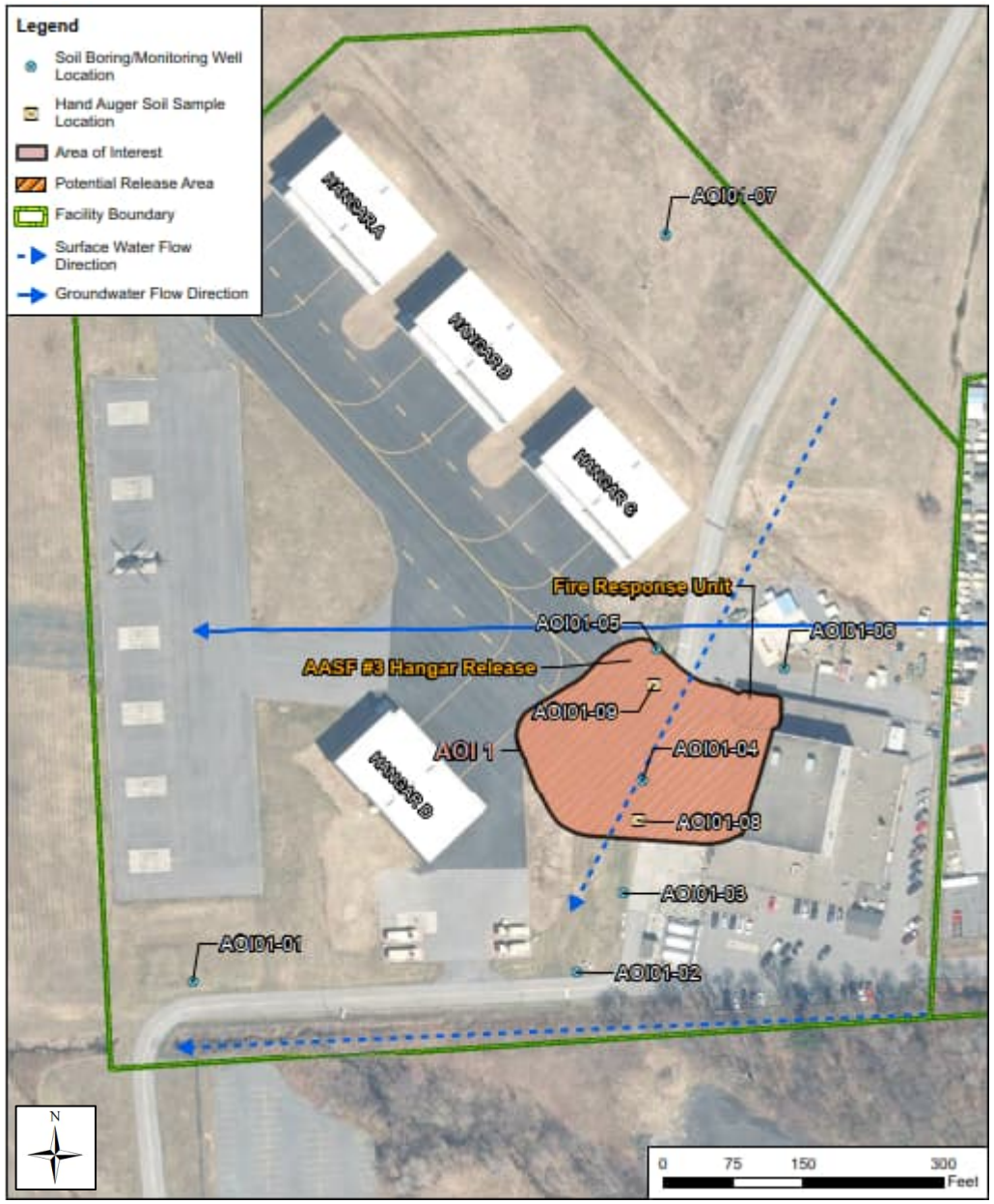
- Data screened against Office of the Secretary of Defense (OSD) Screening Levels (SLs) to determine if moving forward to RI

Analyte[b]	Residential (Soil) (µg/kg)[a] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a]
PFOA	19	250	6
PFOS	13	160	4
PFBS	1,900	25,000	601
PFHxS	130	1,600	39
PFNA	19	250	6

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter
a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.
b.) Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the Preliminary Assessment (PA) and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

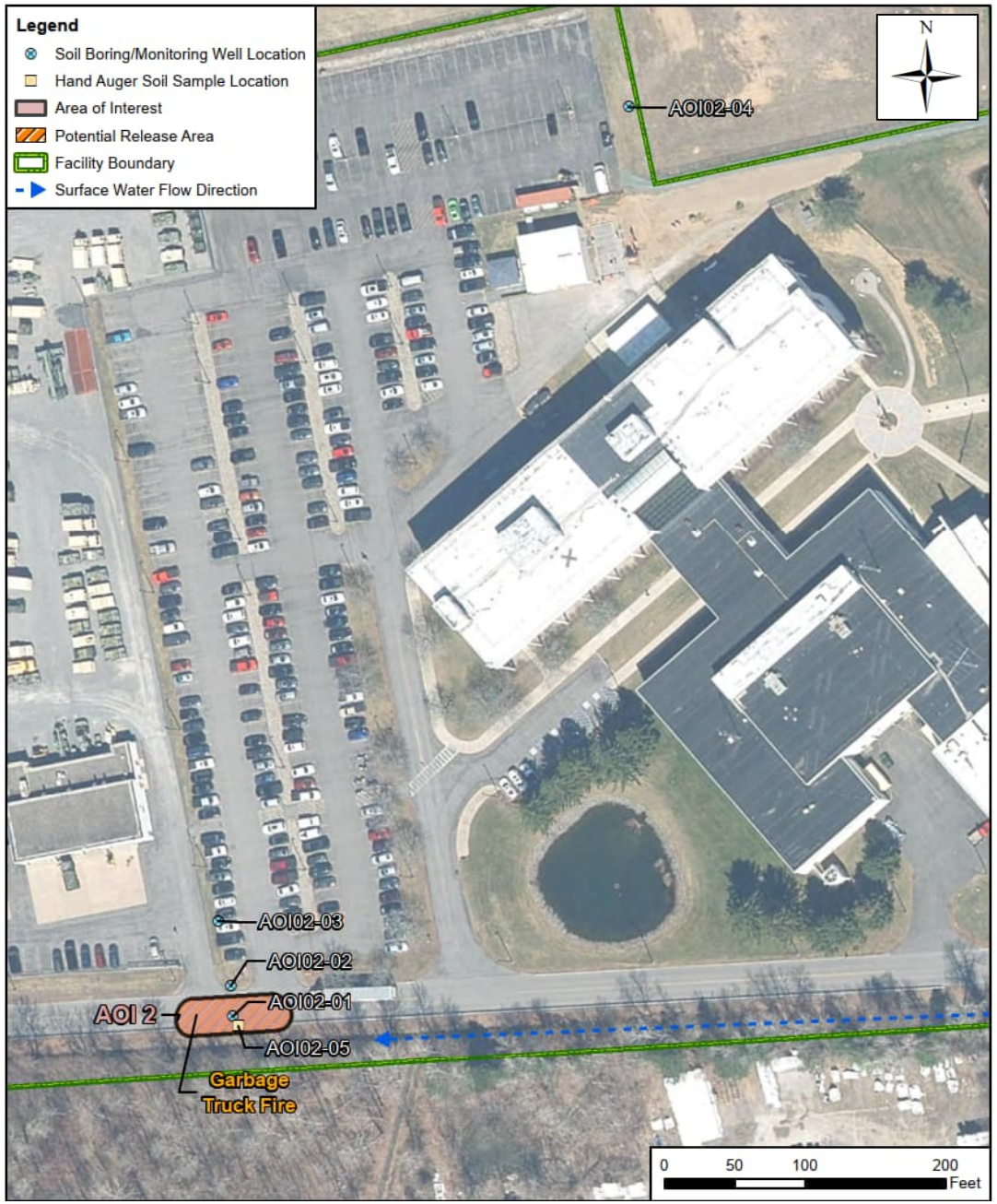
SI Overview

- Area of Interest (AOI) 1: AASF #3 Hangar Release/ Fire Response Unit
  - The AASF #3 Hangar Encompasses two release areas:
    - *2012*: During initial testing of the fire suppression system, foam filled the AASF #3 Hangar and spilled out through the doors onto the tarmac and nearby grass.
    - *2021*: Accidental release of the fire suppression system spilled onto tarmac and grassy area immediately west of AASF #3 Hangar.
  - Fire Response Unit:
    - Responded to all fire & emergency incidents at the facility and airport from 1983 to 1992.
    - Based out of a room attached to the northern side of the AASF #3 Hangar.
    - Housed a firetruck containing AFFF – filling/washing practices unknown.
    - No documented leaks or releases.



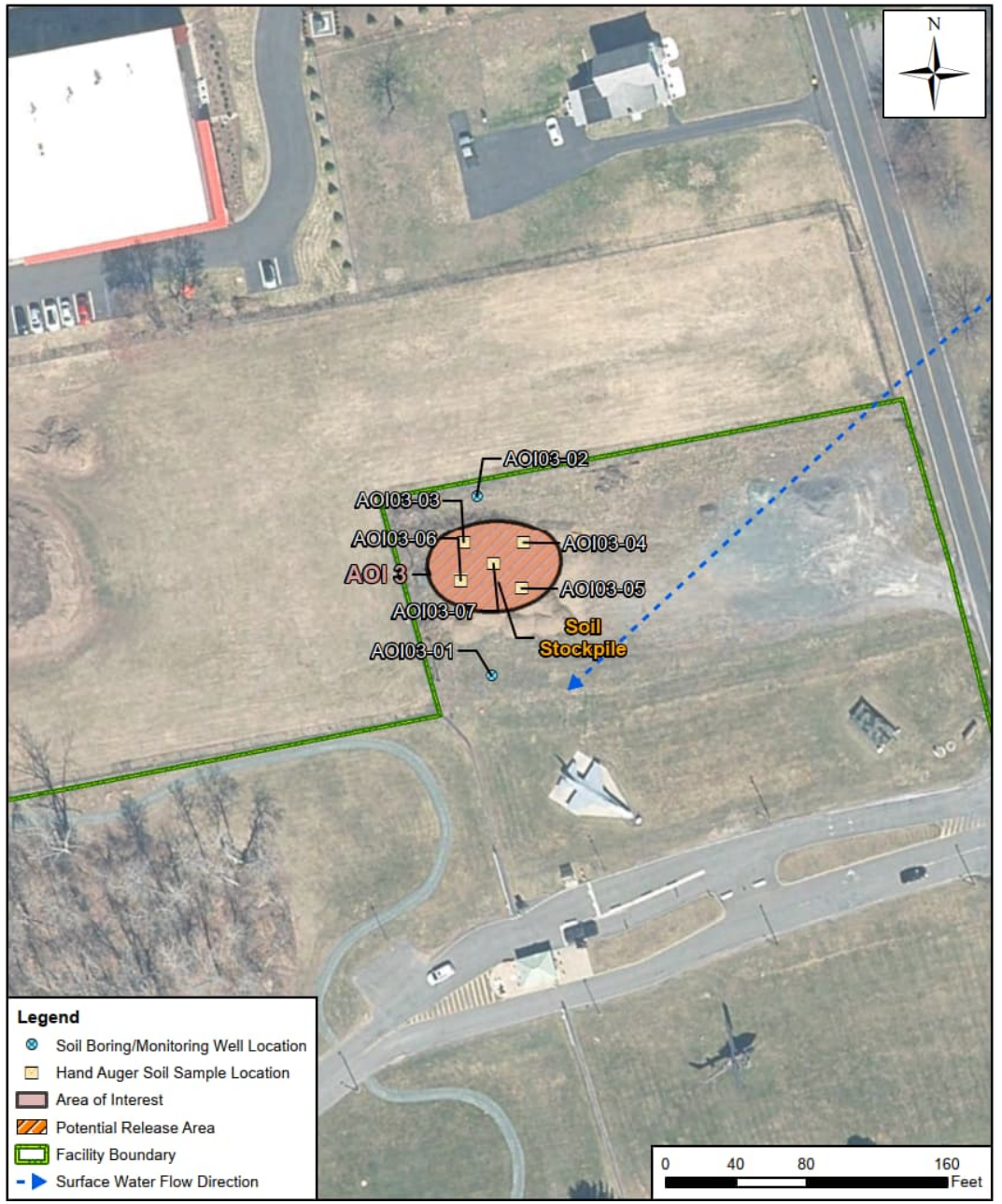
SI Overview

- AOI 2: Garbage Truck Fire
  - ~0.05-acre area where a fire occurred in the back of a garbage truck southeast of the AASF #3 Hangar in May 2017.
  - The Colonie Fire Department responded to the incident using an unknown type of foam.
  - Immediately north of AOI 2 lies a stormwater drop inlet. Booms and socks were used to protect the inlet during the 2017 incident.

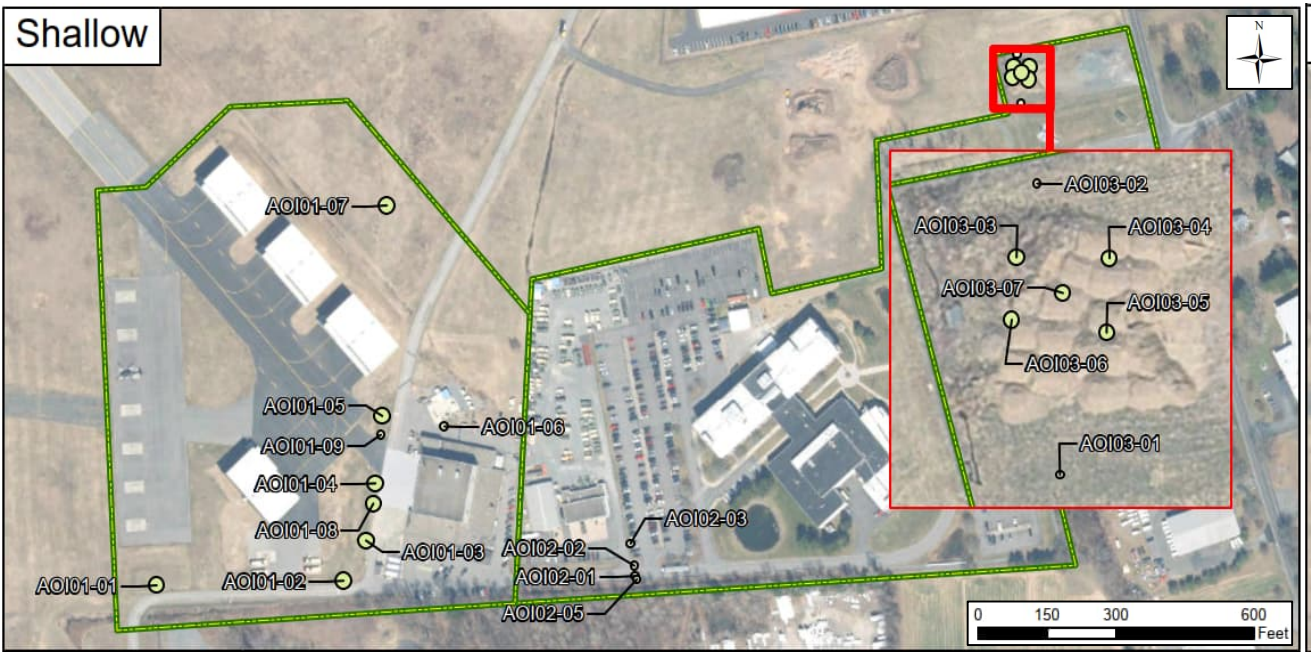


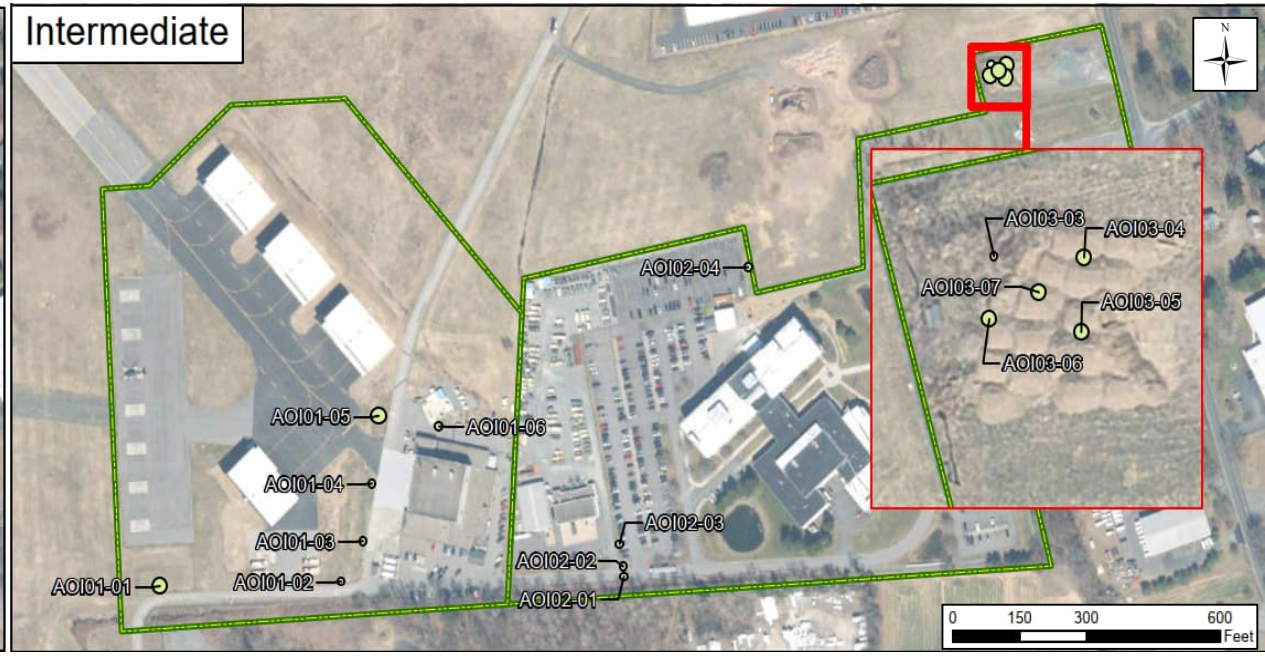
SI Overview

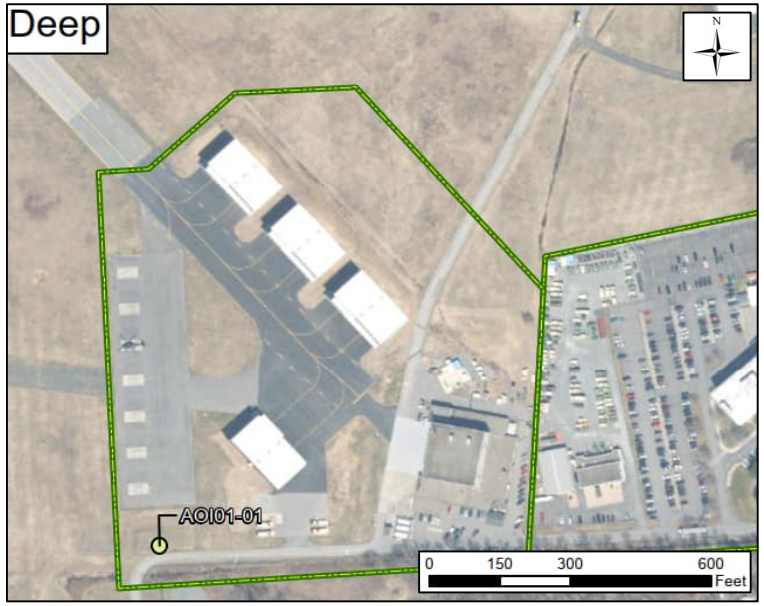
- AOI 3: Stockpiled Soil
  - ~0.07-acre area containing ~ 80 cubic yards of stockpiled soil removed from AOI 1.
  - *May – November 2020*: 4 new hangars (A-D) were constructed resulting in soil removal from AOI 1.



SI Overview – Results: PFOA in Soil







Legend

Facility Boundary

PFOA Residential Soil Screening Level 0-2 ft bgs: 19µg/kg

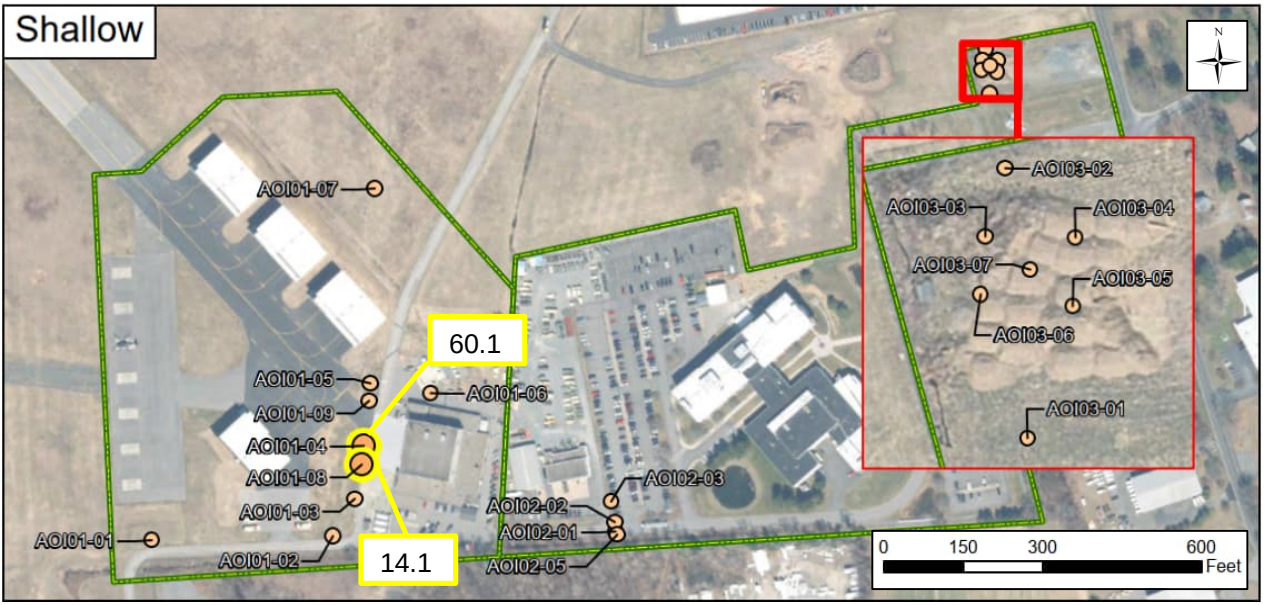
PFOA Industrial Soil Screen Level 2-15 ft bgs: 250 µg/kg

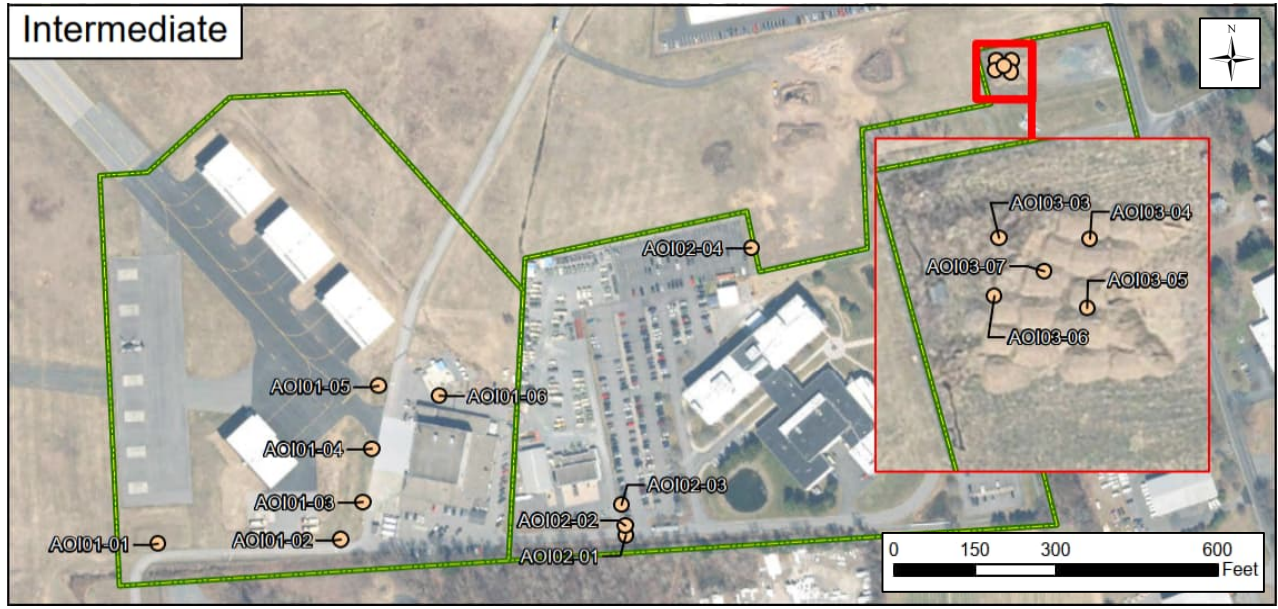
Exceedances of the OSD SL are depicted with a yellow halo.

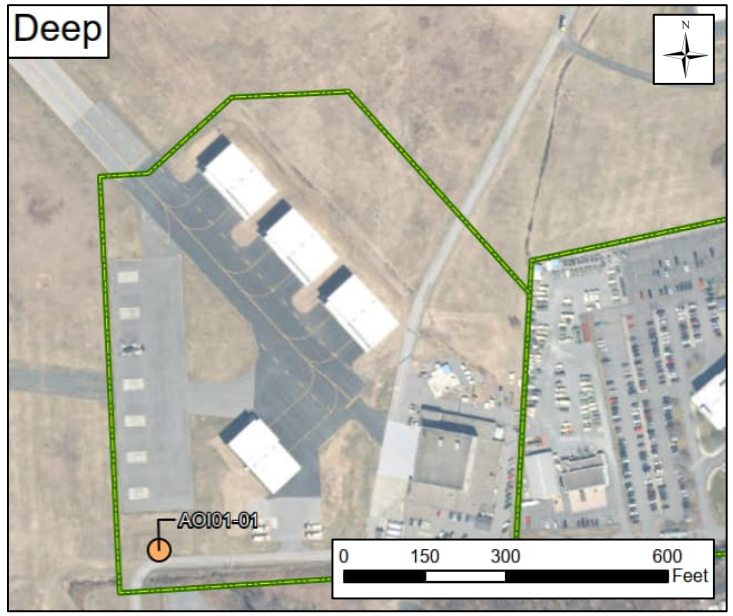
PFOA Results (µg/Kg)

- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

SI Overview – Results: PFOS in Soil







Legend

Facility Boundary

PFOS Residential Soil Screening Level 0-2 ft bgs: 13 µg/kg

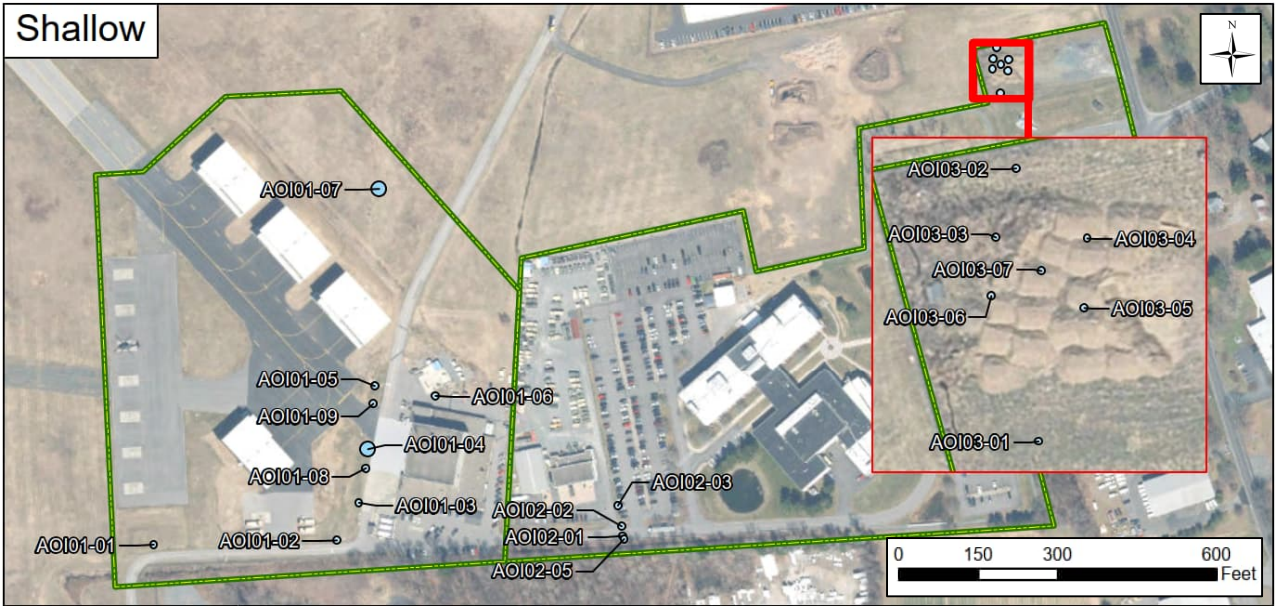
PFOS Industrial Soil Screen Level 2-15 ft bgs: 160 µg/kg

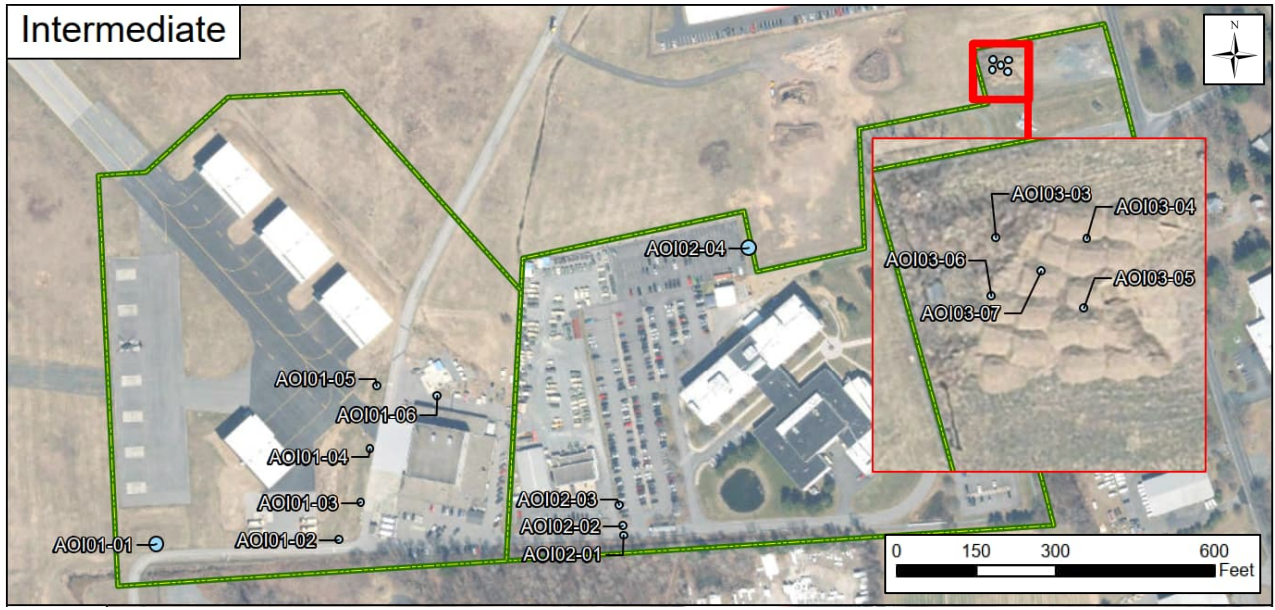
Exceedances of the OSD SL are depicted with a yellow halo.

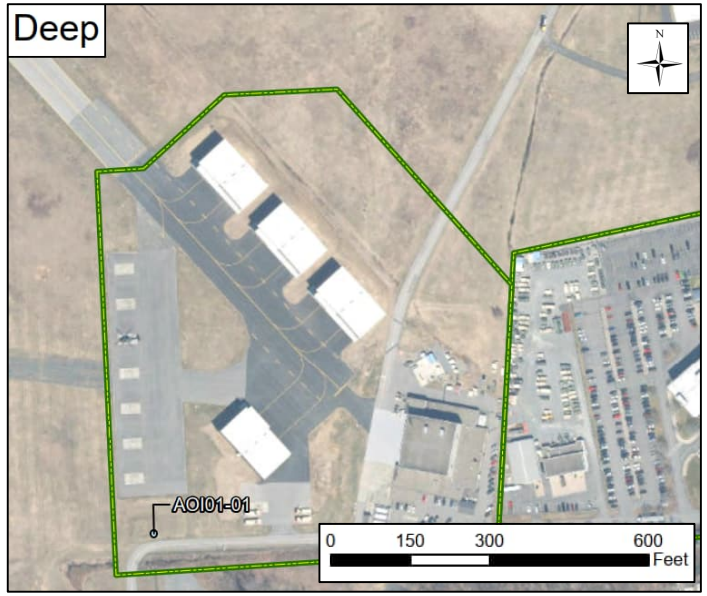
PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

SI Overview – Results: PFBS in Soil







Legend

Facility Boundary

PFBS Residential Soil Screening Level 0-2 ft bgs: 1,900 µg/kg

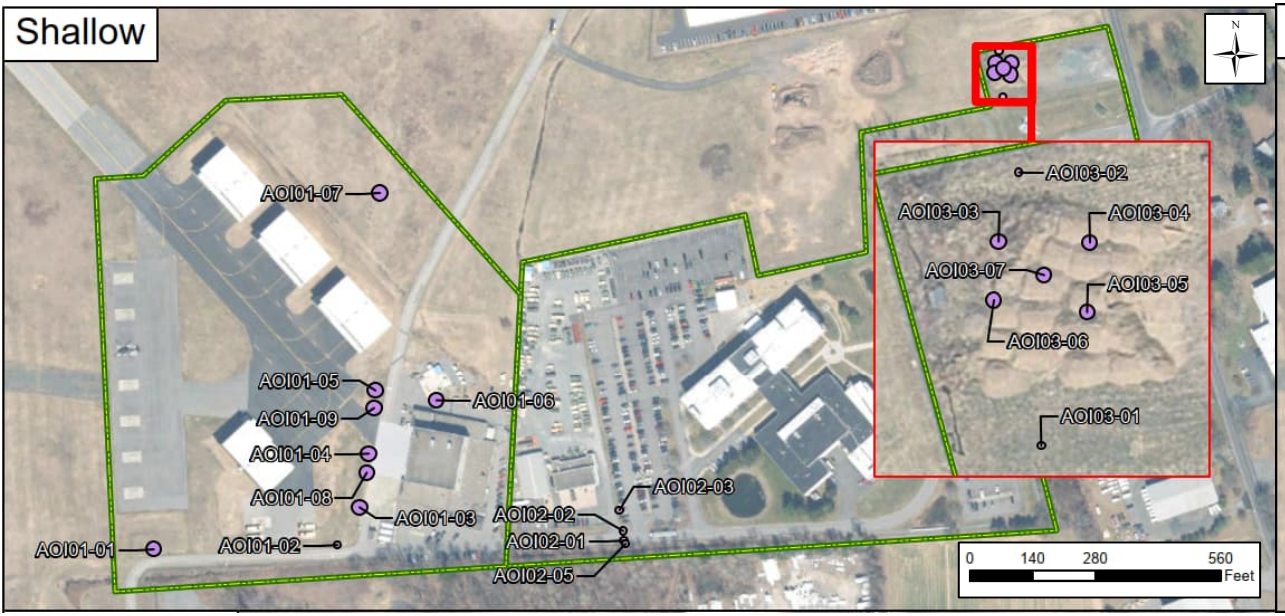
PFBS Industrial Soil Screen Level 2-15 ft bgs: 25,000 µg/kg

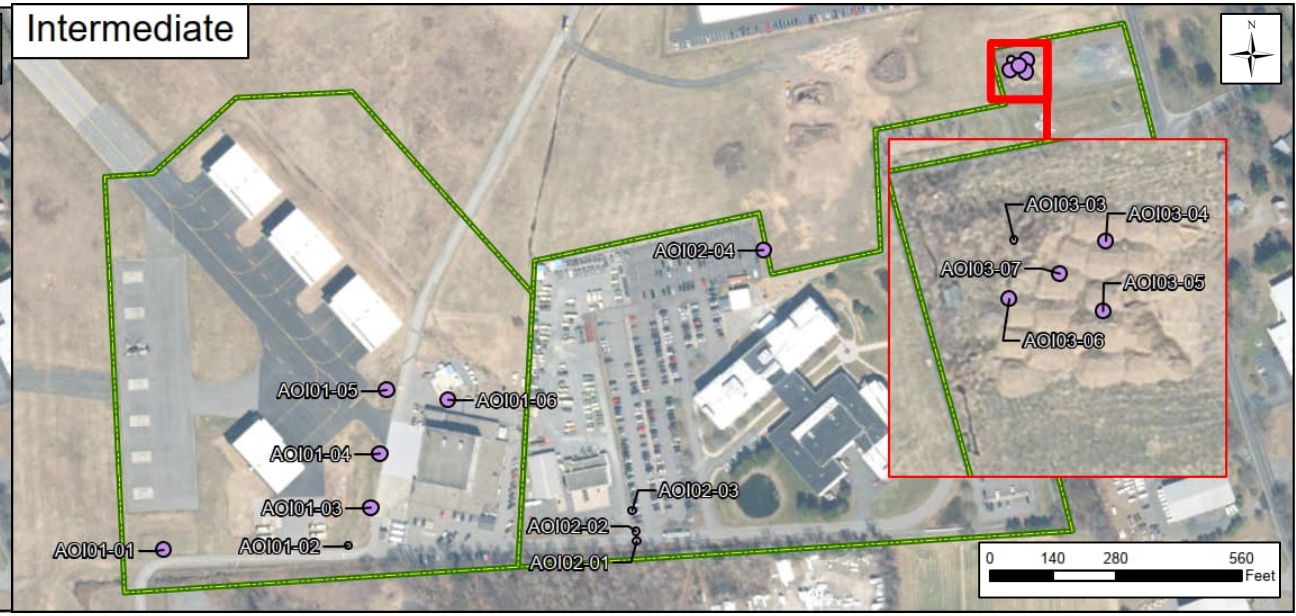
Exceedances of the OSD SL are depicted with a yellow halo.

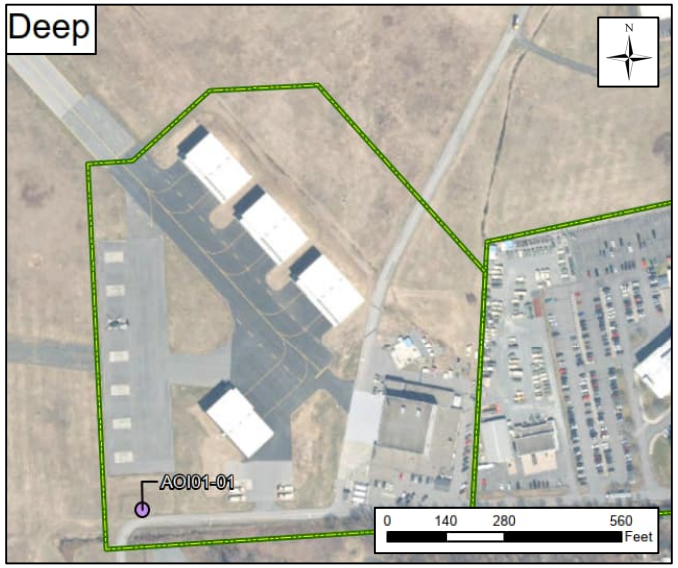
PFBS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

SI Overview – Results: PFHxS in Soil







Legend

Facility Boundary

PFHxS Residential Soil Screening Level 0 - 2 ftbgs: 130 µg/kg

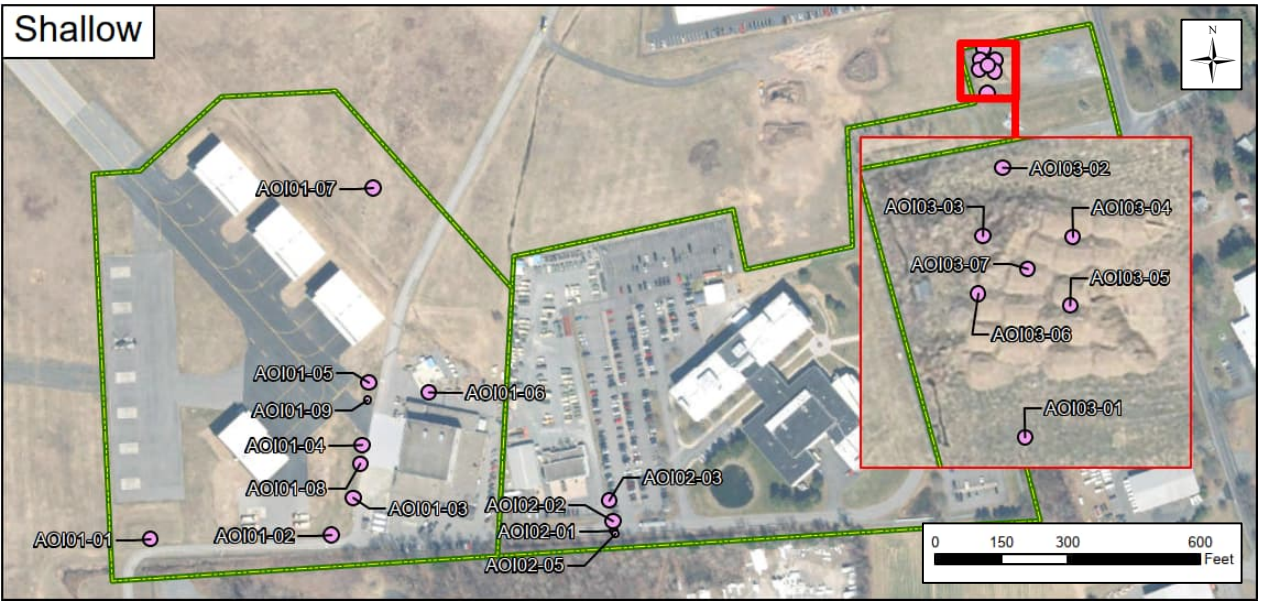
PFHxS Industrial Soil Screen Level 2-15 ftbgs: 1,600 µg/kg

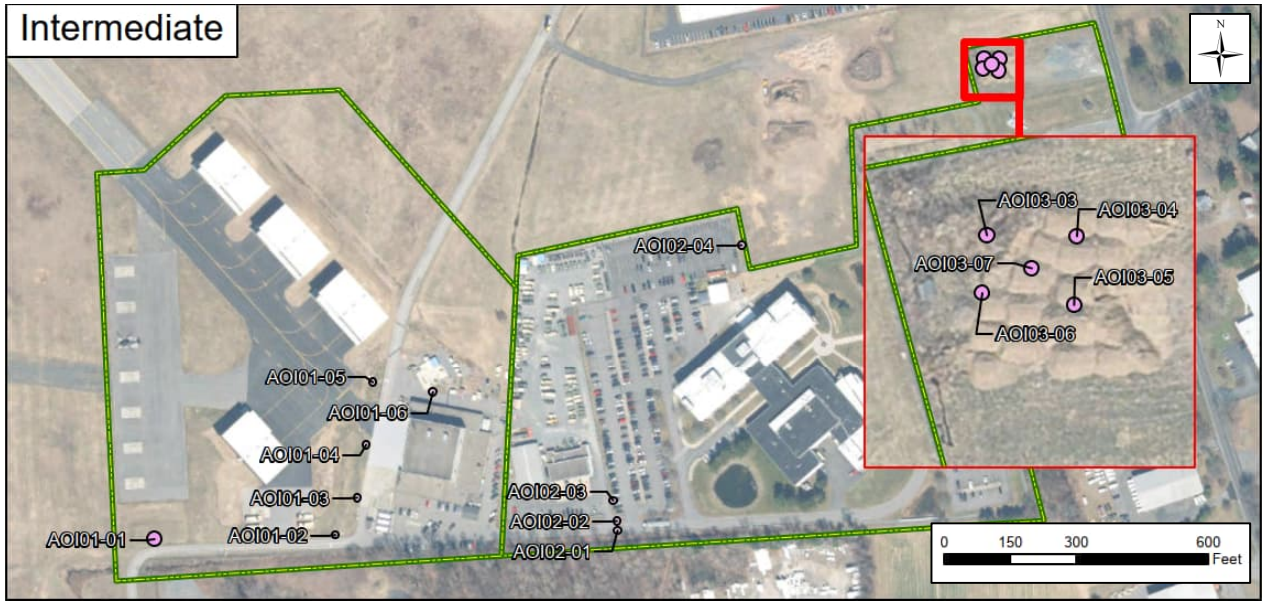
Exceedances of the OSD SL are depicted with a yellow halo.

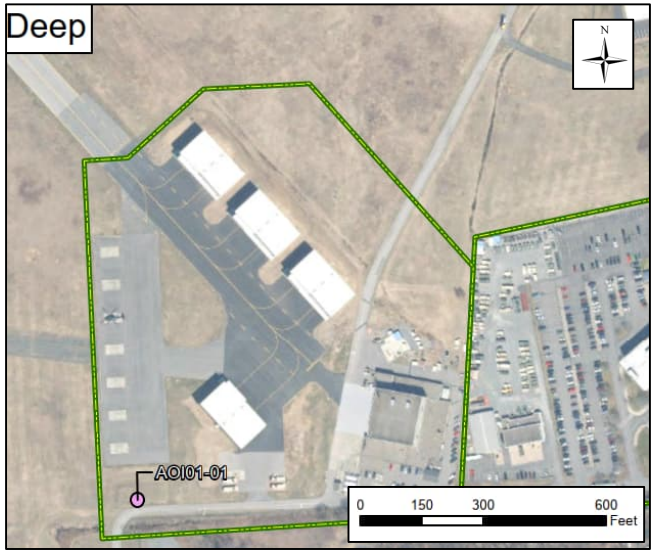
PFHxS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

SI Overview – Results: PFNA in Soil







Legend

Facility Boundary

PFNA Residential Soil Screening Level 0 - 2 ft bgs: 19 µg/kg

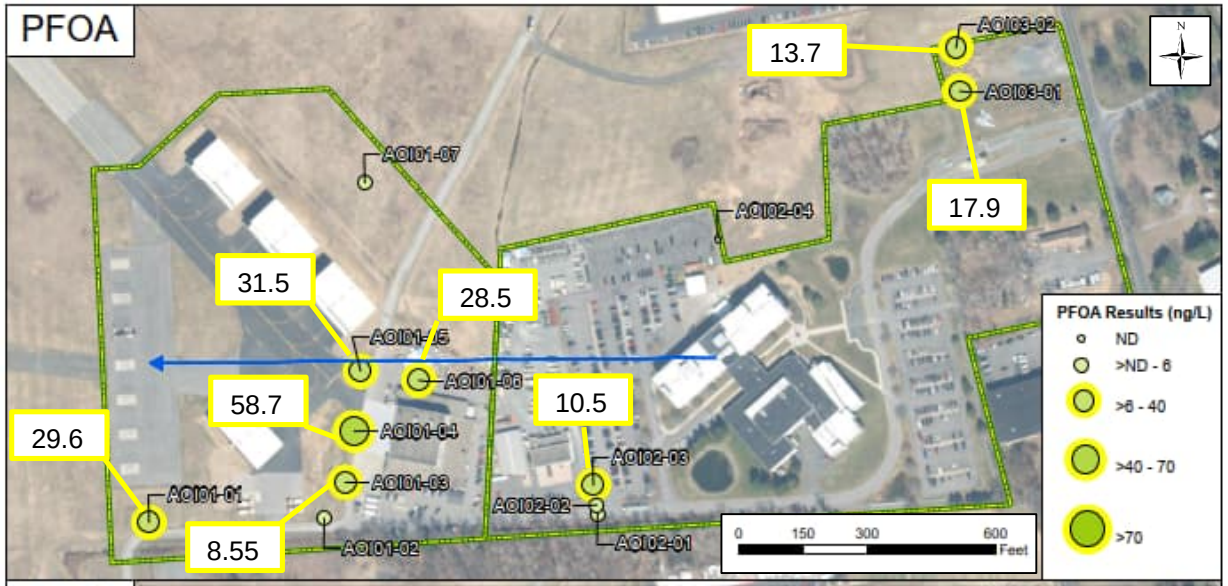
PFNA Industrial Soil Screen Level 2-15 ft bgs: 250 µg/kg

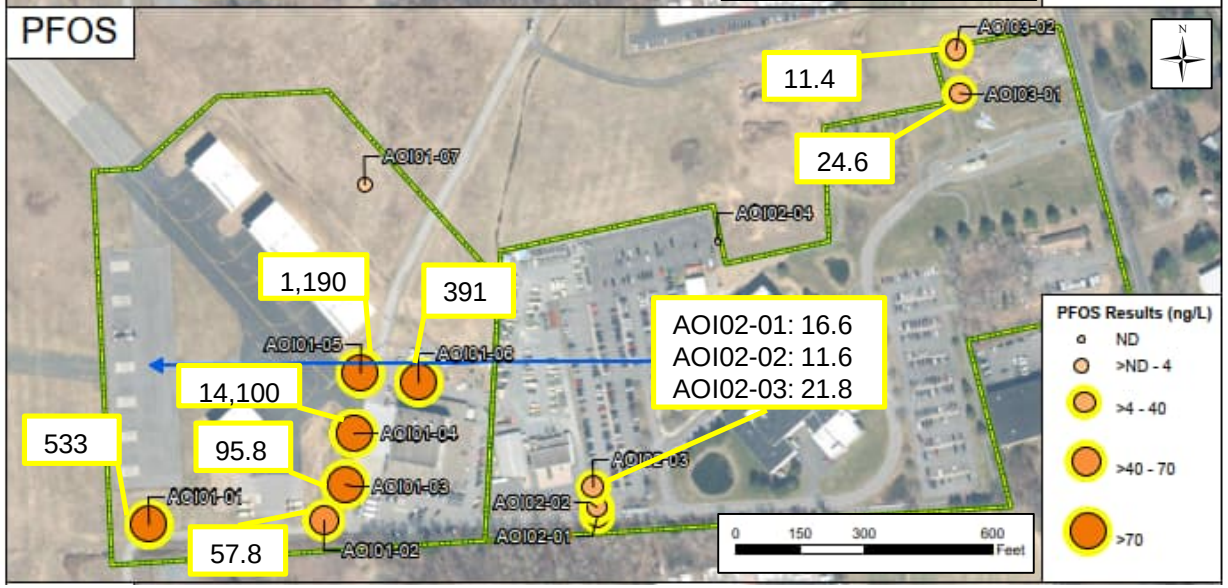
Exceedances of the OSD SL are depicted with a yellow halo.

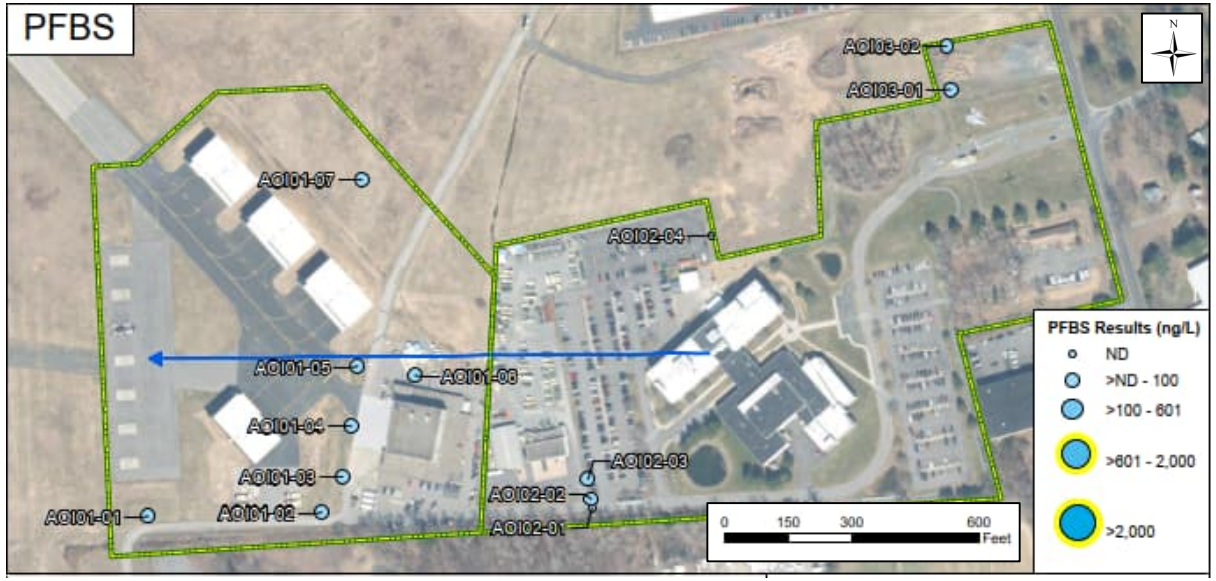
PFNA Results (µg/Kg)

- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

SI Overview – Results: PFOA, PFOS, and PFBS in Groundwater







Legend

Facility Boundary

Groundwater Flow Direction

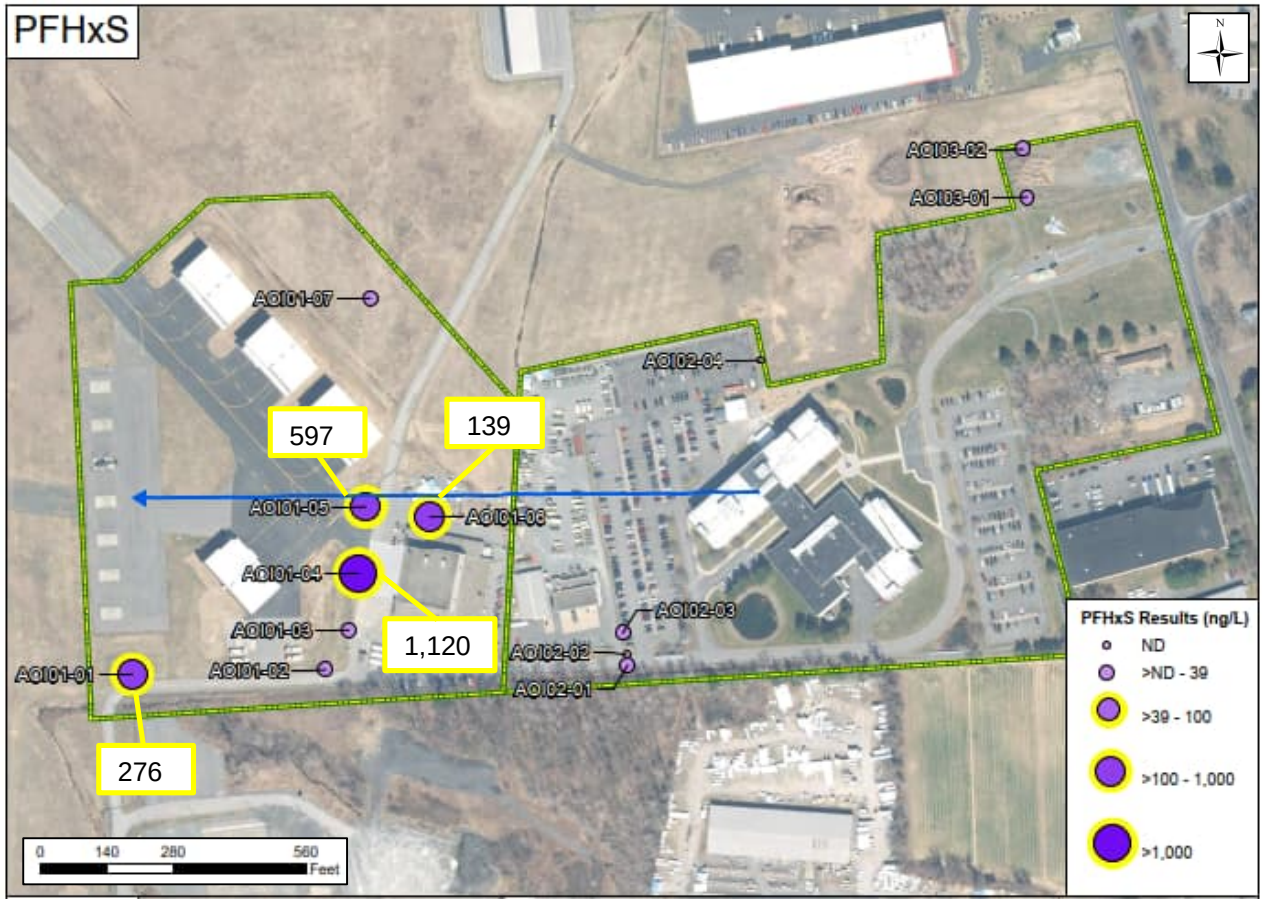
PFOA Groundwater Screening Level: 6 ng/L

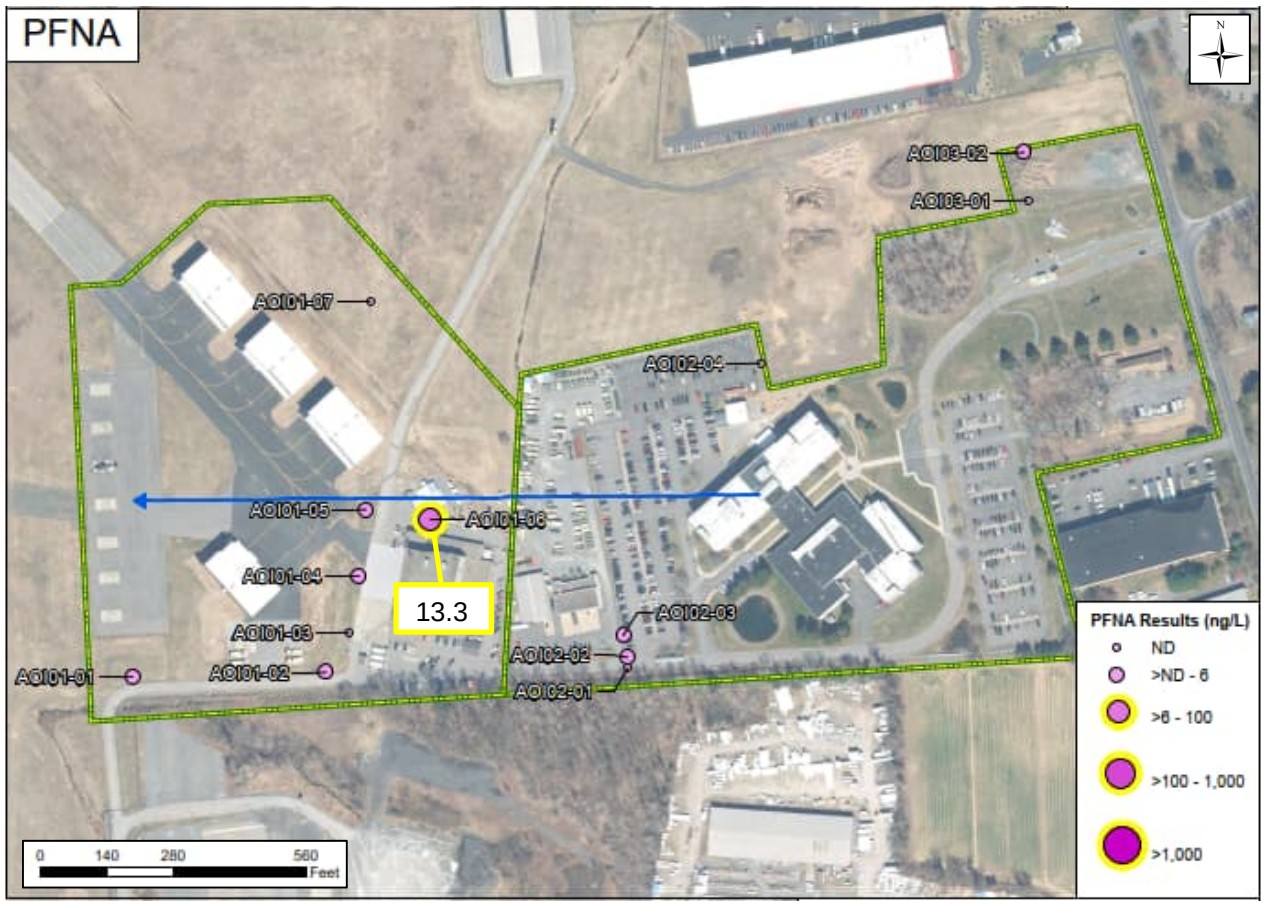
PFOS Groundwater Screening Level: 4 ng/L

PFBS Groundwater Screening Level: 601 ng/L

Exceedances of the OSD SL are depicted with a yellow halo.

SI Overview – Results: PFHxS and PFNA in Groundwater





Legend

Facility Boundary

Groundwater Flow Direction

PFHxS Groundwater Screening Level: 39 ng/L

PFNA Groundwater Screening Level: 6 ng/L

Exceedances of the OSD SL are depicted with a yellow halo.

SI Overview – Results Summary

- PFAS in soil and GW have been confirmed at all 3 AOIs
- Soil Findings
  - PFOS exceeded its SLs in surface soil at AOI 1
    - Maximum concentration for PFOS was 60.1 ug/kg at AOI1-04
    - PFOA, PFBS, PFHxS, and PFNA were detected in in soil at concentrations below their respective SLs
- Groundwater Findings
  - PFOS, PFOA, PFHxS, and PFNA exceeded their SLs in GW
    - Maximum concentration for PFOA was 58.7 ng/L at AOI01-04; for PFOS was 14,100 ng/L at AOI01-04; for PFHxS was 1,120 ng/L at AOI01-04; and for PFNA was 13.3 ng/L at AOI01-06.
    - PFBS was detected in GW at all 3 AOIs, but at concentrations below SLs

SI Overview – Results Summary

Table 8-1: Summary of Site Inspection Findings and Recommendations

AOI	Potential Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary	Future Action
1	AASF #3 Hangar Release/ Fire Response Unit	●	●	●	Proceed to RI
2	Garbage Truck Fire	◐	●	◐	Proceed to RI
3	Stockpiled Soil	◐	●	N/A	Proceed to RI

Legend:

● = detected; exceedance of the screening levels

◐ = detected; no exceedance of the screening levels

○ = not detected

RI/FS Purpose

- RI
  - Collect data to characterize site conditions
  - Determine the nature of the contamination
  - Assess risk to human health and the environment
  - Gather information sufficient to support informed risk management decisions

- FS
  - Develop, screen, and evaluate potential remedial actions
  - Conduct Applicable or Relevant and Appropriate Requirements (ARARs) evaluation

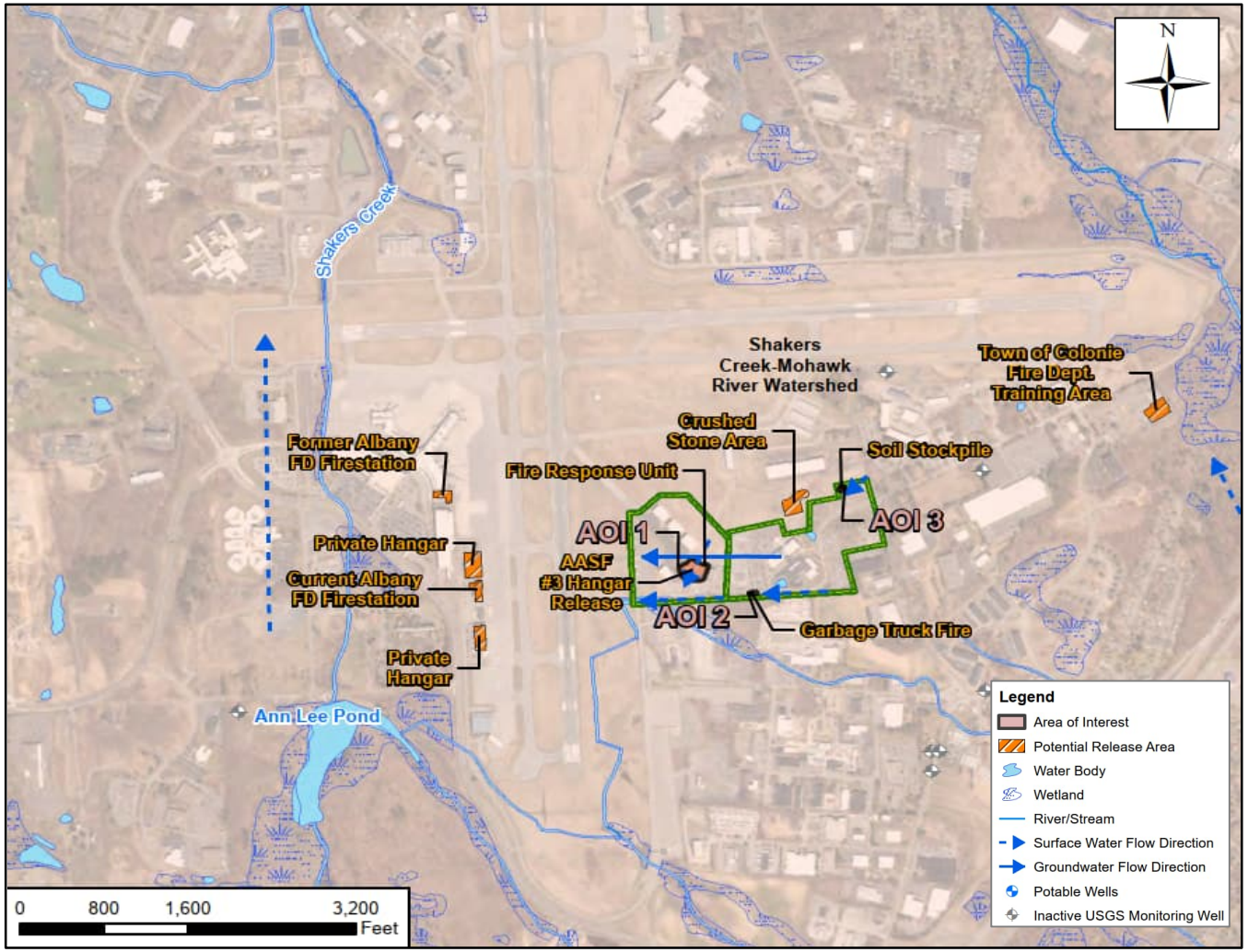
RI Technical Approach

Three primary phases of field work

- **Prescriptive**
  - Develop characterization strategy using PA/SI data and preliminary conceptual site model (CSM)
  - Use a fixed laboratory with systematic sample sequencing to balance cost and timing of decision making
  - Tentative use of a screening level analytical method for PFAS (American Society for Testing and Materials [ASTM] D8421)
  - Evaluate potential for co-contaminants near PFAS source areas
- **Adaptive**
  - Based on findings of prescriptive phase, use rapid site characterization techniques to delineate sources and define geometry of plume(s)
- **Final Characterization & Monitoring**
  - Install complete groundwater well network
  - Complete well development, slug testing, and initiate quarterly monitoring

RI Technical Approach – Prescriptive Phase (Mobilization 1)

- **Prescriptive Phase**
  - Initial data gathering mobilization to inform next two phases of work
  - Evaluate source area “hot-spots” contributing to observed groundwater impacts (surface/ subsurface soil)
  - Evaluate the role of utility structures in the fate and transport of PFAS
  - Laterally delineate impacts to groundwater in the overburden aquifer
  - Evaluate groundwater-surface water interactions and the impacts on nearby surface water bodies
  - Identify potential drinking water receptors (well survey underway under separate task)



RI Technical Approach – Screening Criteria

- SI data was rescreened against 24 August 2023 OSD Memo
- Includes USEPA Regional Screening Levels (RSLs) for two additional PFAS: PFBA and PFHxA
  - No changes to final decisions determined during SI

Analyte	Residential (Soil) (µg/kg)[a] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a]
HFPO-DA[b]	23	350	6.0
PFBA	7,800	120,000	1,800
PFBS	1,900	25,000	600
PFHxA	3,200	41,000	990
PFHxS	130	1,600	39
PFNA	19	250	5.9
PFOA	19	250	6.0
PFOS	13	160	4.0

bgs = below ground surface
ng/L = nanograms per liter
µg/kg = micrograms per kilogram

HFPO-DA = Hexafluoropropylene oxide dimer acid
PFBA = Perfluorobutanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHxA = Perfluorohexanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
PFOA = Perfluorooctanoic acid
PFOS = Perfluorooctanesulfonic acid

Notes:
a.) Assistant Secretary of Defense, 2023. Risk Based Screening Levels Calculated for HFPO-DA, PFBA, PFBS, PFHxA, PFHxS, PFNA, PFOA, and PFOS in Groundwater and Soil based on United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 24 August 2023.
b.) Of the eight PFAS compounds presented in the 24 August 2023 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the Preliminary Assessment (PA) and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

RI Technical Approach – Rights of Entry and FAA Notifications

- Rights-of-Entry Coordination
  - ROEs managed by USACE Omaha District, Real Estate Division
  - Albany International Airport for off-site sample locations
  - ROEs will be requested if and when the investigation determines they are needed

- Federal Aviation Administration (FAA) notifications

- **Critical to start process early to avoid field work delays**

RI Community Involvement

- Community Involvement Plan (CIP) is a formal plan for community involvement activities
- Includes interviews from a cross-section of the community surrounding the facility in order to:
  - Identify key concerns
  - Gauge interest in the remedial investigation
  - Identify the best fit (modes of communication) for outreach activities
  - Establish a location for the public to access the Information Repository
- CIP interviews will be scheduled prior to initiation of the RI field activities, following submittal of the Draft Final Site-Specific Quality Assurance Project Plans
- Restoration Advisory Board (RAB) Solicitation
  - Initial interest in formation of a RAB will be gauged as part of the CIP interview process
  - A formal solicitation notice in the local newspaper for community stakeholder interest
  - If there is a lack of initial interest, RAB solicitation will occur every 2 years

Schedule

- Estimated schedule for initial phases of RI

Task	Start Date[a]
RI QAPP (Draft, Draft Final, Final)	1Q 2024
CIP Report (Draft, Draft Final, Final)	1Q 2024
Pre-mobilization (Prescriptive)	3Q 2024
Mobilization (Prescriptive)	3Q 2024
Field Work (Prescriptive)	3Q 2024
Demobilization (Prescriptive)	3Q 2024
Data Review/Validation (Prescriptive)	4Q 2024
Data Analysis (Prescriptive)[b]	4Q 2024
Next phases of work (Adaptive and Final Characterization/ Monitoring)	2025

Notes:
a.) Calendar year
b.) A deliverable will not be prepared at the conclusion of the Prescriptive Phase mobilization. Project Delivery Team meetings will be held to provide status updates and investigation results.

Questions and Open Discussion

Acronyms and Abbreviations

A2P JV– AECOM Arcadis PFAS Joint Venture
AFFF – aqueous film forming foam
AOI – Area of Interest
ARNG – Army National Guard
bgs – below ground surface
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CIP – Community Involvement Plan
CSM – conceptual site model
DD – Decision Document
FAA – Federal Aviation Administration
FS – Feasibility Study
GIS – Geographic Information Systems
GSE – Ground Support Equipment
GW – Groundwater
HFPO-DA – Hexafluoropropylene oxide dimer acid
HQ – hazard quotient
ng/L – nanograms per liter
NTCRA – Non-Time Critical Removal Action
NYARNG – New York Army National Guard
NYSDEC – New York State Department of Environmental Conservation
NYSDOH – New York State Department of Health
OSD – Office of the Secretary of Defense
PA – Preliminary Assessment
PFAS – per- and polyfluoroalkyl substances
PFBA – Perfluorobutanoic acid
PFBS – Perfluorobutanesulfonic acid
PFOA – Perfluorooctanoic acid
PFOS – Perfluorooctanesulfonic acid
PFHxA – Perfluorohexanoic acid
PFHxS – Perfluorohexanesulfonic acid
PMO – Project Management Office
MIL-SPEC – military specification
QAPP – Quality Assurance Project Plan
RAB – Restoration Advisory Board
RI – Remedial Investigation
RSL – Regional Screening Level
SL – Screening Level
SI – Site Inspection
TCRA – Time-Critical Removal Action
TPP – Technical Project Planning
µg/kg – micrograms per kilogram
USACE – United States Army Corps of Engineers
USEPA – United States Environmental Protection Agency

Thank you.

Meeting Minutes
Albany Army Aviation Support Facility #3, NY
Technical Project Planning (TPP) – Meeting 2
Remedial Investigations (RI), Feasibility Studies (FS), Decision Documents (DD), and Time Critical / Non-Time Critical Removal Actions (TCRA/NTCRA) for Per-and Polyfluoroalkyl Substances (PFAS) Impacted Sites
Army National Guard (ARNG) Installations, Nationwide
Contract No. W912DR-23-D-0007, Task Order W912DR23F0388
Friday, 2 May 2025
0900-1024

Participants			
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**Notes: A2P JV – AECOM-Arcadis PFAS Joint Venture, ALB – Albany International Airport, ARNG-G9 - Army National Guard-G9, NYARNG – New York Army National Guard, NYSDEC – New York State Department of Environmental Conservation, NYSDOH – New York State Department of Health, USACE – United States Army Corps of Engineers*

Mr. Colin Wasteneys (AECOM Arcadis PFAS Joint Venture [A2P JV]) welcomed participants and reviewed the purpose of the meeting, outlined the agenda, and led a roundtable of introductions for everyone on the virtual and at the in-person Technical Project Planning (TPP) 2 meeting. The purpose of the meeting was to present the planned technical approach for the Per- and Polyfluoroalkyl Substance (PFAS) Remedial Investigation (RI) at Albany Army Aviation Support Facility #3 (AASF#3) in Latham, New York.

Presentation slides were provided to participants prior to the meeting and are included in **Attachment A**. Key points that supplement the presentation are summarized below.

A safety moment was provided to the participants. Mr. Wasteneys discussed the dangers of distracted walking, with a focus on phone usage while walking. This discussion included a list of associated common hazards and preventative measures.

Programmatic Discussion (Slides 5–8): *presented by Mr. Wasteneys (A2P JV)*

- The program follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.
- The first step in the CERCLA process is the Preliminary Assessment (PA), which has been finalized for this facility. The final results of the PAs determine whether a specific site would move to the SI-phase or be recommended for No Further Action, per the CERCLA process.
- The second step in the CERCLA process is the SI, which has been finalized for this facility. Presence or absence of PFAS at the source areas and facility boundary during the SI (results discussed in detail in later slides) were used to determine whether there was a need for a RI.

- Albany AASF#3 is currently in the RI step of the CERCLA process. While the CERCLA framework follows a step-wise approach, an interim removal action or No Further Action determination can be made at any phase during the process.
- The TPP#2 meeting goals and agenda are as follows: discuss Albany AASF #3 background, SI findings, RI DQOs, and technical approach; encourage stakeholder involvement, review project schedule, capture action items, and perform site reconnaissance.

Albany AASF #3 SI Overview (Slides 9-16): *presented by Mr. Wasteneys (A2P JV)*

- The SI findings for Albany AASF #3 were presented. Much of this information had been discussed during the TPP 1 meeting and was discussed in brief.
- Area of Interest (AOI) 1 encompasses the AASF#3 Hangar Release and Fire Response Unit
    - In 2012, a fire fighting foam release occurred at the AASF#3 Hangar during initial testing of the fire suppression system.
    - In 2021, an accidental release of the fire suppression system spilled onto the tarmac and grassy area immediately west of AASF #3 Hangar.
    - The Fire Response Unit (active from 1983-1992) operated from a room attached to the northern part of the hangar.
    - The Fire Response Unit housed an aqueous film forming foam (AFFF) containing fire truck. There are no documented spills or releases but AFFF handling practices are unknown.
- AOI 2, the Garbage Truck Fire consists of a ~0.05-acre area where a fire occurred in the back of a garbage truck southeast of the AASF #3 Hangar in May 2017.
    - The Colonie Fire Department responded to the incident using an unknown type of foam.
- AOI 3, The Former Stockpiled Soil includes the ~0.07-acre area formerly containing ~ 433 cubic yards of stockpiled soil removed from AOI 1.
- SI analytical results were reviewed and screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).
- SI soil results were reviewed.
    - Exceedances of SLs in surface soil and shallow subsurface soil for perfluorooctanesulfonic acid (PFOS), and Perfluorooctanoic acid (PFOA) no other exceedances in soil results.
    - Exceedances in soil at AOI 1 and AOI 3, no exceedances at AOI 2.
- SI groundwater results were reviewed.
    - PFOA, PFOS, perfluorohexanesulfonic acid (PFHxS), and perfluorononanoic acid (PFNA) exceedances were detected within AOI boundaries.
    - Perfluorobutanesulfonic acid (PFBS) was detected in GW at all 3 AOIs, but at concentrations below SLs.
    - PFOS exceedances at AOI 1 were the highest by several orders of magnitude.
- All three AOIs are proceeding to RI based on the results of the SI.

Albany AASF #3 Conceptual Site Model (CSM) (Slides 17-25): *presented by Mr. Wasteneys (A2P JV)*

- The facility's geographic, physiographic, and topographic location were reviewed.
- Notable surface hydrologic features surrounding the facility were discussed. A stream that crosscuts the southwestern corner of the facility discharges into Ann Lee Pond located west of the facility; Ann Lee Pond then discharges into Shaker's Creek which eventually discharges to the Mohawk River which lies to the north of the facility.
- Surficial and bedrock geology underlying the facility were presented and discussed. The facility's surficial geology is primarily made up of lacustrine sand. The bedrock geology underlying the site is the Normanskill Shale which is notably marked by a bedrock valley that crosscuts the facility and airport property running North/south.
- Two overburden aquifers that underlie the facility: a surficial aquifer formed by glaciolacustrine sand deposited by proglacial Lake Albany, and the Colonie Channel aquifer located beneath the surficial sand aquifer, and occupying the pre-glacial bedrock channel.
- Groundwater elevation data collected from temporary wells during the SI indicate a westerly flow. The A2P JV pointed out that the water level data was not collected synoptically, and shallow monitoring wells installed during the first RI phase will be used to verify the direction of shallow groundwater flow.

Albany AASF #3 RI Data Quality Objectives (Slides 26-28): *presented by Mr. Wasteneys (A2P JV)*

- The A2P JV presented the data quality objectives for the prescriptive, adaptive, and final characterization phases for all media.
- Data Quality objectives in relation to Risk Assessment (human health risk assessment and in the screening-level ecological risk assessment) were also briefly discussed.

Albany AASF #3 RI Technical Approach (Slides 29-38): *presented by Ms. Link-Harrington (A2P JV)*

- The A2P JV presented the technical goals and general field activities to be associated with the three phases of RI work: Prescriptive, Adaptive, and Final Delineation and Monitoring.
- The technical approach and field activities detailed in the Draft Final RI QAPP are primarily focused on the first phase of work – the Prescriptive Phase.
- The Prescriptive Phase will entail vertical profiling via direct push technology, the installation and sampling of monitoring wells, Rapid Site Characterization (RSC) surface soil sampling at source areas, and surface water/sediment sampling.
- Two PFAS analytical methods will be used during the prescriptive phase:
    - PFAS by ASTM D8421
    - PFAS by LC/MS/MS compliant with USEPA Method 1633
- USEPA Method 1633 will apply to surface water, sediment and groundwater samples collected from monitoring wells during the prescriptive phase
- All other samples will be analyzed via ASTM D8421, RSC samples will be analyzed using ASTM D8421 at a fixed laboratory with a 48-hour turnaround time on analytical results.
- The number of each type of prescriptive phase sample location were reviewed followed by QAPP figures 17-1, and 17-2 that illustrate proposed prescriptive phase RI sample locations.
- The A2P JV revisited the most recent RSLs listed in the *OSD's memorandum, Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025). The A2P clarified that an addendum with the most recent RSLs will be included as part of the Final QAPP. The A2P JV also discussed the new PFAS compounds included in the most recent OSD memo, and noted that PFPrA and TFSI are not currently included in the standard list of compounds by for USEPA Method1633.
- ROEs and Federal Aviation Administration (FAA) notifications were discussed. No ROEs will be necessary as part of the prescriptive phase of work, however, may be required in subsequent phases of work. Ms. Link-Harrington (A2PJV) noted that the eastern portion of the facility is owned by New York Division of Military and Naval Affairs, and the western portion, including the flight operations is leased from the ALB airport.
- The FAA notification for prescriptive phase field work was submitted on 30 July 2024 and approved on 16 October 2024 with minimal conditions.

Albany AASF #3 RI Community Involvement (Slides 39-40): *presented by Ms. Link-Harrington (A2P JV)*

- The A2P discussed the Community Involvement Plan (CIP) and progress made to date. The community interviews were conducted during the week of 28 October, 2024.
- The A2P is having trouble establishing a location for the public to access the Information Repository (IR). Much of this trouble has been associated with the length of time that the location would be responsible for holding documents (~20 years). Mr. Austin (NYARNG) and Mr. Swartout (NYSDEC) both recommended keeping the IR in the town of Colonie and strongly considering digital options.
- Mr. Swartout (NYSDEC) also suggested that the Colonie Town Hall might work as an IR, Mr. Austin (NYARNG) pointed out that the Colonie Municipal Center is across the street from the facility.
- Mr. Braunlin (ARNG G-9) and the A2P JV agreed to revisit the digital options with Claire Mitchell, the A2P JV project manager.

Albany AASF #3 RI Schedule (Slides 41-45): *presented by Ms. Link-Harrington (A2P JV)*

- The A2P presented the RI schedule for reporting and field activities. The A2P asked the NYSDOH and NYSDEC if expecting comments back on the Draft Final RI QAPP on 7 May 2025 was reasonable, and both agencies confirmed that it was.

- The A2P presented plans for fieldwork to begin in June or July 2025, and reviewed expectations for RSC sample step-outs and PDT meetings.
- Additionally, the A2P JV outlined the process, deliverables, and timeline that would be associated with moving from the prescriptive to adaptive phases of fieldwork.

Albany AASF #3 Questions/Open Discussion (Slides 46-47):

- Mr. Braunlin (ARNG-G9) suggested setting aside a time that works either weekly or bi-weekly once field work begins for the Project Delivery Team (PDT) to meet if needed. NYARNG, NYSDEC, and NYSDOH agreed that this could be helpful.
- Ms. Wagh (NYSDOH) inquired about plans for off-facility private well sampling associated with the well survey which was finalized in 2024. The A2P JV stated that at this time, based on the well survey findings and the early stages of the facility's RI, private well sampling is not planned. However, as the A2P JV moves through the RI process and receptors are assessed/identified, the need for private well sampling will be revisited.
- The northeastern most permanent monitoring well location (AASF-MW006) was discussed. The well location appears to be within the area of a planned drainage feature for a new facility entrance construction project that is planned for later this year. An alternate location for this well may need to be identified. Mr. Williamson (NYARNG) stated that he will check to see if any updated figures showing the new entrance road configuration are available as they may have changed since the version that was shared during the TPP#2 meeting.

The presentation ended at 1024 and the phone line was closed.

Albany AASF #3 Site Reconnaissance:

- Following the TPP2 slide presentation, the in-person participants took a break, and the NYARNG and A2P JV coordinated with Mr. Montiverdi (ALB) to meet with the rest of the group at the facility. Around 1100, Mr. Montiverdi joined the onsite group (NYARNG, ARNG G-9, A2P JV, NYSDEC, and NYSDOH) and the site walk began.
- The group started the site walk in the northeast portion of the facility looking at the AOI 3 area where the soil pile from the new hangar construction was formerly located.
- The group next walked to the AOI 2 area, the site of a former garbage truck fire. Mr. Austin (NYARNG) described the incident: when smoke was witnessed coming from the truck, the driver dumped the load onto the parking lot pavement where the fire continued to grow. The fire was witnessed by the ALB Fire Department, which responded from their station located across the runway and extinguished the fire using what was likely AFFF. The three stormwater catch basins in the immediate vicinity were reportedly blocked off to prevent any runoff from fire fighting operations getting into the stormwater system.
- Mr. Austin (NYARNG) stated that the nearby building FMS #16 might be a good place to obtain drilling/decontamination water for use during investigation activities.
- The drainage ditch along the southern facility boundary was seen from this area and there was approximately 1-2 inches of water in the bottom. There appeared to be a geotextile lining under stone slope stabilization material. The area can be accessed for sampling via a person-gate in the fence located further east of the AOI 2 area. There is a chain-link fence blocking access, but there is a large opening in the fence that would allow access.
- The attendees next visited the AASF #3 Aircraft Maintenance Hangar (part of AOI 1) and former Fire Response Unit building which houses a deluge system using JET-X 2.75 HEF. Mr. Austin (NYARNG) explained that there are still two AFFF-containing fire hose units; one on either side of the maintenance hangar. These are in addition to the deluge system that is the main fire protection system for the hangar. The AFFF systems would only be used to manually fight a fire in the hangar, and they are not regularly tested. Mr. Austin (NYARNG) described the accidental deluge system release in the hangar in 2021. He said he observed only a small amount of JET-X 2.75 HEF material leave the paved apron onto the grassy area.

- The group was escorted by AASF #3 staff Paul Bailie and David Malizia to the remaining investigation locations starting in the southwest corner of the facility. The drainage ditch exits the facility at this point onto airport property after it is joined by a small creek that is a tributary to Shaker Creek. There is considerably more flow in this area due to the creek flow.
- The planned RSC01 area was observed to have a flat, elevated mound over most of the area. According to facility staff, this mound area is used for training and has been there as long as they can remember. There is an underground utility vault near the southwest corner of this elevated area.
- At the northwestern most location, AASF-MW001, facility staff point out the runway hold short line that cannot be crossed without prior coordination and direct communication with the ALB airport tower.
- Facility staff stated that Wednesdays and Thursdays are typically very busy flying days and that night operations are conducted on these days.
- The site walk concluded at approximately 1300.

Attachment A - TPP 2 Briefing Slides

Technical Project Planning Meeting 2
Albany Aviation Support Facility (AASF) #3, NY

May 2025

Remedial Investigations (RI), Feasibility Studies (FS), Decision Documents (DD), and Time Critical / Non-Time Critical Removal Actions (TCRA/NTCRA) for Per-and Polyfluoroalkyl Substances (PFAS) Impacted Sites
Army National Guard (ARNG) Installations, Nationwide

Contract No. W912DR-23-D-0007
Task Order W912DR23F0388

Agenda

Introductions
Safety Moment
Program Overview
Technical Project Planning (TPP) 2 Meeting Goals
Site Inspection (SI) Overview
RI Data Quality Objectives (DQOs)
RI Technical Approach Overview
RI Community Involvement
RI Schedule
Questions and Open Discussion

Introductions

ARNG G-9

Jennifer Li, Nationwide Technical Lead

Bonnie Packer, Nationwide Technical Lead

Robert Braunlin, Project Manager

New York State Department of Environmental Conservation (NYSDEC)

Rick Mustico, Bureau Director, Division of Environmental Remediation

John Swartwout, Section Chief, Remedial Bureau A, Division of Environmental Remediation

Sankavi Sampath, Technical Project Manager

United States Army Corp of Engineers (USACE)

Emily Cline, Nationwide Program Manager, Baltimore District

Josiah Fernandez, Project Manager, Baltimore District

Genna Huston Rohleder, Clifford Opdyke, Technical Support, Baltimore District

New York State Department of Health (NYSDOH)

Renata Ockerby, Bureau of Environmental Exposure Investigation

Sarita Wagh, Bureau of Environmental Exposure Investigation

New York Army National Guard (NYARNG)

James Williamson, Environmental Branch Chief

Gregory Austin, Environmental Compliance

Robert Epp, Director of Facilities Management and Engineering

Albany International Airport

David Montiverdi, Chief Airport Planner

AECOM Arcadis PFAS JV (A2P JV)

Claire Mitchell, Project Manager

Colin Wasteneys, RI Facility Task Leader

Agnes Link-Harrington, RI Deputy Task Leader

Safety Moment – Distracted Walking

- Pick a safe location to text/talk on the jobsite/office
- Do not walk and text at the same time – even talking and walking can pose a hazard
- Hazards include being struck by moving vehicles/equipment, walking over an edge or into an open hole, slips/trips/falls
- Heads up and avoid pacing!





Program Overview

Program Overview – CERCLA Work Phases



Notes: *Current stage of activity

- Follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process
- Preliminary Assessment (PA) and Site Inspection are complete
- An interim removal action (e.g., TCRA or NTCRA) can be conducted or a No Further Action determination can be made at any phase

TPP 2 Meeting Goals

TPP 2 Meeting Goals

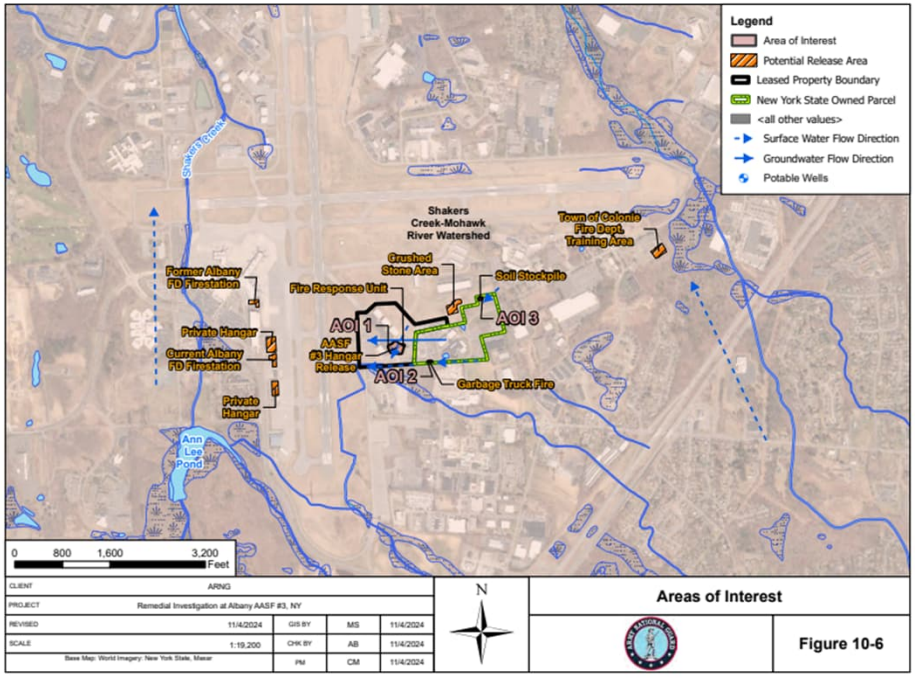
- Briefly revisit Albany AASF #3 background and discuss SI findings
- Review RI DQOs
- Present RI technical approach for Prescriptive Phase
- Encourage stakeholder involvement
- Review project schedule
- Capture action items
- Perform site reconnaissance

SI Overview

SI Overview

- SI field work completed: April 2022
- SI report finalized: June 2023
- Three Areas of Interest moving forward to RI: AOI01, AOI02, and AOI03

  - *AOI01* – AASF #3 Hangar Release: two potential AFFF releases
  - *AOI02* – Garbage Truck Fire: one fire fighting foam release of unknown foam type
  - *AOI03* – Stockpiled Soil: No known AFFF release areas but area received stockpiled soil from AOI01

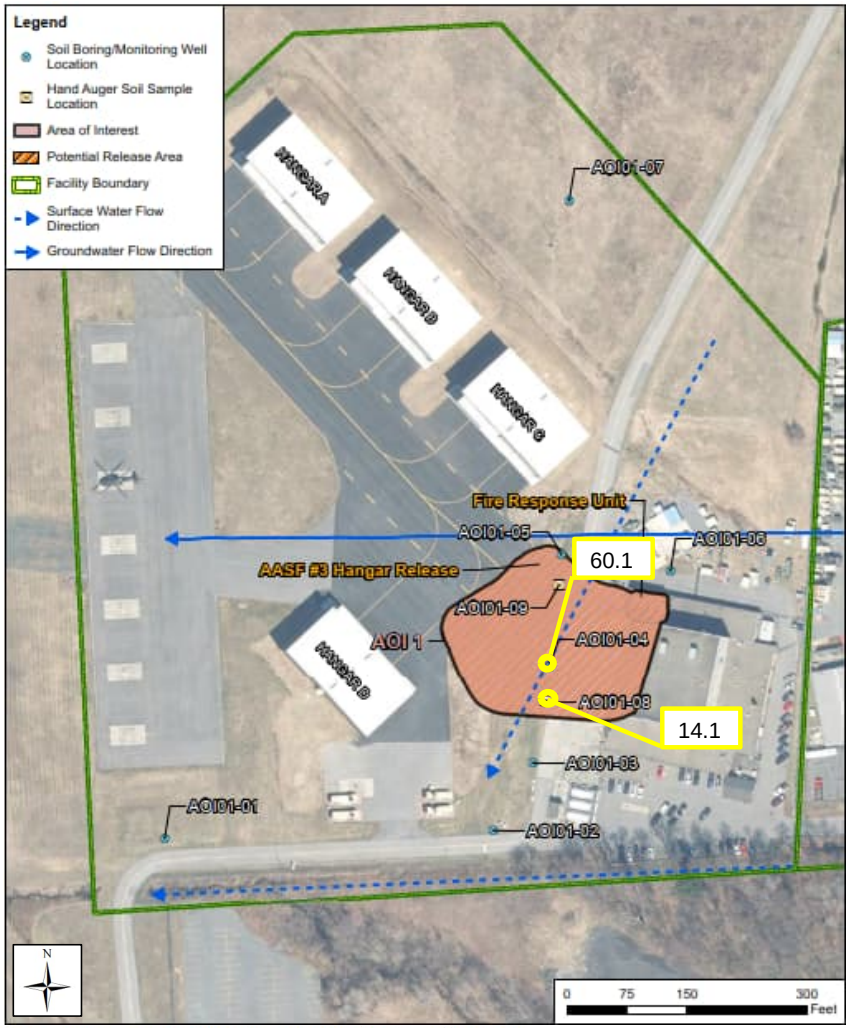


SI Overview – AOI01 Soil Results

Surface Soil (µg/kg)	PFBA (7,800)	PFBS (1,900)	PFHxA (3,200)	PFHxS (130)	PFNA (19)	PFOA (0.070)	PFOS (0.63)
AOI01-01-SB-00-02	0.076J	ND	0.077J	0.25J	0.06J	**0.164J**	**7.45**
AOI01-02-SB-00-02	0.08J	ND	0.04J	ND	0.071J	**0.104J**	0.538J
AOI01-03-SB-00-02	0.082J	ND	0.071J	0.102J	0.057J	**0.177J**	**4.7**
AOI01-04-SB-00-02	0.063J	0.039J	0.188J	1.24	0.037J	**0.174J**	**60.1**
AOI01-05-SB-00-02	0.053J	ND	0.08J	0.332J	0.077J	**0.229J**	**6.4**
AOI01-06-SB-00-02	ND	ND	0.031J	0.26J	0.039J	ND	**6.33**
AOI01-07-SB-00-02	0.248J	0.028J	0.096J	0.088J	0.079J	**0.242J**	0.31J
AOI01-08-SB-00-02	0.072J	ND	0.095J	0.146J	0.058J	**0.136J**	**14.1**
AOI01-SB-DUP-1	0.046J	ND	0.066J	0.121J	0.042J	ND	**12**
AOI01-09-SB-00-02	ND	ND	ND	0.086J	ND	ND	**8.88**

Subsurface Soil (µg/kg)	PFBA (120,000)	PFBS (25,000)	PFHxA (41,000)	PFHxS (1,600)	PFNA (250)	PFOA (0.078)	PFOS (8.2)
AOI01-01-SB-03-04	ND	0.027J	0.121J	3.23	0.049J	**0.726J**	**10.7**
AOI01-01-SB-05.6-06.2	ND	ND	0.127J	0.433J	0.057J	**0.193J**	**14.7**
AOI01-02-SB-03-04	ND	ND	ND	ND	ND	ND	0.063J
AOI01-03-SB-02-03	ND	ND	ND	0.036J	ND	ND	1.22
AOI01-04-SB-03-04	ND	ND	0.067J	0.398J	ND	ND	**10.3**
AOI01-05-SB-03-04	ND	ND	0.301J	2.18	ND	**0.148J**	0.925J
AOI01-SB-DUP-2	ND	ND	0.313J	2.09	ND	**0.133J**	0.597J
AOI01-06-SB-02-02.7	ND	ND	0.098J	0.196J	ND	ND	3.87

*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



Exceedances of the OSD SL are depicted with a yellow halo.

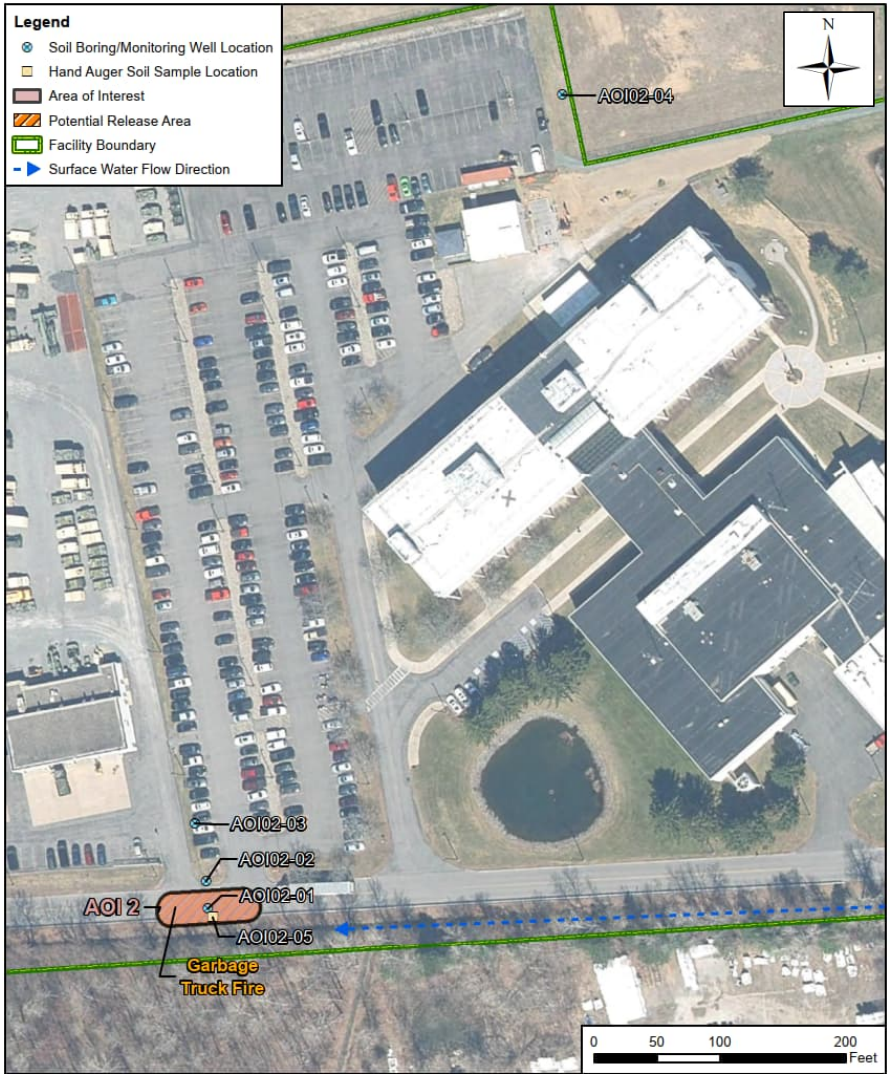
60.1 PFOS Concentrations (ug/kg)

SI Overview – AOI02 Soil Results

Surface Soil (µg/kg)	PFBA (7,800)	PFBS (1,900)	PFHxA (3,200)	PFHxS (130)	PFNA (19)	PFOA (0.070)	PFOS (0.63)
AOI02-01-SB-00.9-03.5	ND	ND	ND	ND	ND	ND	0.071J
AOI02-SB-DUP-3	ND	ND	ND	ND	ND	ND	0.087J
AOI02-02-SB-00-02	ND	ND	0.042J	ND	0.031J	ND	0.463J
AOI02-03-SB-00-02	ND	ND	0.031J	ND	0.029J	ND	0.492J
AOI02-05-SB-00-02	ND	ND	ND	ND	ND	ND	0.08J

Subsurface Soil (µg/kg)	PFBA (120,000)	PFBS (25,000)	PFHxA (41,000)	PFHxS (1,600)	PFNA (250)	PFOA (0.078)	PFOS (8.2)
AOI02-02-SB-03-03.7	ND	ND	0.027J	ND	ND	ND	0.148J
AOI02-03-SB-02-02.7	ND	ND	ND	ND	ND	ND	0.139J
AOI02-04-SB-05-05.5	ND	0.032J	ND	0.166J	ND	ND	0.23J

*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



SI Overview – AOI03 Soil Results

Surface Soil (µg/kg)	PFBA (7,800)	PFBS (1,900)	PFHxA (3,200)	PFHxS (130)	PFNA (19)	PFOA (0.070)	PFOS (0.63)
AOI03-01-SB-00-01	ND	ND	ND	ND	0.028J	ND	0.32J
AOI03-02-SB-00-01	0.093J	ND	0.045J	ND	0.072J	ND	**0.638J**
AOI03-03-SB-00-02	0.118J	ND	0.07J	0.047J	0.096J	**0.107J**	0.441J
AOI03-04-SB-00-02	0.087J	ND	0.129J	0.163J	0.069J	**0.151J**	**2.67**
AOI03-04-SB-00-02-DUP	0.111J	ND	0.094J	0.145J	0.089J	**0.196J**	**2.19**
AOI03-05-SB-00-02	0.077J	ND	0.074J	0.078J	0.06J	**0.12J**	**1.23**
AOI03-06-SB-00-02	0.084J	ND	0.074J	0.116J	0.076J	**0.146J**	**3.44**
AOI03-07-SB-00-02	0.117J	ND	0.088J	0.163J	0.101J	**0.191J**	**3.12**

Subsurface Soil (µg/kg)	PFBA (120,000)	PFBS (25,000)	PFHxA (41,000)	PFHxS (1,600)	PFNA (250)	PFOA (250)	PFOS (160)
AOI03-03-SB-02-04	0.084J	ND	0.067J	ND	0.078J	ND	0.391J
AOI03-04-SB-02-04	0.112J	ND	0.085J	0.144J	0.09J	0.193J	2.2
AOI03-05-SB-02-04	0.149J	ND	0.091J	0.079J	0.13J	0.219J	1.87
AOI03-06-SB-02-04	0.132J	ND	0.11J	0.133J	0.131J	0.235J	4.12
AOI03-07-SB-02-04	0.128J	ND	0.087J	0.091J	0.098J	0.179J	2

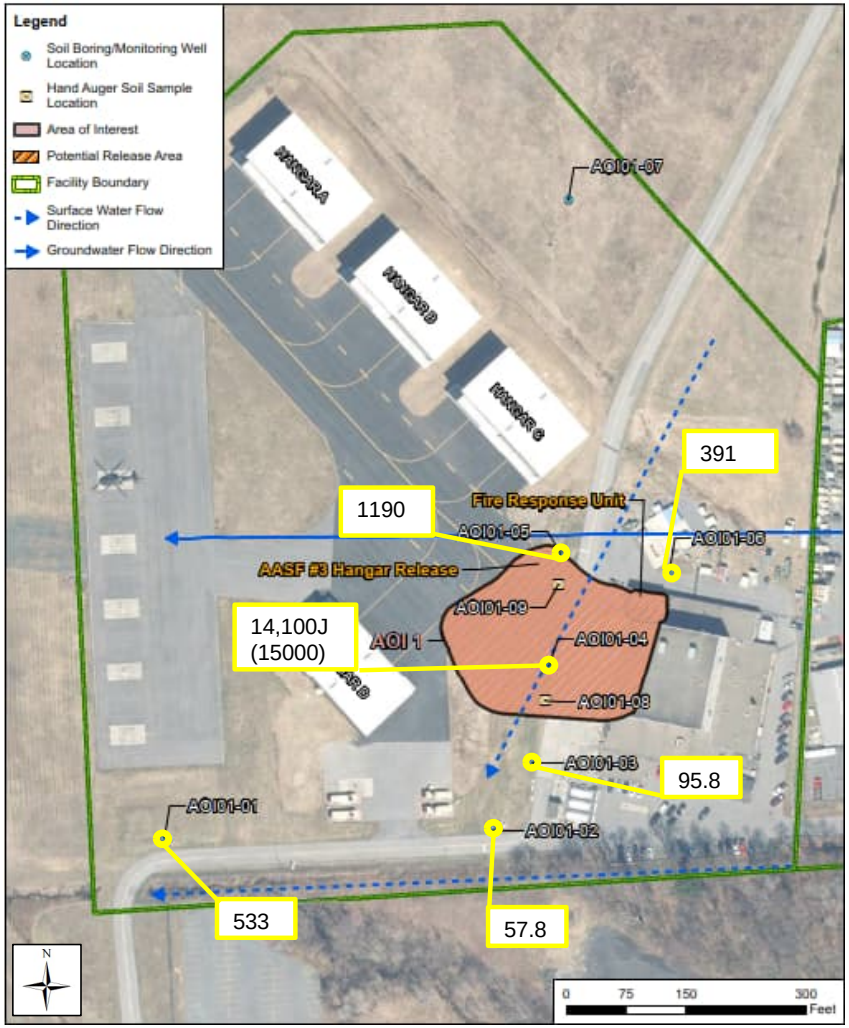
*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



SI Overview – AOI01 Groundwater Results

Groundwater (ng/L)	PFBA (1800)	PFBS (600)	PFHxA (990)	PFHxS (10)	PFNA (5.9)	PFOA (4)	PFOS (4)
AOI01-01-GW	3.84J	9.07	20.7	**276**	1.72J	**29.6**	**533**
AOI01-02-GW	7.49	2.05J	5.75	6.51	1.31J	2.71J	**57.8**
AOI01-03-GW	5.2	3.54J	8.08	24.4	ND	**8.55**	**95.8**
AOI01-04-GW	49.2	48.5	152	**1120**	4.9	**58.7**	**14100J**
DUP-GW-01	52.2	51.6	167	**1180**	5.06	**61.9**	**15000**
AOI01-05-GW	11.8	49.6	64.1	**597**	2.46J	**31.5**	**1190**
AOI01-06-GW	18	7.55	31.7	**139**	**13.3**	**28.5**	**391**
AOI01-07-GW	1.73J	1.90J	1.12J	**14.6**	ND	1.46J	1.31J

*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



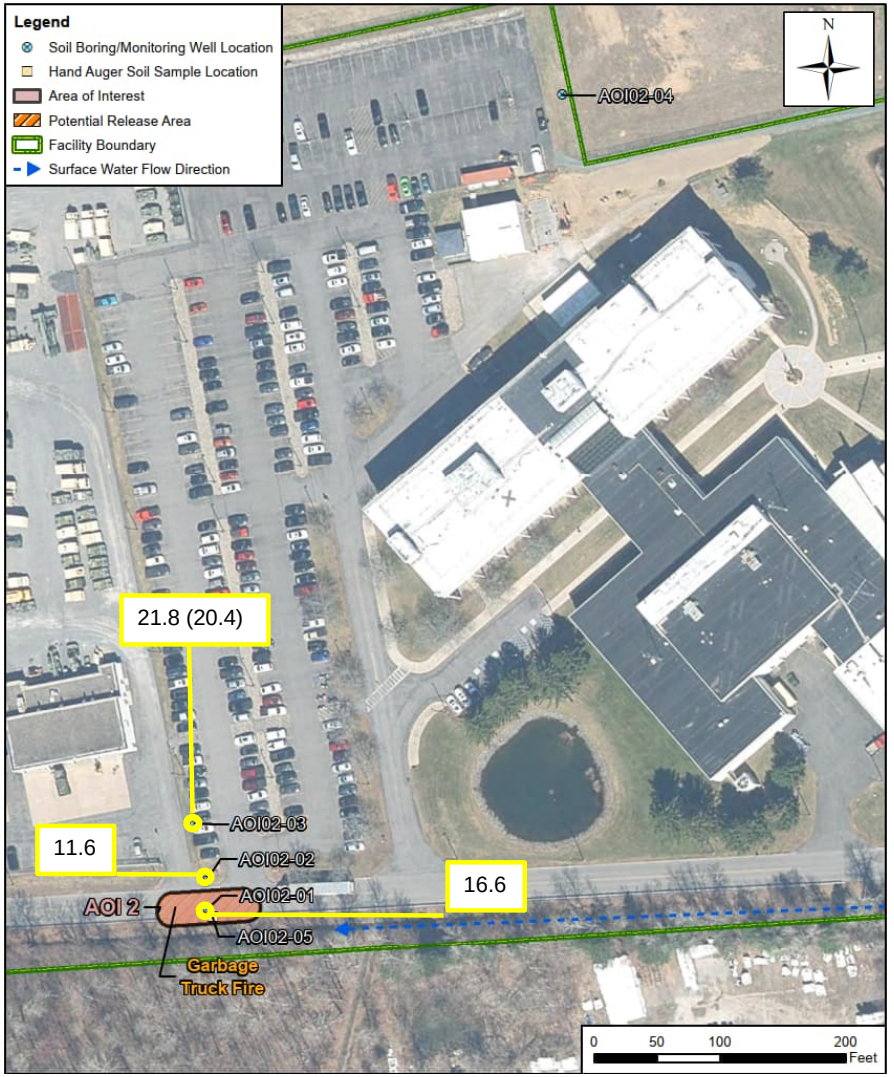
Exceedances of the OSD SL are depicted with a yellow halo.

533 PFOS Concentrations (ng/L)

SI Overview – AOI02 Groundwater Results

Groundwater (ng/L)	PFBA (1800)	PFBS (600)	PFHxA (990)	PFHxS (10)	PFNA (5.9)	PFOA (4)	PFOS (4)
AOI02-01-GW	5.82	ND	3.29J	1.59J	ND	**4.5**	**16.6**
AOI02-02-GW	32.3	1.21J	43.5	ND	1.80J	1.51J	**11.6**
AOI02-03-GW	13.3	6.69	22.8	2.89J	2.13J	**10.5**	**21.8**
AOI02-DUP-GW-02	15.4	6.28	23.3	2.34J	2.08J	**9.97**	**20.4**
AOI02-04-GW	ND	ND	ND	ND	ND	ND	ND

*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



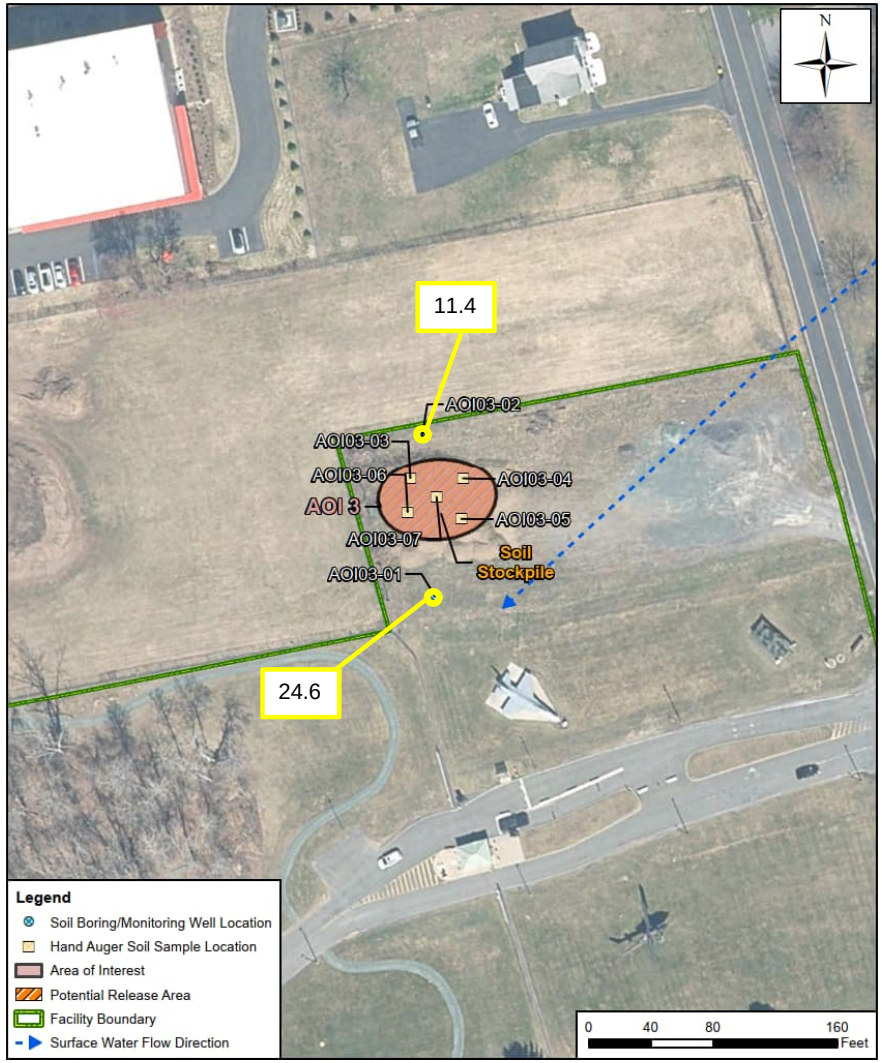
Exceedances of the OSD SL are depicted with a yellow halo.

11.6 PFOS Concentrations (ng/L)

SI Overview – AOI03 Groundwater Results

Groundwater (ng/L)	PFBA (1800)	PFBS (600)	PFHxA (990)	PFHxS (10)	PFNA (5.9)	PFOA (4)	PFOS (4)
AOI03-01-GW	9.27	3.30J	3.59J	3.36J	ND	**17.9**	**24.6**
AOI03-02-GW	2.51J	1.87J	1.50J	2.42J	1.17J	**13.7**	**11.4**

*SI analytical results are screened against the RSLs listed in the OSD's memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025).



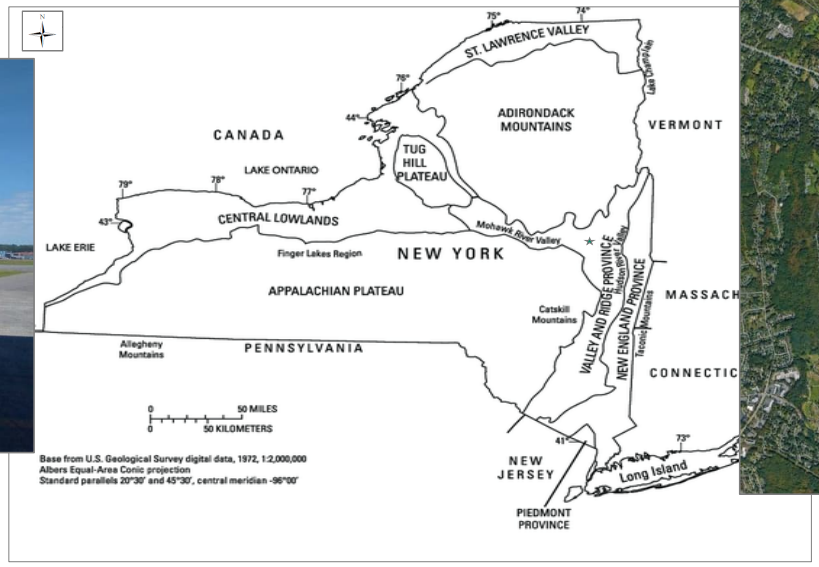
Exceedances of the OSD SL are depicted with a yellow halo.

24.6 PFOS Concentrations (ng/L)

CSM – Facility Location and Description

- Located in Latham, New York, Albany AASF #3 (the facility) lies on Albany International Airport (ALB) property that is leased to the New York ARNG (NYARNG)
  - ALB's Runway 1 lies ~ 600 feet to the west of the facility
- The facility is approximately 7 miles north-northwest from the Albany city center, and two miles south of the Mohawk River.
- The Mohawk River trends west to east before converging with the Hudson River roughly 5.5 miles to the northeast of the facility.
- The facility is located within the southeastern geological region of the Hudson-Mohawk River Lowlands, which is a segment of the Mohawk River Basin physiographic province.



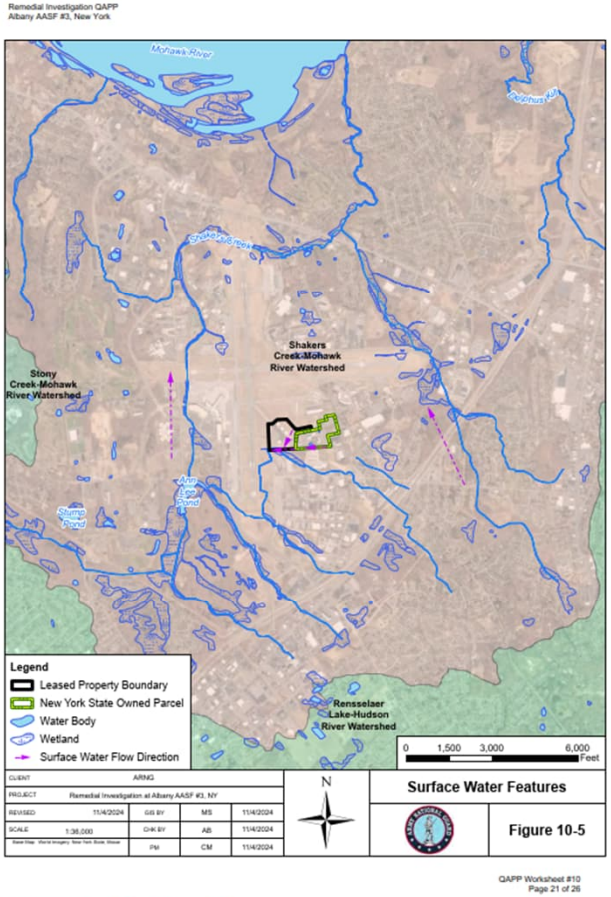


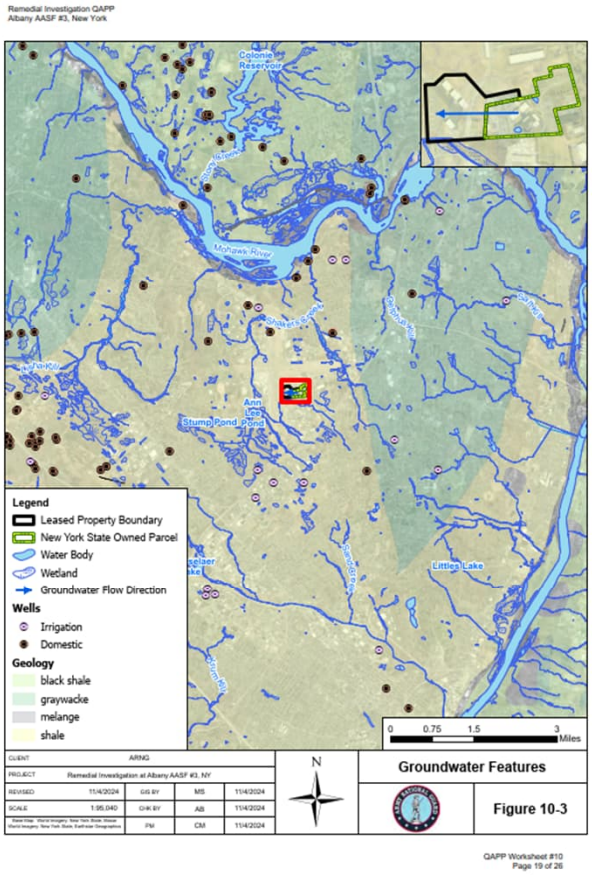




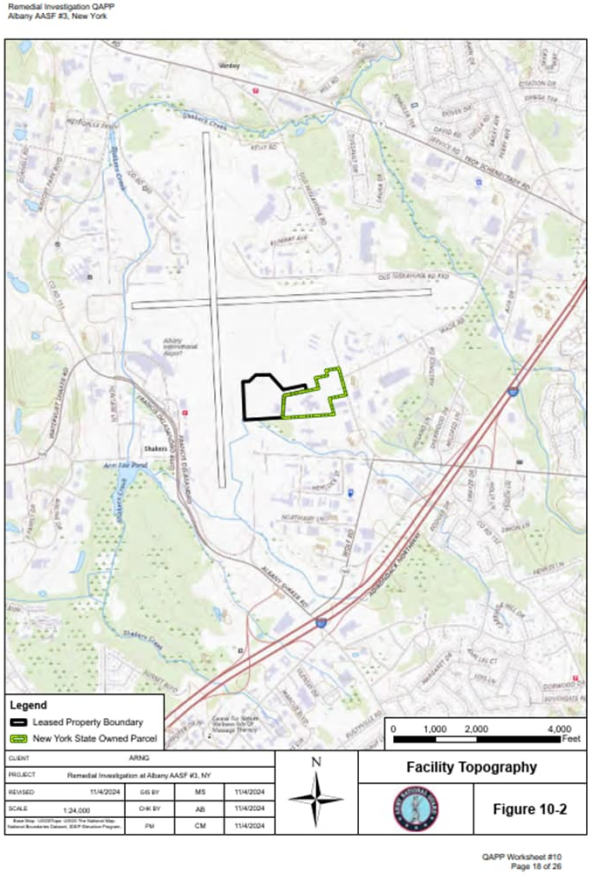
CSM – Physical Setting

Surface Hydrologic Features

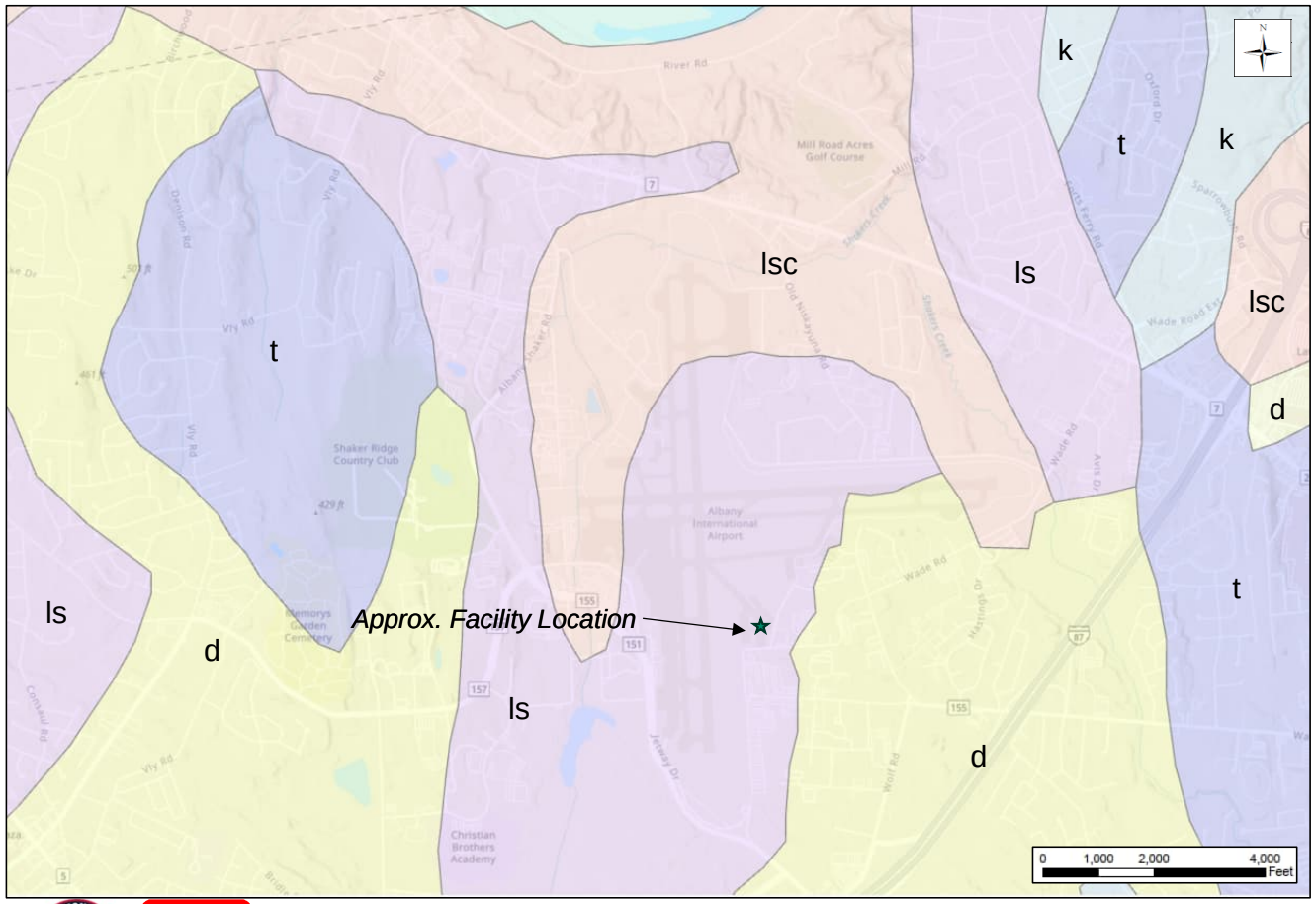




Regional Topography



CSM – Regional Surficial Geology



d - Wind-deposited sand
Fine to medium sand,
well sorted, stratified,
generally, wind-reworked lake sediments,
permeable, well drained,
thickness variable (1-10 meters).

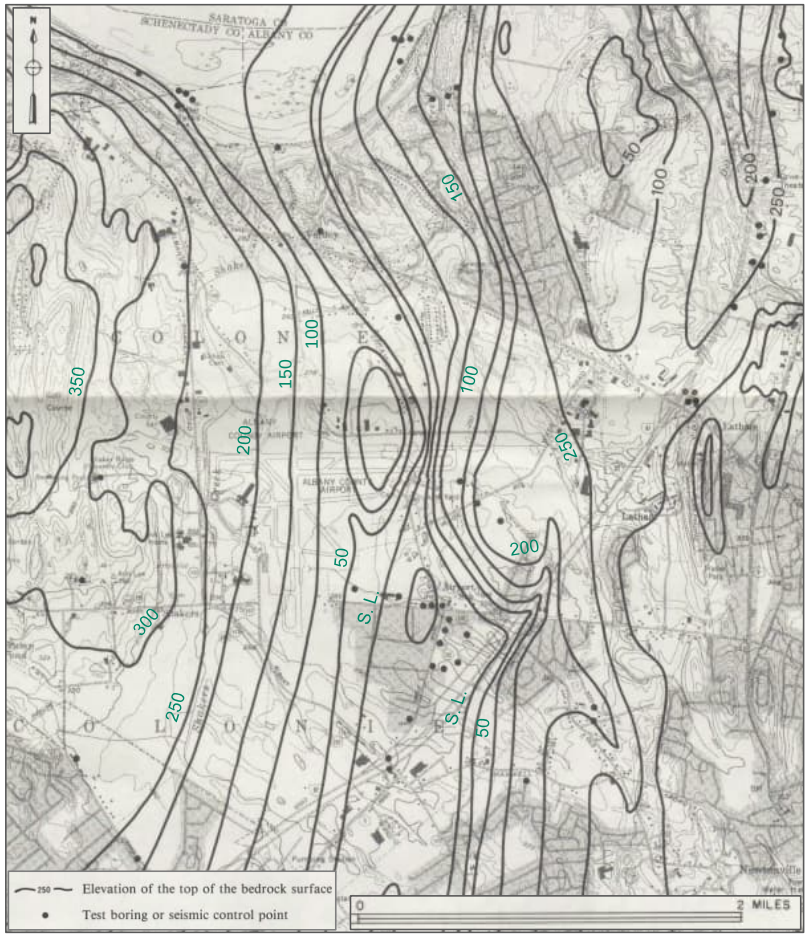
ls - Lacustrine sand
Generally, quartz sand, well sorted, stratified,
usually deposited in proglacial lakes,
but may have been deposited on remnant ice,
generally, a near-shore deposit or near a sand source,
permeable, thickness variable (2-20 meters).

lsc - Lacustrine silt and clay
Generally laminated silt and clay,
deposited in proglacial lakes,
generally calcareous, low permeability,
potential land instability,
thickness variable (up to 50 meters).

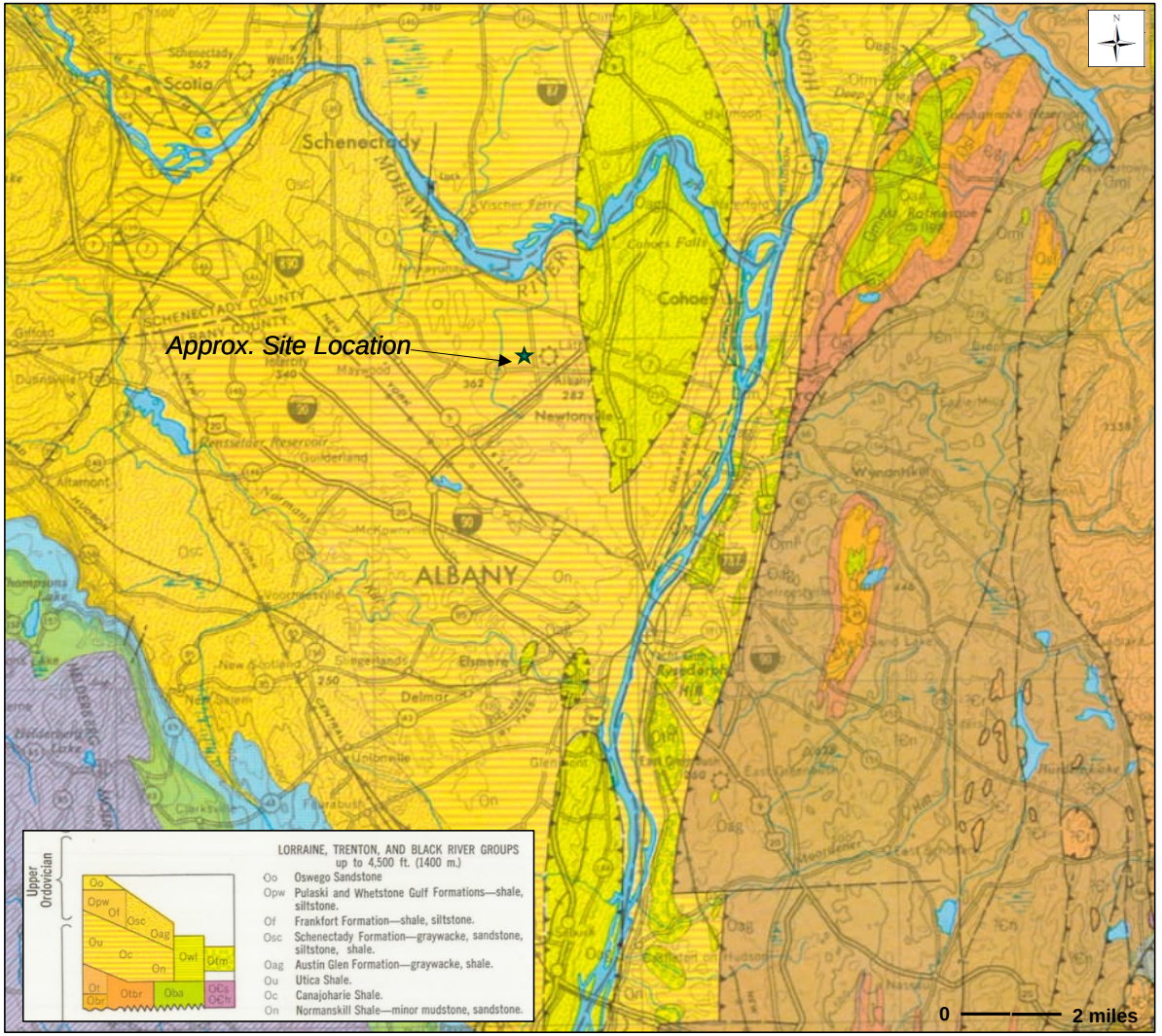
k - Kame deposits
Coarse to fine gravel and/or sand,
includes kames, eskers, kame terraces, kame deltas,
ice contact, or ice cored deposition,
lateral variability in sorting, texture
and permeability,
may be firmly cemented with calcareous cement,
thickness variable (10-30 meters).

t - Till
Variable texture (boulders to silt),
usually poorly sorted sand-rich diamict,
deposition beneath glacier ice,
permeability varies with compaction,
thickness variable (1-50 meters).

CSM – Regional Bedrock Geology

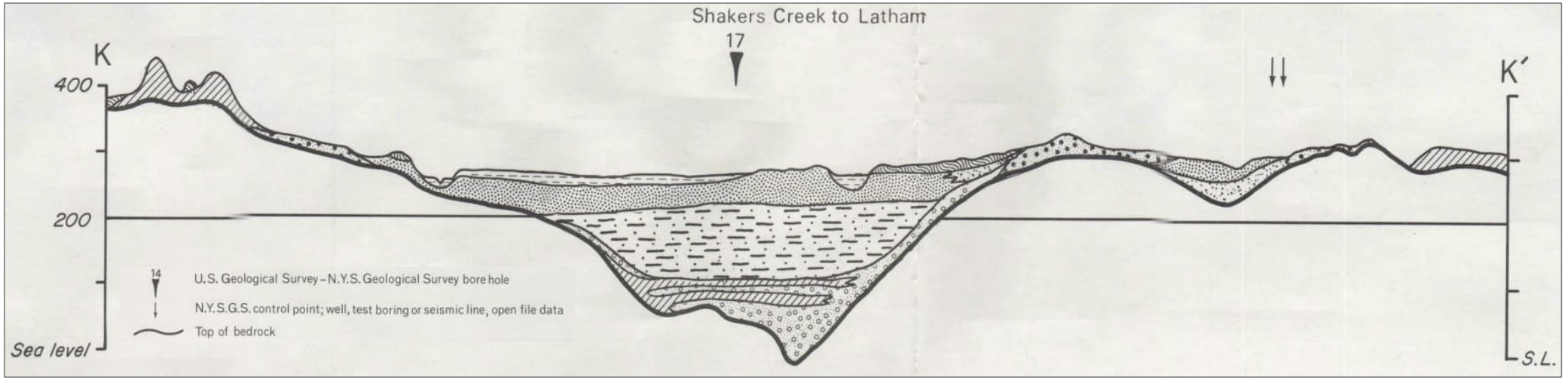


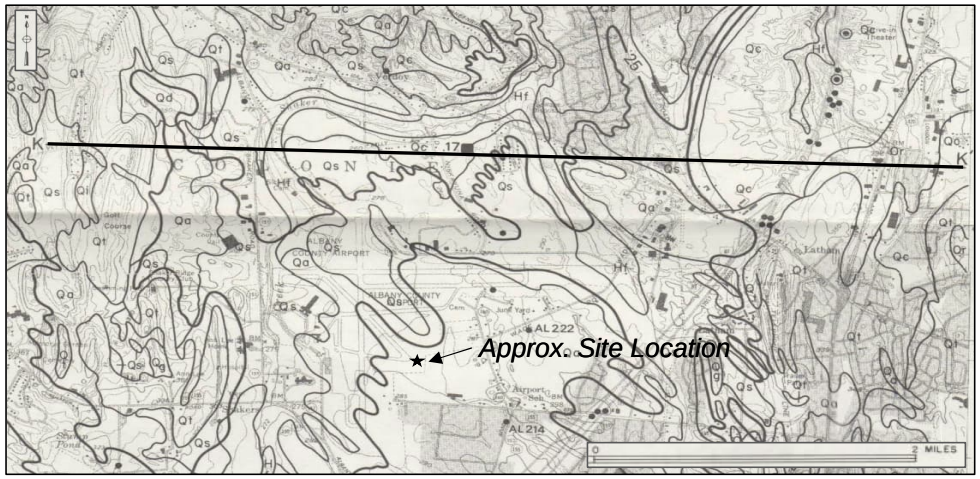
Bedrock Topography



Bedrock Geologic Map

CSM – Regional Geology



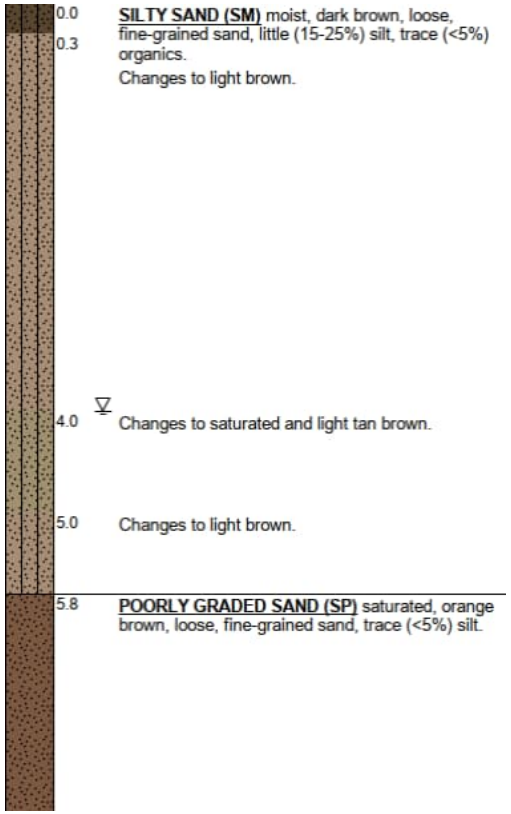


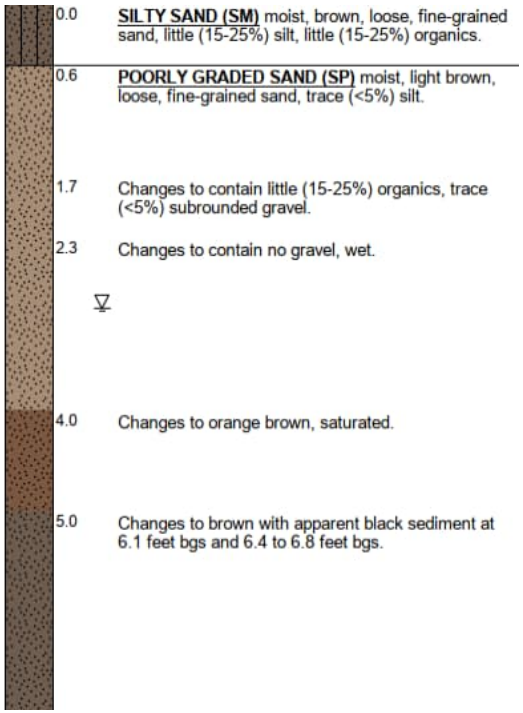


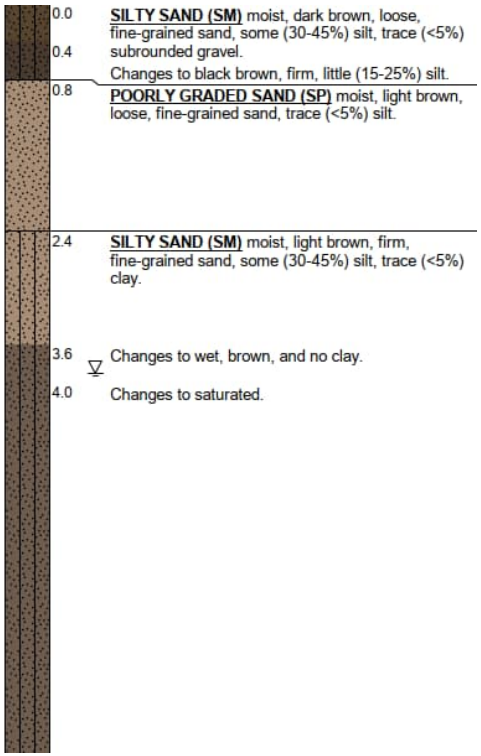
CSM – Site-Specific Geology

Lithologies encountered during the SI were consistent with the lacustrine deposits of proglacial Lake Albany

- Fine-grained silty sand, and poorly graded sand are the dominant lithologies







CSM – Regional Hydrogeology

Overburden

- *Surficial aquifer*
  - Formed from glaciolacustrine sand deposited by proglacial Lake Albany.
  - Tapped by individual domestic wells and small public-supply wells.
- *Colonie Channel aquifer*
  - Located beneath the surficial sand aquifer
  - Confined, productive, and consists of ice-contact sand and gravel
  - Occupies a pre-glacial bedrock drainage channel
  - In some areas, the Colonie Channel Aquifer is confined by thick clay or till resulting in artesian flow.
  - The Shakers Creek drainage area overlies the entire artesian flowing area
  - The largest area of artesian flow is in the vicinity of ALB

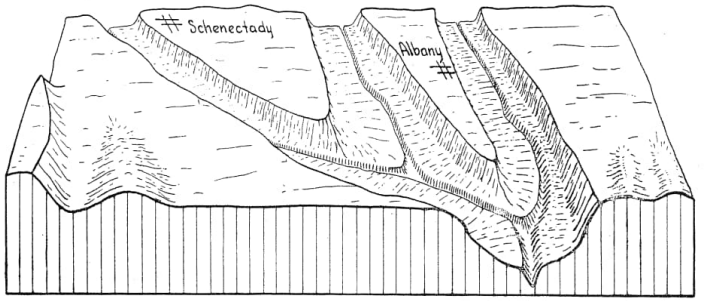
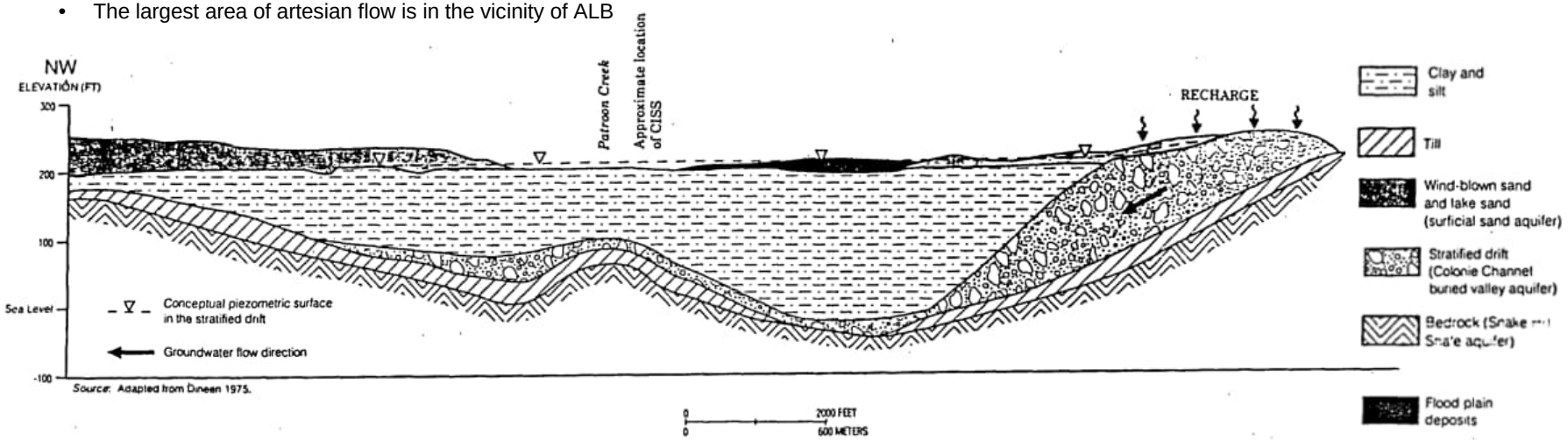


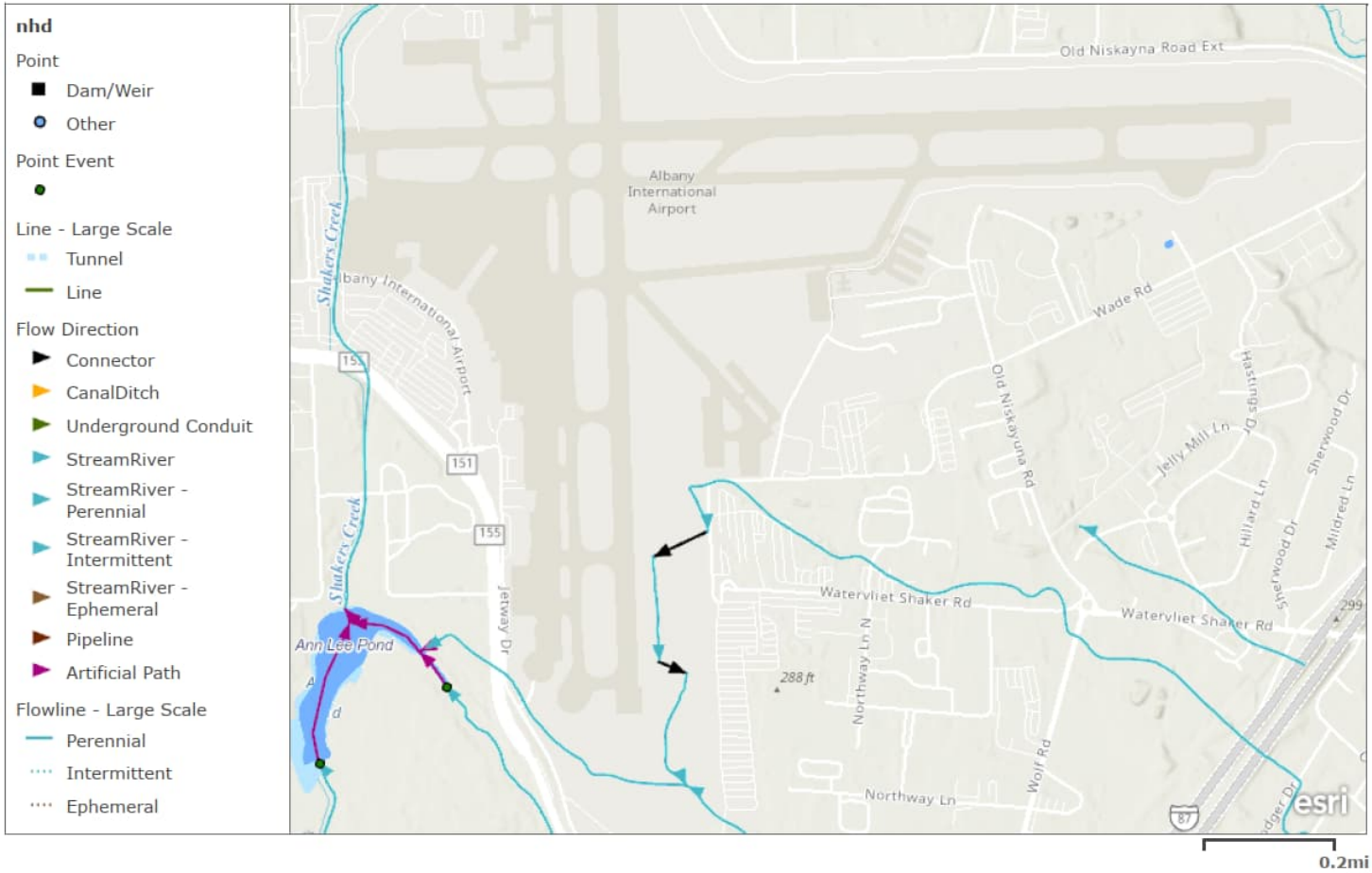
FIG. 2. Block diagram showing possible bedrock topography in the Albany-Schenectady area (Diagram modified after Cook, J. H., Chapter on glacial geology, *in* Geology of the Capital District, by Rudolf Ruedemann; New York State Mus. Bull. 285, p. 188, 1930).



Generalized Hydrogeologic Cross Section Through the Buried Colonie Channel

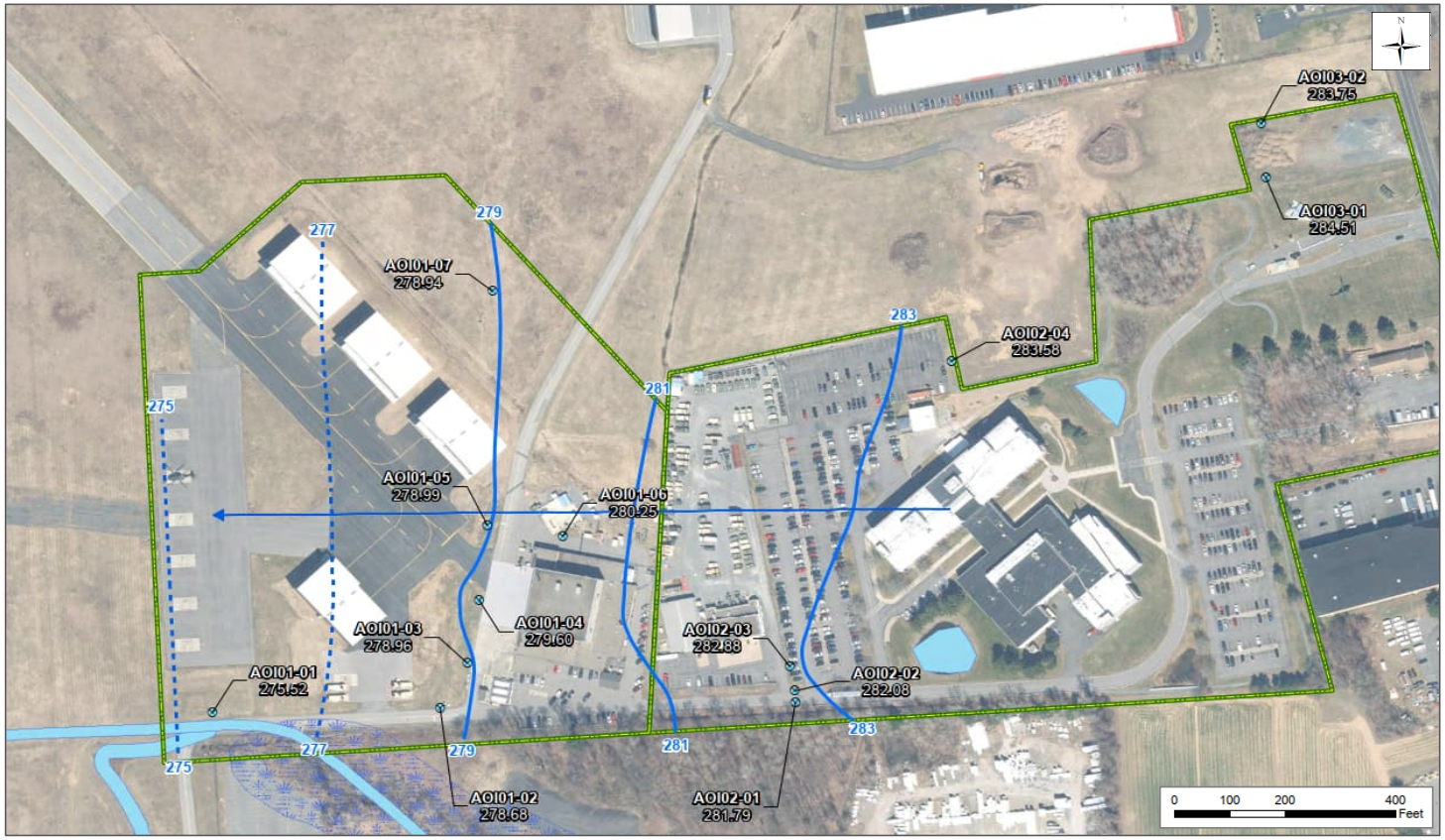
CSM – Local Hydrology

- Shakers Creek a tributary of the Mohawk River runs north towards the Mohawk River along the western portion of the airport property
- A tributary of Shakers Creek runs across the southwestern portion of the facility
- PFAS was detected in fish tissue samples near the confluence of the Mohawk and Shaker's Creek. Samples collected by NYSDEC in 2021.



CSM – Local Hydrogeology

- Surficial aquifer encountered between 2 to 6.4 ft btoc during SI
- SI groundwater measurements show a westerly flow direction
- Localized shallow groundwater flow may be influenced by Shakers Creek



Legend

- Soil Boring/Monitoring Well Location
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction

Groundwater Elevations, April 2022

RI Data Quality Objectives

RI Technical Approach Overview – Data Quality Objectives

Phase/Description	Objective

Prescriptive/Adaptive ***Groundwater***	• Install and collect groundwater samples from shallow permanent monitoring wells to further refine groundwater flow direction, document PFAS concentrations at the facility boundaries, and support grab groundwater evaluation
	• Collect grab groundwater samples from transects of vertical subsurface borings to assess the relative vertical and horizontal distribution of PFAS in the surficial aquifer at the facility; and **refine the extent of PFAS attributable to ARNG activities at concentrations above the relevant screening criteria**
	• During the Adaptive phase, if groundwater concentrations:
	  • **Exceed criteria → adaptive sampling locations may be adjusted to account for "step-out" locations as needed.**
	  • **Below criteria → investigation may proceed to further evaluation of data gaps, where applicable.**
	• During the Adaptive phase, establish placement and screened intervals for additional **permanent monitoring wells based on the evaluation of PFAS data and measured groundwater flow direction**.

Prescriptive/Adaptive ***Soil***	• Conduct sampling in surface and subsurface soil to **determine source strength** at the established AOIs and to **evaluate horizontal and vertical extent of PFAS** in soil at/near the facility boundary. • If decreasing concentrations are observed in the four cardinal directions away from an area of elevated surface soil concentrations, then the local release area is assumed to have been identified.
Surface Water/Sediment	• Collect surface water and sediment samples from the drainage ditch along the southern boundary of the facility to **evaluate whether the drainage ditch is impacted by sources attributable to ARNG activities** due to facility runoff. • If PFAS are detected, **evaluate potential for overland transport and assess if there is any potential of comingling sources** from PFAS impacts in surrounding area that are not attributable to ARNG activities.

RI Technical Approach Overview – Data Quality Objectives

Phase/Description	Objective
Quarterly Monitoring & Final Characterization ***Groundwater***	• Collect quarterly groundwater samples from permanent monitoring wells for analysis of PFAS to **refine the extent attributable to ARNG activities in groundwater at concentrations above relevant screening criteria** both on the facility and downgradient in the surrounding properties (if needed). • Determine extent of concentrations that are a result of ARNG activities or a result of offsite potential source areas not under the control of the ARNG.
Final Characterization ***All Media***	• Collect data to evaluate the site characteristics that influence PFAS fate and transport, to refine the conceptual site model, and inform the potential remedial alternatives evaluation.
Risk Assessment	• Further evaluate the results of PFAS concentrations as part of the Risk Assessment Work Plan (Appendix E of the Quality Assurance Project Plan [QAPP]) in the **human health risk assessment (HHRA)** and **in the screening-level ecological risk assessment (SLERA)**. The SLERA will evaluate ecological risk using relevant screening values from readily-available, peer-reviewed sources.

RI Technical Approach Overview

RI Technical Approach

Three primary phases of field work

- **Prescriptive**
  - **Initial data gathering mobilization to inform next two phases of work**
  - **Develop characterization strategy using PA/SI data and preliminary conceptual site model (CSM)**
  - **Source characterization − evaluate horizontal and vertical extent of PFAS impacts in groundwater and soil**
  - **Refine vertical extent of PFAS impacts in groundwater through coarse vertical profile boring (VP) transects upgradient and downgradient of source areas**
- Adaptive Phase
  - Based on findings of prescriptive phase, use rapid site characterization (RSC) techniques to delineate sources, refine CSM, and define geometry of plume(s)
- Final Delineation & Monitoring
  - Install complete groundwater well network
  - Complete well development, slug testing, and initiate quarterly monitoring

RI Technical Approach – Proposed Prescriptive Phase Sample Types

- Vertical Profiling (VP) via Direct Push Technology (DPT)
  - Evaluate the vertical and horizontal extent of source areas using transects of water table and multi-interval VP borings oriented perpendicular to the direction of groundwater flow.
  - Three groundwater samples will be taken from multi-interval VP borings at ~20’ intervals starting at the water table to a depth of 50’ bgs or refusal
  - At least two soil samples will be collected from each on-facility VP boring:
    1. Surface soil (0-2’bgs)
    2. Directly above the water table (depth will vary across the site)
    3. A third sample at the midpoint between 2’ bgs and the water table may be collected, depending on the depth to water at each boring
- Permanent Monitoring Wells
  - Install and sample six new monitoring wells
    - Verify groundwater flow direction and support grab groundwater evaluation
    - Evaluate water quality at facility boundaries
- RSC Soil Sampling Grids
  - Evaluate PFAS extent in soil at source areas associated with hangar releases.
- Surface Water/Sediment
  - Evaluate potential impacts to surface water, sediment, in the drainage ditch/stormwater structure running through the southwest corner of the site

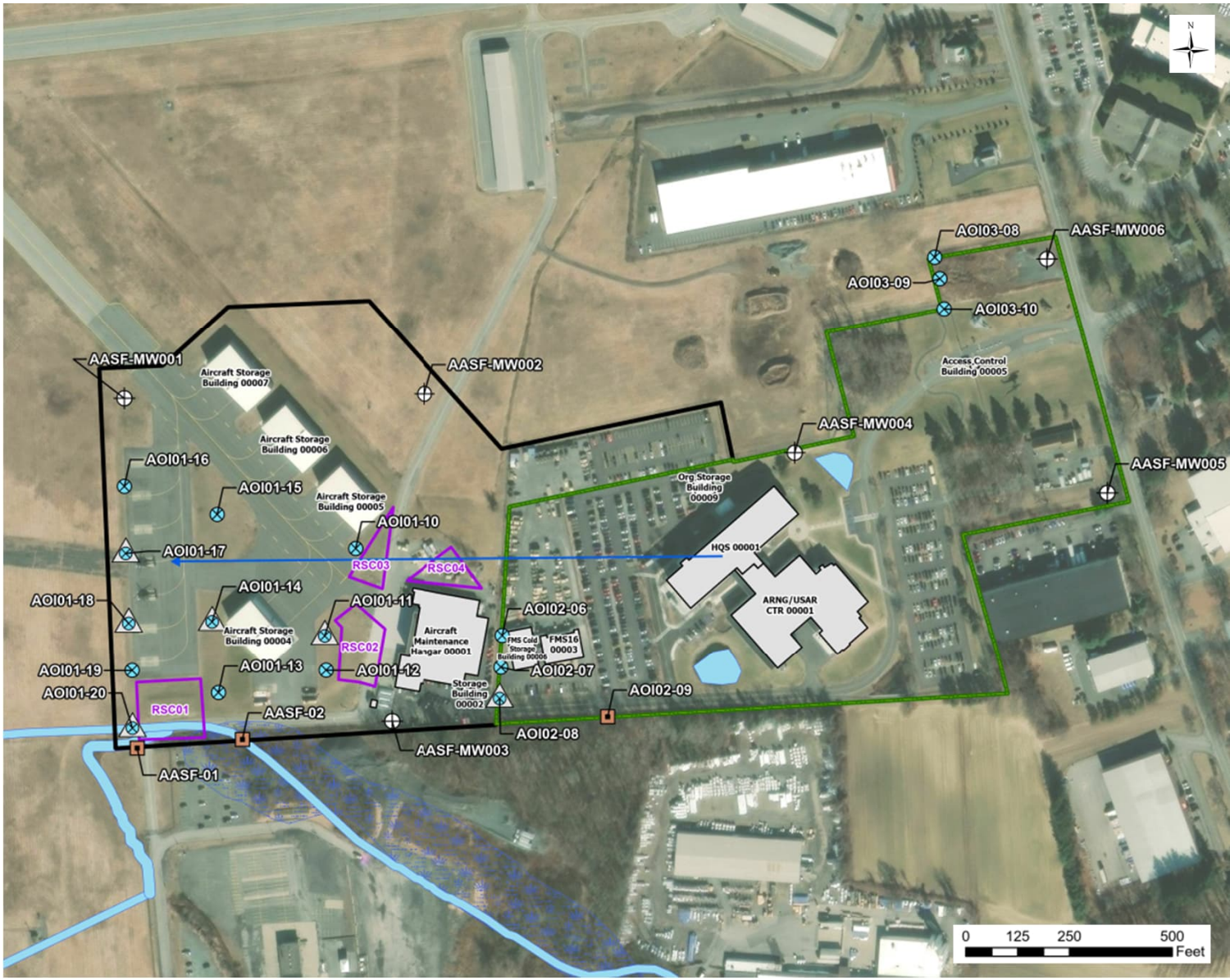
RI Technical Approach
Prescriptive Phase Analytical Methods

- Screening level data via PFAS by ASTM D8421
  - Applied to prescriptive sampling in soil and groundwater
- Definitive data via PFAS by LC/MS/MS compliant with USEPA Method 1633
  - Applied to prescriptive sampling in surface water, and sediment
- RSC samples will be analyzed using ASTM D8421 at a fixed laboratory with a 48-hour turnaround time on analytical results.

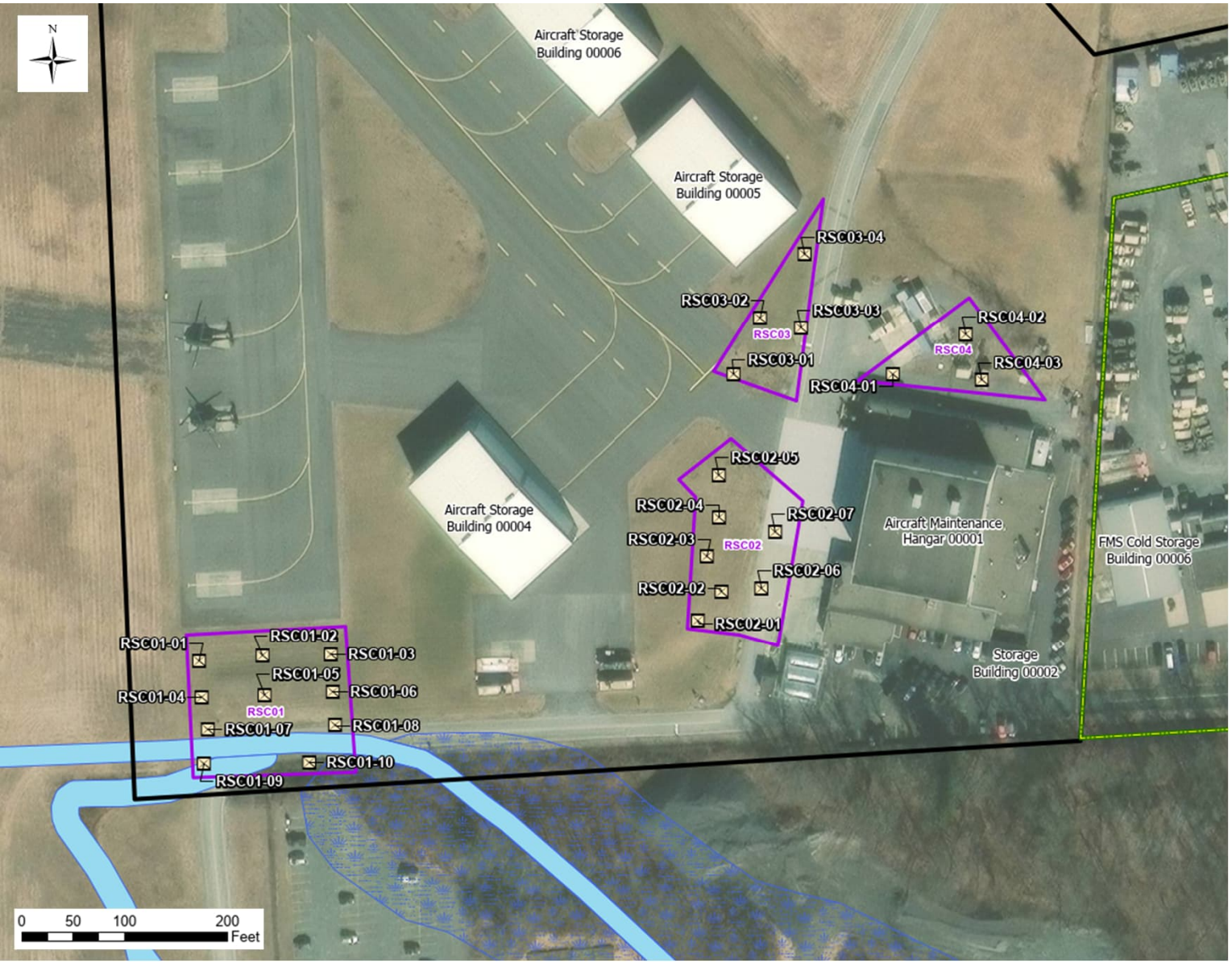
RI Approach – Proposed Prescriptive Phase Sample Locations

- Sample Types & Totals
  - RSC Soil Grids: 4
    - 1 grid: 3 surface soil samples
    - 1 grid: 4 surface soil samples
    - 1 grid: 7 surface soil samples
    - 1 grid: 10 surface soil samples
  - Surface Water/Sediment Location: 3
  - DPT Boring Locations: 17
    - Water table borings: 11 total
    - Multi-interval VP borings: 6 total
    - Soil samples: 39 total (1-3 from each boring)
  - Permanent Monitoring Wells: 6 new

RI Approach – Prescriptive Phase Remedial Investigation Proposed Sample Locations



RI Approach – RI Proposed RSC Surface Soil Sample Locations



Legend

- Proposed Surface Soil Sample
- Proposed RSC Grids
- Leased Property Boundary
- New York State Owned Parcel
- Water Body
- Wetland

RI Technical Approach – Department of Defense (DoD) Screening Levels

Analyte	Residential (Soil) (µg/kg)[a, b] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a, b]
HFPO-DA	23	350	1.5
PFBA	7,800	120,000	1,800
PFBS	1,900	25,000	600
PFHxA	3,200	41,000	990
PFHxS	130	1,600	10
PFNA	19	250	5.9
PFOA	0.070	0.078	4.0
PFOS	0.63	8.2	4.0
TFSI[c]	2,300	35,000	590
PFPrA[c]	3,900	58,000	980
PFDA	0.06	0.16	0.52

bgs = below ground surface
ng/L = nanograms per liter
µg/kg = micrograms per kilogram

HFPO-DA = Hexafluoropropylene oxide dimer acid
PFBA = Perfluorobutanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHxA = Perfluorohexanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
PFOA = Perfluorooctanoic acid
PFOS = Perfluorooctanesulfonic acid
TFSI = Bis(trifluoromethylsulfonyl)amine
PFPrA = Perfluoropropanoic acid
PFDA = Perfluorodecanoic acid

Notes:

[a] The DoD Screening Levels (SLs) are derived from a combination of USEPA Regional Screening Level (RSLs) based on a cancer risk level of 1E-06 and a hazard quotient of 0.1 (November 2024), USEPA Maximum Contaminant Levels, and DoD-adjusted SLs which are based on pooled method detection limits. The DoD SLs are consistent with the memorandum from the OSD, Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program (17 January 2025) and the list of RSLs included in Department of Defense Investigations of PFAS as of November 2024 (https://www.acq.osd.mil/eie/eer/ecc/pfas/pfas101/rsl.html).

[b] Note that the OSD memo values are applicable to tap water (groundwater and/or surface water) and soil. Surface water and sediment screening criteria are multiplied by a factor of 10 from the respective residential tap water and soil RSLs to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario.

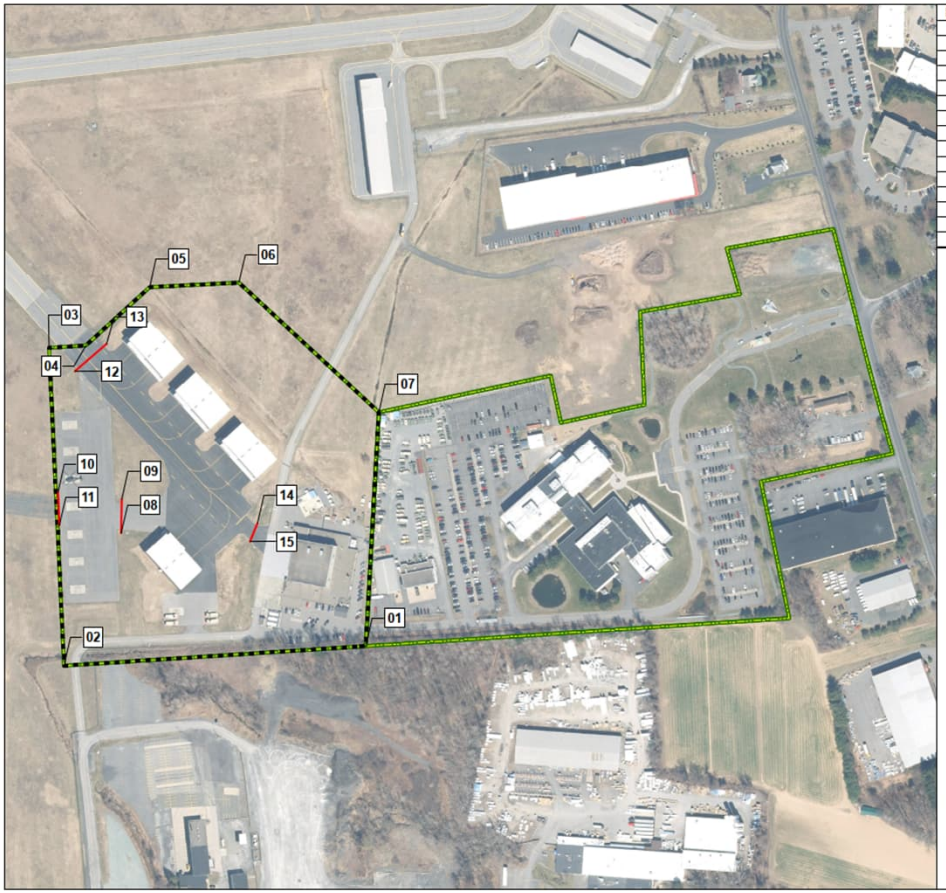
[C] PFPrA and TFSI are not currently included in the 40-compound list for USEPA Method 1633.

RI Technical Approach – Rights of Entry (ROEs)

- Rights-of-Entry Coordination
  - ROEs managed by USACE Omaha District, Real Estate Division
  - Albany International Airport for off-site sample locations
  - ROEs will be requested if and when the investigation determines they are needed
- Federal Aviation Administration (FAA) notifications
- Critical to start process early to avoid field work delays

RI Technical Approach – Federal Aviation Administration (FAA)

- Obstruction Evaluation/ Airport Airspace Analysis (OE/AAA) required
- Submitted on 30 July 2024
- Determination received on 16 October 2024 with minimal conditions



Point	Description	Longitude	Latitude	SE	AGL	AMSL
1	Area 01	73° 47' 55.54" W	42° 44' 29.93" N	284.18	16	300.18
2	Area 01	73° 48' 7.27" W	42° 44' 29.49" N	276.55	16	292.55
3	Area 01	73° 48' 7.68" W	42° 44' 38.62" N	278.11	16	294.11
4	Area 01	73° 48' 6.25" W	42° 44' 38.67" N	279.05	16	295.05
5	Area 01	73° 48' 3.74" W	42° 44' 40.32" N	276.58	16	292.58
6	Area 01	73° 48' 0.27" W	42° 44' 40.41" N	278.15	16	294.15
7	Area 01	73° 47' 54.91" W	42° 44' 36.65" N	282.26	16	298.26
8	Access Route 1	73° 48' 4.98" W	42° 44' 33.27" N	279.87	16	295.87
9	Access Route 1	73° 48' 4.94" W	42° 44' 34.23" N	279.45	16	295.45
10	Access Route 2	73° 48' 7.41" W	42° 44' 34.46" N	278.94	16	294.94
11	Access Route 2	73° 48' 7.37" W	42° 44' 33.51" N	279.11	16	295.11
12	Access Route 3	73° 48' 6.69" W	42° 44' 37.95" N	278.48	16	294.48
13	Access Route 3	73° 48' 5.44" W	42° 44' 38.71" N	278.64	16	294.64
14	Access Route 4	73° 47' 59.68" W	42° 44' 33.50" N	281.21	16	297.21
15	Access Route 4	73° 47' 59.98" W	42° 44' 32.97" N	280.49	16	296.49

Notes:

1. Drilling work includes environmental soil borings and monitoring well installations at multiple locations within the Work Area.
2. Work Area shown on the map include the entire potential area of equipment and work extents (drilling, support, ground movements). Actual drilling locations within the work area to be determined based on field conditions.
3. Work uses a mobile drill rig (track or truck mounted), support vehicles (pickup truck, small flatbed), and personnel.
4. The drill rig boom extends 16 feet above ground when drilling. The boom will be lowered to the height of a standard pickup truck when moving between locations and at the end of each day. The boom can be lowered in 10 minutes at any time, if needed.
5. Drilling at each location will typically be completed in 2 to 3 days. The duration of work is expected to be approximately 4 to 6 weeks.
6. Follow up access to the locations will be necessary to collect environmental samples. Sample collection may last several hours and includes a pickup truck and personnel.

Acronyms:
AGL: Above Ground Level (in feet)
AMSL: Above Mean Sea Level (in feet)
SE: Site Elevation (in feet)
FAA OE/AAA: Federal Aviation Administration Obstruction Evaluation/Airport Airspace Analysis
AASF: Army Aviation Support Facility

Sources:
The surface elevation was calculated using the digital elevation model (DEM) of the land surface in Albany County, New York provided by the USGS National Elevation Dataset.

Aerial Imagery Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

Legend
Access Route
Work Area
Facility Boundary

N

0 135 270 540
Feet

RI Community Involvement

RI Community Involvement

- Community Involvement Plan (CIP) is a formal plan for community involvement activities
- Includes interviews from a cross-section of the community surrounding the facility in order to:
  - Identify key concerns
  - Gauge interest in the remedial investigation
  - Identify the best fit (modes of communication) for outreach activities
  - Establish a location for the public to access the Information Repository(IR)
- CIP interviews were conducted during the week of 28 October, 2024
- Restoration Advisory Board (RAB) Solicitation
  - Initial interest in formation of a RAB was gauged as part of the CIP interview process
  - After establishing an IR location, a formal solicitation notice in the local newspaper for community stakeholder interest
  - If there is a lack of initial interest, RAB solicitation will occur every 2 years

RI Schedule

RI Schedule

Task	Start Date	End Date
RI QAPP (Prescriptive)	January 2025	June 2025
Pre-mobilization (Prescriptive)	June 2025	June 2025
Mobilization (Prescriptive)	June 2025	June 2025
Field Work (Prescriptive)	July 2025	July 2025
Demobilization (Prescriptive)	July 2025	August 2025
Data Analysis / Data Validation (Prescriptive)	August 2025	January 2026
Pre-mobilization (Adaptive)	May 2026	May 2026
Field Work (Adaptive)	June 2026	June 2026
Demobilization (Adaptive)	June 2026	July 2026
Data Analysis / Data Validation (Adaptive)	July 2026	November 2026
Pre-mobilization (Final Characterization/Monitoring)	May 2027	May 2027
Field Work (Final Characterization/Monitoring)	May 2027	June 2027
Demobilization (Final Characterization/Monitoring)	June 2027	June 2027
Data Analysis / Data Validation (Final Characterization/Monitoring)	June 2027	October 2027
Reporting	October 2027	March 2028

RI Schedule – Current Status

- Draft Final QAPP
  - Submitted to NYSDEC/NYSDOH on 7 April 2025
  - Requested review from NYSDEC/NYSDOH by 7 May 2025

- Mobilize for Prescriptive Phase fieldwork in June/July 2025
  - Pending approval of QAPP

- RSC process/ expectations during fieldwork
  - Check-ins with PDT will be scheduled, as needed, to determine step-out locations as data are received
  - Please do your best to attend scheduled meetings as time-sensitive decisions will be made
  - Meeting notes will be circulated documenting path forward

RI Schedule – Field Planning Process

Goal: Streamline planning process between field mobilizations

Process:

- Teleconference to be held with stakeholders to discuss current investigation status following completion of most recent field activities
- Detailed slide deck providing recent investigations results, updated CSM, and proposed path forward will be shared no less than 2 weeks prior to holding meeting
- Meeting objective to develop stakeholder consensus through interactive discussion
- Field Planning Request Form will be submitted with slide deck and used to summarize data, highlight data gaps, and establish plan for next phase of work with amended RI QAPP Worksheets #17 & #18

Note: RI QAPP will remain primary planning document and will be referenced in Field Planning Request Form

RI Schedule – Hypothetical Timeline to Adaptive Phase

- Approximately 6 months from end of Prescriptive Phase to start of Adaptive Phase
- Timing constraints may include ROEs, FAA notification, weather, laboratory turnaround times, and administrative review times

Task Name	Duration	Start	Finish
Hypothetical Timeline to Adaptive Phase	**138 days**	**Fri 8/1/25**	**Mon 2/16/26**
End of Field Work (Prescriptive)	*0 days*	*Fri 8/1/25*	*Fri 8/1/25*
Laboratory Data Analysis/ Final EDDs Provided	30 days	Fri 8/1/25	Thu 9/11/25
Data Validation	15 days	Fri 9/12/25	Fri 10/03/25
Data Reduction; Prepare Draft Scoping Materials	25 days	Mon 10/06/25	Mon 11/10/25
Submit Draft Scoping Materials to Internal PDT; Internal PDT Review	**10 days**	**Tues 11/11/25**	**Wed 11/26/25**
Internal Scoping Call	*1 day*	*Tues 11/18/25*	*Tues 11/18/25*
Resolve feedback; Prepare Draft Final Scoping Materials	8 days	Fri 11/21/25	Wed 12/5/25
Initiate Field Planning	*50 days*	*Fri 11/21/25*	*Tues 2/3/26*
Submit Draft Final Scoping Materials to External PDT; External PDT Review	0 days	Wed 12/5/25	Wed 12/5/25
External Scoping Call; resolve initial comments on scope	*10 days*	*Thu 12/6/25*	*Fri 12/19/25*
Additional review time for External PDT; Provide any final comments	10 days	Mon 12/22/25	Thurs 1/8/26
Resolve final feedback; Prepare Final Scoping Materials	10 days	Fri 1/9/26	Fri 1/23/26
Submit Final Scoping Materials	0 days	Fri 1/23/25	Fri 1/23/25
Mobilize to Field (Adaptive)	*0 days*	*Mon 2/16/26*	*Mon 2/16/26*

Questions/ Open Discussion

Questions and Open Discussion

Acronyms and Abbreviations

A2P JV– AECOM Arcadis PFAS Joint Venture
AFFF – aqueous film forming foam
AOI – Area of Interest
ARNG – Army National Guard
bgs – below ground surface
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CIP – Community Involvement Plan
CSM – conceptual site model
DD – Decision Document
FAA – Federal Aviation Administration
FS – Feasibility Study
GIS – Geographic Information Systems
GSE – Ground Support Equipment
GW – Groundwater
HFPO-DA – Hexafluoropropylene oxide dimer acid
HQ – hazard quotient
ng/L – nanograms per liter
NTCRA – Non-Time Critical Removal Action
NYARNG – New York Army National Guard
NYSDEC – New York State Department of Environmental Conservation
NYSDOH – New York State Department of Health
OSD – Office of the Secretary of Defense
PA – Preliminary Assessment
PFAS – per- and polyfluoroalkyl substances
PFBA – Perfluorobutanoic acid
PFBS – Perfluorobutanesulfonic acid
PFOA – Perfluorooctanoic acid
PFOS – Perfluorooctanesulfonic acid
PFHxA – Perfluorohexanoic acid
PFHxS – Perfluorohexanesulfonic acid
PMO – Project Management Office
MIL-SPEC – military specification
QAPP – Quality Assurance Project Plan
RAB – Restoration Advisory Board
RI – Remedial Investigation
RSL – Regional Screening Level
SL – Screening Level
SI – Site Inspection
TCRA – Time-Critical Removal Action
TPP – Technical Project Planning
µg/kg – micrograms per kilogram
USACE – United States Army Corps of Engineers
USEPA – United States Environmental Protection Agency

Thank you.

Appendix B
SI Analytical Tables and Figures

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Appendix F Laboratory Data
Surface Soil
Site Inspection Report, Albany AASF #3

Area of Interest		AOI01																							
Sample ID		AOI01-01-SB-00-02				AOI01-02-SB-00-02				AOI01-03-SB-00-02				AOI01-04-SB-00-02				AOI01-05-SB-00-02				AOI01-06-SB-00-02			
Sample Date		04/11/2022				04/11/2022				04/11/2022				04/11/2022				04/12/2022				04/12/2022			
Depth		0-2 ft				0-2 ft				0-2 ft				0-2 ft				0-2 ft				0-2 ft			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																									
6:2 FTS	-	<	0.213	1.07	U	<	0.228	1.14	U	<	0.229	1.15	U	<	0.232	1.16	U	<	0.225	1.12	U	<	0.228	1.14	U
8:2 FTS	-	<	0.107	1.07	U	<	0.114	1.14	U	<	0.115	1.15	U	<	0.116	1.16	U	<	0.112	1.12	U	<	0.114	1.14	U
NEtFOSAA	-	5.53	0.107	1.07		<	0.114	1.14	U	<	0.115	1.15	U	<	0.116	1.16	U	<	0.112	1.12	U	<	0.114	1.14	U
NMeFOSAA	-	<	0.053	1.07	U	<	0.057	1.14	U	<	0.057	1.15	U	<	0.058	1.16	U	<	0.056	1.12	U	<	0.057	1.14	U
PFBA	-	0.076	0.107	1.07	J	0.080	0.114	1.14	J	0.082	0.115	1.15	J	0.063	0.116	1.16	J	0.053	0.112	1.12	J	<	0.114	1.14	U
PFBS	1900	<	0.053	1.07	U	<	0.057	1.14	U	<	0.057	1.15	U	0.039	0.058	1.16	J	<	0.056	1.12	U	<	0.057	1.14	U
PFDA	-	0.050	0.107	1.07	J	0.054	0.114	1.14	J	<	0.115	1.15	U	0.070	0.116	1.16	J	<	0.112	1.12	U	0.094	0.114	1.14	J
PFDoA	-	0.034	0.053	1.07	J	<	0.057	1.14	U	<	0.057	1.15	U	0.024	0.058	1.16	J	<	0.056	1.12	U	<	0.057	1.14	U
PFHpA	-	0.033	0.053	1.07	J	0.046	0.057	1.14	J	0.052	0.057	1.15	J	0.064	0.058	1.16	J	0.045	0.056	1.12	J	<	0.057	1.14	U
PFHxA	-	0.077	0.053	1.07	J	0.040	0.057	1.14	J	0.071	0.057	1.15	J	0.188	0.058	1.16	J	0.080	0.056	1.12	J	0.031	0.057	1.14	J
PFHxS	130	0.250	0.107	1.07	J	<	0.114	1.14	U	0.102	0.115	1.15	J	1.24	0.116	1.16		0.332	0.112	1.12	J	0.260	0.114	1.14	J
PFNA	19	0.060	0.053	1.07	J	0.071	0.057	1.14	J	0.057	0.057	1.15	J	0.037	0.058	1.16	J	0.077	0.056	1.12	J	0.039	0.057	1.14	J
PFOA	19	0.164	0.213	1.07	J	0.104	0.228	1.14	J	0.177	0.229	1.15	J	0.174	0.232	1.16	J	0.229	0.225	1.12	J	<	0.228	1.14	U
PFOS	13	7.45	0.213	1.07		0.538	0.228	1.14	J	4.70	0.229	1.15		60.1	1.16	5.80		6.40	0.225	1.12		6.33	0.228	1.14	
PFPeA	-	0.053	0.053	1.07	J	0.037	0.057	1.14	J	0.058	0.057	1.15	J	0.109	0.058	1.16	J	0.050	0.056	1.12	J	<	0.057	1.14	U
PFTeDA	-	<	0.053	1.07	U	<	0.057	1.14	U	<	0.057	1.15	U	<	0.058	1.16	U	<	0.056	1.12	U	<	0.057	1.14	U
PFTrDA	-	0.110	0.107	1.07	J	<	0.114	1.14	U	<	0.115	1.15	U	<	0.116	1.16	U	<	0.112	1.12	U	<	0.114	1.14	U
PFUnDA	-	0.206	0.053	1.07	J	0.041	0.057	1.14	J	0.029	0.057	1.15	J	0.035	0.058	1.16	J	0.037	0.056	1.12	J	0.054	0.057	1.14	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
Dup	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI01																				AOI02			
Sample ID		AOI01-07-SB-00-02				AOI01-08-SB-00-02				AOI01-SB-DUP-1				AOI01-09-SB-00-02				AOI02-01-SB-00.9-03.5				AOI02-SB-DUP-3			
Sample Date		04/12/2022				04/11/2022				04/12/2022				04/11/2022				04/14/2022				04/14/2022			
Depth		0-2 ft				0-2 ft				0-2 ft				0-2 ft				0.9-3.5 ft				0.9-3.5 ft			
Analyte	**OSD Screening Level [a]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																									
6:2 FTS	-	<	0.257	1.28	U	<	0.221	1.10	U	<	0.220	1.10	U	<	0.221	1.11	U	<	0.189	0.947	U	<	0.193	0.963	U
8:2 FTS	-	<	0.128	1.28	U	<	0.110	1.10	U	<	0.110	1.10	U	<	0.111	1.11	U	<	0.095	0.947	U	<	0.096	0.963	U
NEtFOSAA	-	<	0.128	1.28	U	<	0.110	1.10	U	<	0.110	1.10	U	<	0.111	1.11	U	<	0.095	0.947	U	<	0.096	0.963	U
NMeFOSAA	-	<	0.064	1.28	U	<	0.055	1.10	U	<	0.055	1.10	U	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFBA	-	0.248	0.128	1.28	J	0.072	0.110	1.10	J	0.046	0.110	1.10	J	<	0.111	1.11	U	<	0.095	0.947	U	<	0.096	0.963	U
PFBS	1900	0.028	0.064	1.28	J	<	0.055	1.10	U	<	0.055	1.10	U	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFDA	-	<	0.128	1.28	U	<	0.110	1.10	U	<	0.110	1.10	U	<	0.111	1.11	U	<	0.095	0.947	U	<	0.096	0.963	U
PFDoA	-	<	0.064	1.28	U	<	0.055	1.10	U	<	0.055	1.10	U	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFHpA	-	0.106	0.064	1.28	J	0.042	0.055	1.10	J	0.026	0.055	1.10	J	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFHxA	-	0.096	0.064	1.28	J	0.095	0.055	1.10	J	0.066	0.055	1.10	J	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFHxS	130	0.088	0.128	1.28	J	0.146	0.110	1.10	J	0.121	0.110	1.10	J	0.086	0.111	1.11	J	<	0.095	0.947	U	<	0.096	0.963	U
PFNA	19	0.079	0.064	1.28	J	0.058	0.055	1.10	J	0.042	0.055	1.10	J	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFOA	19	0.242	0.257	1.28	J	0.136	0.221	1.10	J	<	0.220	1.10	UJ	<	0.221	1.11	U	<	0.189	0.947	U	<	0.193	0.963	U
PFOS	13	0.310	0.257	1.28	J	14.1	0.221	1.10		12.0	0.220	1.10		8.88	0.221	1.11		0.071	0.189	0.947	J	0.087	0.193	0.963	J
PFPeA	-	0.155	0.064	1.28	J	0.070	0.055	1.10	J	0.043	0.055	1.10	J	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFTeDA	-	<	0.064	1.28	U	<	0.055	1.10	U	<	0.055	1.10	U	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U
PFTrDA	-	<	0.128	1.28	U	<	0.110	1.10	U	<	0.110	1.10	U	<	0.111	1.11	U	<	0.095	0.947	U	<	0.096	0.963	U
PFUnDA	-	<	0.064	1.28	U	0.024	0.055	1.10	J	<	0.055	1.10	UJ	<	0.055	1.11	U	<	0.047	0.947	U	<	0.048	0.963	U

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

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Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
Dup	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Appendix F Laboratory Data
Surface Soil
Site Inspection Report, Albany AASF #3

Area of Interest		AOI02												AOI03											
Sample ID		AOI02-02-SB-00-02				AOI02-03-SB-00-02				AOI02-05-SB-00-02				AOI03-01-SB-00-01				AOI03-02-SB-00-01				AOI03-03-SB-00-02			
Sample Date		04/12/2022				04/13/2022				04/14/2022				04/13/2022				04/13/2022				01/04/2022			
Depth		0-2 ft				0-2 ft				0-2 ft				0-1 ft				0-1 ft				0-2 ft			
Analyte	**OSD Screening Level [a]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																									
6:2 FTS	-	<	0.211	1.05	U	<	0.220	1.10	U	<	0.211	1.06	U	<	0.211	1.05	U	<	0.232	1.16	U	<	0.230	1.15	U
8:2 FTS	-	<	0.105	1.05	U	<	0.110	1.10	U	<	0.106	1.06	U	<	0.105	1.05	U	<	0.116	1.16	U	<	0.115	1.15	U
NEtFOSAA	-	<	0.105	1.05	U	<	0.110	1.10	U	<	0.106	1.06	U	<	0.105	1.05	U	<	0.116	1.16	U	<	0.115	1.15	U
NMeFOSAA	-	<	0.053	1.05	U	<	0.055	1.10	U	<	0.053	1.06	U	<	0.053	1.05	U	<	0.058	1.16	U	<	0.057	1.15	U
PFBA	-	<	0.105	1.05	U	<	0.110	1.10	U	<	0.106	1.06	U	<	0.105	1.05	U	0.093	0.116	1.16	J	0.118	0.115	1.15	J
PFBS	1900	<	0.053	1.05	U	<	0.055	1.10	U	<	0.053	1.06	U	<	0.053	1.05	U	<	0.058	1.16	U	<	0.057	1.15	U
PFDA	-	0.044	0.105	1.05	J	0.102	0.110	1.10	J	<	0.106	1.06	U	<	0.105	1.05	U	0.047	0.116	1.16	J	0.067	0.115	1.15	J
PFDoA	-	<	0.053	1.05	U	0.052	0.055	1.10	J	<	0.053	1.06	U	0.021	0.053	1.05	J	<	0.058	1.16	U	0.029	0.057	1.15	J
PFHpA	-	0.026	0.053	1.05	J	<	0.055	1.10	U	<	0.053	1.06	U	<	0.053	1.05	U	0.035	0.058	1.16	J	0.059	0.057	1.15	J
PFHxA	-	0.042	0.053	1.05	J	0.031	0.055	1.10	J	<	0.053	1.06	U	<	0.053	1.05	U	0.045	0.058	1.16	J	0.070	0.057	1.15	J
PFHxS	130	<	0.105	1.05	U	<	0.110	1.10	U	<	0.106	1.06	U	<	0.105	1.05	U	<	0.116	1.16	U	0.047	0.115	1.15	J
PFNA	19	0.031	0.053	1.05	J	0.029	0.055	1.10	J	<	0.053	1.06	U	0.028	0.053	1.05	J	0.072	0.058	1.16	J	0.096	0.057	1.15	J
PFOA	19	<	0.211	1.05	U	<	0.220	1.10	U	<	0.211	1.06	U	<	0.211	1.05	U	<	0.232	1.16	U	0.107	0.230	1.15	J
PFOS	13	0.463	0.211	1.05	J	0.492	0.220	1.10	J	0.080	0.211	1.06	J	0.320	0.211	1.05	J	0.638	0.232	1.16	J	0.441	0.230	1.15	J
PFPeA	-	0.051	0.053	1.05	J	0.025	0.055	1.10	J	0.029	0.053	1.06	J	<	0.053	1.05	U	0.064	0.058	1.16	J	0.095	0.057	1.15	J
PFTeDA	-	<	0.053	1.05	U	0.033	0.055	1.10	J	<	0.053	1.06	U	<	0.053	1.05	U	<	0.058	1.16	U	<	0.057	1.15	U
PFTrDA	-	<	0.105	1.05	U	<	0.110	1.10	U	<	0.106	1.06	U	<	0.105	1.05	U	<	0.116	1.16	U	<	0.115	1.15	U
PFUnDA	-	<	0.053	1.05	U	0.042	0.055	1.10	J	<	0.053	1.06	U	0.034	0.053	1.05	J	0.033	0.058	1.16	J	0.058	0.057	1.15	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
Dup	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI03																			
Sample ID		AOI03-04-SB-00-02				AOI03-04-SB-00-02-DUP				AOI03-05-SB-00-02				AOI03-06-SB-00-02				AOI03-07-SB-00-02			
Sample Date		01/04/2022				01/04/2022				01/04/2022				01/04/2022				01/04/2022			
Depth		0-2 ft				0-2 ft				0-2 ft				0-2 ft				0-2 ft			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	<	0.219	1.10	UJ	<	0.229	1.15	UJ	0.355	0.216	1.08	JJ	<	0.227	1.14	U	<	0.230	1.15	U
8:2 FTS	-	<	0.110	1.10	U	<	0.115	1.15	U	0.077	0.108	1.08	J	<	0.114	1.14	U	<	0.115	1.15	U
NEtFOSAA	-	<	0.110	1.10	U	<	0.115	1.15	U	<	0.108	1.08	U	<	0.114	1.14	U	<	0.115	1.15	U
NMeFOSAA	-	<	0.055	1.10	U	<	0.057	1.15	U	<	0.054	1.08	U	<	0.057	1.14	U	<	0.058	1.15	U
PFBA	-	0.087	0.110	1.10	J	0.111	0.115	1.15	J	0.077	0.108	1.08	J	0.084	0.114	1.14	J	0.117	0.115	1.15	J
PFBS	1900	<	0.055	1.10	U	<	0.057	1.15	U	<	0.054	1.08	U	<	0.057	1.14	U	<	0.058	1.15	U
PFDA	-	<	0.110	1.10	UJ	0.052	0.115	1.15	J	<	0.108	1.08	U	0.048	0.114	1.14	J	0.060	0.115	1.15	J
PFDoA	-	<	0.055	1.10	UJ	0.026	0.057	1.15	J	<	0.054	1.08	U	<	0.057	1.14	U	0.029	0.058	1.15	J
PFHpA	-	0.060	0.055	1.10	J	0.068	0.057	1.15	J	0.047	0.054	1.08	J	0.055	0.057	1.14	J	0.068	0.058	1.15	J
PFHxA	-	0.129	0.055	1.10	J	0.094	0.057	1.15	J	0.074	0.054	1.08	J	0.074	0.057	1.14	J	0.088	0.058	1.15	J
PFHxS	130	0.163	0.110	1.10	J	0.145	0.115	1.15	J	0.078	0.108	1.08	J	0.116	0.114	1.14	J	0.163	0.115	1.15	J
PFNA	19	0.069	0.055	1.10	J	0.089	0.057	1.15	J	0.060	0.054	1.08	J	0.076	0.057	1.14	J	0.101	0.058	1.15	J
PFOA	19	0.151	0.219	1.10	J	0.196	0.229	1.15	J	0.120	0.216	1.08	J	0.146	0.227	1.14	J	0.191	0.230	1.15	J
PFOS	13	2.67	0.219	1.10		2.19	0.229	1.15		1.23	0.216	1.08		3.44	0.227	1.14		3.12	0.230	1.15	
PFPeA	-	0.087	0.055	1.10	J	0.077	0.057	1.15	J	0.064	0.054	1.08	J	0.075	0.057	1.14	J	0.083	0.058	1.15	J
PFTeDA	-	<	0.055	1.10	U	<	0.057	1.15	U	<	0.054	1.08	U	<	0.057	1.14	U	<	0.058	1.15	U
PFTrDA	-	<	0.110	1.10	U	<	0.115	1.15	U	<	0.108	1.08	U	<	0.114	1.14	U	<	0.115	1.15	U
PFUnDA	-	0.039	0.055	1.10	J	0.054	0.057	1.15	J	0.035	0.054	1.08	J	0.043	0.057	1.14	J	0.057	0.058	1.15	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
Dup	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Appendix F Laboratory Data
Shallow Subsurface Soil
Site Inspection Report, Albany AASF #3

Area of Interest		AOI01																											
Sample ID		AOI01-01-SB-03-04				AOI01-01-SB-05.6-06.2				AOI01-02-SB-03-04				AOI01-03-SB-02-03				AOI01-04-SB-03-04				AOI01-05-SB-03-04				AOI01-SB-DUP-2			
Sample Date		04/11/2022				04/11/2022				04/11/2022				04/11/2022				04/11/2022				04/12/2022				04/12/2022			
Depth		3-4 ft				5.6-6.2 ft				3-4 ft				2-3 ft				3-4 ft				3-4 ft				3-4 ft			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																													
6:2 FTS	-	<	0.199	0.995	U	<	0.214	1.07	U	<	0.238	1.19	U	<	0.224	1.12	U	<	0.233	1.17	U	<	0.279	1.39	U	<	0.236	1.18	U
8:2 FTS	-	<	0.099	0.995	U	<	0.107	1.07	U	<	0.119	1.19	U	<	0.112	1.12	U	<	0.117	1.17	U	<	0.139	1.39	U	<	0.118	1.18	U
NEtFOSAA	-	3.58	0.099	0.995		0.578	0.107	1.07	J	<	0.119	1.19	U	<	0.112	1.12	U	<	0.117	1.17	U	<	0.139	1.39	U	<	0.118	1.18	U
NMeFOSAA	-	<	0.050	0.995	U	<	0.053	1.07	U	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U
PFBA	-	<	0.099	0.995	U	<	0.107	1.07	U	<	0.119	1.19	U	<	0.112	1.12	U	<	0.117	1.17	U	<	0.139	1.39	U	<	0.118	1.18	U
PFBS	25000	0.027	0.050	0.995	J	<	0.053	1.07	U	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U
PFDA	-	<	0.099	0.995	U	<	0.107	1.07	U	<	0.119	1.19	U	<	0.112	1.12	U	<	0.117	1.17	U	<	0.139	1.39	U	<	0.118	1.18	U
PFDoA	-	<	0.050	0.995	U	<	0.053	1.07	U	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U
PFHpA	-	0.050	0.050	0.995	J	0.034	0.053	1.07	J	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	0.068	0.070	1.39	J	0.064	0.059	1.18	J
PFHxA	-	0.121	0.050	0.995	J	0.127	0.053	1.07	J	<	0.060	1.19	U	<	0.056	1.12	U	0.067	0.058	1.17	J	0.301	0.070	1.39	J	0.313	0.059	1.18	J
PFHxS	1600	3.23	0.099	0.995		0.433	0.107	1.07	J	<	0.119	1.19	U	0.036	0.112	1.12	J	0.398	0.117	1.17	J	2.18	0.139	1.39		2.09	0.118	1.18	
PFNA	250	0.049	0.050	0.995	J	0.057	0.053	1.07	J	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U
PFOA	250	0.726	0.199	0.995	J	0.193	0.214	1.07	J	<	0.238	1.19	U	<	0.224	1.12	U	<	0.233	1.17	U	0.148	0.279	1.39	J	0.133	0.236	1.18	J
PFOS	160	10.7	0.199	0.995		14.7	0.214	1.07		0.063	0.238	1.19	J	1.22	0.224	1.12		10.3	0.233	1.17		0.925	0.279	1.39	J	0.597	0.236	1.18	J
PFPeA	-	0.020	0.050	0.995	J	0.079	0.053	1.07	J	<	0.060	1.19	U	<	0.056	1.12	U	0.034	0.058	1.17	J	0.089	0.070	1.39	J	0.080	0.059	1.18	J
PFTeDA	-	<	0.050	0.995	U	<	0.053	1.07	U	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U
PFTrDA	-	<	0.099	0.995	U	<	0.107	1.07	U	<	0.119	1.19	U	<	0.112	1.12	U	<	0.117	1.17	U	<	0.139	1.39	U	<	0.118	1.18	U
PFUnDA	-	0.097	0.050	0.995	J	0.097	0.053	1.07	J	<	0.060	1.19	U	<	0.056	1.12	U	<	0.058	1.17	U	<	0.070	1.39	U	<	0.059	1.18	U

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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Acronyms and Abbreviations

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LOQ	limit of quantitation
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QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI01				AOI02																AOI03							
Sample ID		AOI01-06-SB-02-02.7				AOI02-01-SB-03.5-04.3				AOI02-02-SB-03-03.7				AOI02-03-SB-02-02.7				AOI02-04-SB-05-05.5				AOI03-03-SB-02-04				AOI03-04-SB-02-04			
Sample Date		04/12/2022				04/14/2022				04/12/2022				04/13/2022				04/12/2022				01/04/2022				01/04/2022			
Depth		2-2.7 ft				3.5-4.3 ft				3-3.7 ft				2-2.7 ft				5-5.5 ft				2-4 ft				2-4 ft			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																													
6:2 FTS	-	1.80	0.246	1.23		<	0.215	1.08	U	<	0.247	1.24	U	<	0.223	1.11	U	<	0.216	1.08	U	<	0.229	1.14	U	<	0.233	1.17	U
8:2 FTS	-	<	0.123	1.23	U	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	<	0.108	1.08	U	<	0.114	1.14	U	<	0.117	1.17	U
NEtFOSAA	-	<	0.123	1.23	U	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	<	0.108	1.08	U	<	0.114	1.14	U	<	0.117	1.17	U
NMeFOSAA	-	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	<	0.057	1.14	U	<	0.058	1.17	U
PFBA	-	<	0.123	1.23	U	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	<	0.108	1.08	U	0.084	0.114	1.14	J	0.112	0.117	1.17	J
PFBS	25000	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	0.032	0.054	1.08	J	<	0.057	1.14	U	<	0.058	1.17	U
PFDA	-	<	0.123	1.23	U	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	<	0.108	1.08	U	0.057	0.114	1.14	J	0.050	0.117	1.17	J
PFDoA	-	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	0.027	0.057	1.14	J	<	0.058	1.17	U
PFHpA	-	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	0.035	0.057	1.14	J	0.068	0.058	1.17	J
PFHxA	-	0.098	0.062	1.23	J	<	0.054	1.08	U	0.027	0.062	1.24	J	<	0.056	1.11	U	<	0.054	1.08	U	0.067	0.057	1.14	J	0.085	0.058	1.17	J
PFHxS	1600	0.196	0.123	1.23	J	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	0.166	0.108	1.08	J	<	0.114	1.14	U	0.144	0.117	1.17	J
PFNA	250	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	0.078	0.057	1.14	J	0.090	0.058	1.17	J
PFOA	250	<	0.246	1.23	U	<	0.215	1.08	U	<	0.247	1.24	U	<	0.223	1.11	U	<	0.216	1.08	U	<	0.229	1.14	U	0.193	0.233	1.17	J
PFOS	160	3.87	0.246	1.23		0.398	0.215	1.08	J	0.148	0.247	1.24	J	0.139	0.223	1.11	J	0.230	0.216	1.08	J	0.391	0.229	1.14	J	2.20	0.233	1.17	
PFPeA	-	0.041	0.062	1.23	J	0.028	0.054	1.08	J	0.040	0.062	1.24	J	<	0.056	1.11	U	<	0.054	1.08	U	0.042	0.057	1.14	J	0.075	0.058	1.17	J
PFTeDA	-	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	<	0.057	1.14	U	<	0.058	1.17	U
PFTrDA	-	<	0.123	1.23	U	<	0.108	1.08	U	<	0.124	1.24	U	<	0.111	1.11	U	<	0.108	1.08	U	<	0.114	1.14	U	<	0.117	1.17	U
PFUnDA	-	<	0.062	1.23	U	<	0.054	1.08	U	<	0.062	1.24	U	<	0.056	1.11	U	<	0.054	1.08	U	0.057	0.057	1.14	J	0.049	0.058	1.17	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI03											
Sample ID		AOI03-05-SB-02-04				AOI03-06-SB-02-04				AOI03-07-SB-02-04			
Sample Date		01/04/2022				01/04/2022				01/04/2022			
Depth		2-4 ft				2-4 ft				2-4 ft			
Analyte	**OSD Screening Level [a]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)													
6:2 FTS	-	<	0.238	1.19	U	<	0.231	1.15	U	<	0.225	1.13	U
8:2 FTS	-	<	0.119	1.19	U	<	0.115	1.15	U	<	0.113	1.13	U
NEtFOSAA	-	<	0.119	1.19	U	<	0.115	1.15	U	<	0.113	1.13	U
NMeFOSAA	-	<	0.060	1.19	U	<	0.058	1.15	U	<	0.056	1.13	U
PFBA	-	0.149	0.119	1.19	J	0.132	0.115	1.15	J	0.128	0.113	1.13	J
PFBS	25000	<	0.060	1.19	U	<	0.058	1.15	U	<	0.056	1.13	U
PFDA	-	0.071	0.119	1.19	J	0.073	0.115	1.15	J	0.063	0.113	1.13	J
PFDoA	-	0.034	0.060	1.19	J	0.029	0.058	1.15	J	0.028	0.056	1.13	J
PFHpA	-	0.083	0.060	1.19	J	0.093	0.058	1.15	J	0.066	0.056	1.13	J
PFHxA	-	0.091	0.060	1.19	J	0.110	0.058	1.15	J	0.087	0.056	1.13	J
PFHxS	1600	0.079	0.119	1.19	J	0.133	0.115	1.15	J	0.091	0.113	1.13	J
PFNA	250	0.130	0.060	1.19	J	0.131	0.058	1.15	J	0.098	0.056	1.13	J
PFOA	250	0.219	0.238	1.19	J	0.235	0.231	1.15	J	0.179	0.225	1.13	J
PFOS	160	1.87	0.238	1.19		4.12	0.231	1.15		2.00	0.225	1.13	
PFPeA	-	0.100	0.060	1.19	J	0.124	0.058	1.15	J	0.077	0.056	1.13	J
PFTeDA	-	<	0.060	1.19	U	<	0.058	1.15	U	<	0.056	1.13	U
PFTrDA	-	<	0.119	1.19	U	<	0.115	1.15	U	<	0.113	1.13	U
PFUnDA	-	0.068	0.060	1.19	J	0.063	0.058	1.15	J	0.058	0.056	1.13	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
DL	detection llimit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable
<	analyte not detected above the LOD

Appendix F Laboratory Data
Groundwater
Site Inspection Report, Albany AASF #3

Area of Interest		AOI01																									
Sample ID		AOI01-01-GW				AOI01-02-GW				AOI01-03-GW				AOI01-04-GW				DUP-GW-01				AOI01-05-GW				AOI01-06-GW			
Sample Date		04/11/2022				04/11/2022				04/12/2022				04/12/2022				04/12/2022				04/12/2022				04/13/2022			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																													
6:2 FTS	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	5.48	3.00	4.00		5.26	3.00	4.00		<	2.88	3.85	U	8.06	3.00	4.00	
8:2 FTS	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	2.88	3.85	U	<	3.00	4.00	U
NEtFOSAA	-	3.02	4.00	8.00	J	<	4.00	8.00	U	<	4.00	8.00	U	<	4.00	8.00	U	<	4.00	8.00	U	<	3.85	7.69	U	<	4.00	8.00	U
NMeFOSAA	-	<	4.00	8.00	U	<	4.00	8.00	U	<	4.00	8.00	U	<	4.00	8.00	U	<	4.00	8.00	U	<	3.85	7.69	U	<	4.00	8.00	U
PFBA	-	3.84	3.50	4.00	J	7.49	3.50	4.00		5.20	3.50	4.00		49.2	3.50	4.00		52.2	3.50	4.00		11.8	3.37	3.85		18.0	3.50	4.00	
PFBS	601	9.07	2.00	4.00		2.05	2.00	4.00	J	3.54	2.00	4.00	J	48.5	2.00	4.00		51.6	2.00	4.00		49.6	1.92	3.85		7.55	2.00	4.00	
PFDA	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	2.94	3.00	4.00	J	3.05	3.00	4.00	J	<	2.88	3.85	U	2.82	3.00	4.00	J
PFDoA	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	2.88	3.85	U	<	3.00	4.00	U
PFHpA	-	4.74	3.00	4.00		3.07	3.00	4.00	J	3.07	3.00	4.00	J	33.9	3.00	4.00		35.3	3.00	4.00		11.3	2.88	3.85		37.5	3.00	4.00	
PFHxA	-	20.7	2.00	4.00		5.75	2.00	4.00		8.08	2.00	4.00		152	2.00	4.00		167	2.00	4.00		64.1	1.92	3.85		31.7	2.00	4.00	
PFHxS	39	276	3.00	4.00		6.51	3.00	4.00		24.4	3.00	4.00		1120	3.00	4.00		1180	3.00	4.00		597	2.88	3.85		139	3.00	4.00	
PFNA	6	1.72	2.00	4.00	J	1.31	2.00	4.00	J	<	2.00	4.00	U	4.90	2.00	4.00		5.06	2.00	4.00		2.46	1.92	3.85	J	13.3	2.00	4.00	
PFOA	6	29.6	2.00	4.00		2.71	2.00	4.00	J	8.55	2.00	4.00		58.7	2.00	4.00		61.9	2.00	4.00		31.5	1.92	3.85		28.5	2.00	4.00	
PFOS	4	533	2.00	4.00		57.8	2.00	4.00		95.8	2.00	4.00		14100	40.0	80.0	J	15000	40.0	80.0		1190	1.92	3.85		391	2.00	4.00	
PFPeA	-	4.66	2.00	4.00		7.59	2.00	4.00		6.32	2.00	4.00		78.6	2.00	4.00		82.9	2.00	4.00		23.9	1.92	3.85		46.1	2.00	4.00	
PFTeDA	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	2.88	3.85	U	<	3.00	4.00	U
PFTrDA	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	2.88	3.85	U	<	3.00	4.00	U
PFUnDA	-	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	3.00	4.00	U	<	2.88	3.85	U	<	3.00	4.00	U

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

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Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
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PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
DL	detection limit
GW	groundwater
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI01				AOI02																				AOI03			
Sample ID		AOI01-07-GW				AOI02-01-GW				AOI02-02-GW				AOI02-03-GW				AOI02-DUP-GW-02				AOI02-04-GW				AOI03-01-GW			
Sample Date		04/12/2022				04/14/2022				04/13/2022				04/13/2022				04/13/2022				04/13/2022				04/14/2022			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																													
6:2 FTS	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U
8:2 FTS	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U
NEtFOSAA	-	<	4.17	8.33	U	<	4.10	8.20	U	<	4.00	8.00	U	<	4.07	8.13	U	<	4.03	8.06	U	<	4.03	8.06	U	<	4.03	8.06	U
NMeFOSAA	-	<	4.17	8.33	U	<	4.10	8.20	U	<	4.00	8.00	U	<	4.07	8.13	U	<	4.03	8.06	U	<	4.03	8.06	U	<	4.03	8.06	U
PFBA	-	1.73	3.65	4.17	J	5.82	3.59	4.10		32.3	3.50	4.00		13.3	3.56	4.07		15.4	3.53	4.03		<	3.53	4.03	U	9.27	3.53	4.03	
PFBS	601	1.90	2.08	4.17	J	<	2.05	4.10	U	1.21	2.00	4.00	J	6.69	2.03	4.07		6.28	2.02	4.03		<	2.02	4.03	U	3.30	2.02	4.03	J
PFDA	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	3.96	3.05	4.07	J	4.10	3.02	4.03		<	3.02	4.03	U	<	3.02	4.03	U
PFDoA	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U
PFHpA	-	<	3.13	4.17	U	3.07	3.07	4.10	J	10.1	3.00	4.00		18.4	3.05	4.07		18.6	3.02	4.03		<	3.02	4.03	U	3.35	3.02	4.03	J
PFHxA	-	1.12	2.08	4.17	J	3.29	2.05	4.10	J	43.5	2.00	4.00		22.8	2.03	4.07		23.3	2.02	4.03		<	2.02	4.03	U	3.59	2.02	4.03	J
PFHxS	39	14.6	3.13	4.17		1.59	3.07	4.10	J	<	3.00	4.00	U	2.89	3.05	4.07	J	2.34	3.02	4.03	J	<	3.02	4.03	U	3.36	3.02	4.03	J
PFNA	6	<	2.08	4.17	U	<	2.05	4.10	U	1.80	2.00	4.00	J	2.13	2.03	4.07	J	2.08	2.02	4.03	J	<	2.02	4.03	U	<	2.02	4.03	U
PFOA	6	1.46	2.08	4.17	J	4.50	2.05	4.10		1.51	2.00	4.00	J	10.5	2.03	4.07		9.97	2.02	4.03		<	2.02	4.03	U	17.9	2.02	4.03	
PFOS	4	1.31	2.08	4.17	J	16.6	2.05	4.10		11.6	2.00	4.00		21.8	2.03	4.07		20.4	2.02	4.03		<	2.02	4.03	U	24.6	2.02	4.03	
PFPeA	-	1.26	2.08	4.17	J	5.42	2.05	4.10		86.8	2.00	4.00		22.8	2.03	4.07		25.3	2.02	4.03		<	2.02	4.03	U	3.11	2.02	4.03	J
PFTeDA	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U
PFTrDA	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U
PFUnDA	-	<	3.13	4.17	U	<	3.07	4.10	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.02	4.03	U	<	3.02	4.03	U	<	3.02	4.03	U

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
DL	detection limit
GW	groundwater
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable
<	analyte not detected above the LOD

Area of Interest		AOI03			
Sample ID		AOI03-02-GW			
Sample Date		04/14/2022			
Analyte	OSD Screening Level [a]	Result	LOD	LOQ	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)					
6:2 FTS	-	<	3.00	4.00	U
8:2 FTS	-	<	3.00	4.00	U
NEtFOSAA	-	<	4.00	8.00	U
NMeFOSAA	-	<	4.00	8.00	U
PFBA	-	2.51	3.50	4.00	J
PFBS	601	1.87	2.00	4.00	J
PFDA	-	<	3.00	4.00	U
PFDoA	-	<	3.00	4.00	U
PFHpA	-	2.29	3.00	4.00	J
PFHxA	-	1.50	2.00	4.00	J
PFHxS	39	2.42	3.00	4.00	J
PFNA	6	1.17	2.00	4.00	J
PFOA	6	13.7	2.00	4.00	
PFOS	4	11.4	2.00	4.00	
PFPeA	-	1.77	2.00	4.00	J
PFTeDA	-	<	3.00	4.00	U
PFTrDA	-	<	3.00	4.00	U
PFUnDA	-	<	3.00	4.00	U

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
DL	detection limit
GW	groundwater
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
OSD	Office of the Secretary of Defense
PFAS	per- and polyfluoroalkyl substances
QSM	Quality Systems Manual
Qual	interpreted qualifier
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable
<	analyte not detected above the LOD

Appendix F Laboratory Data
Decontamination Water and Quality Control Samples
Site Inspection Report, Albany AASF #3

Area of Interest	DECON SOURCE				FIELDQC															
Sample ID	ALB-DECON-01				ALB-ERB-01				EB-1-041122				EB-2-041422				EB-3-041422			
Sample Date	11/19/2021				01/04/2022				04/11/2022				04/14/2022				04/14/2022			
Analyte	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
8:2 FTS	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
NEtFOSAA	<	4.00	8.00	U	<	4.00	8.00	U	<	4.07	8.13	U	<	4.00	8.00	U	<	4.03	8.06	U
NMeFOSAA	<	4.00	8.00	U	<	4.00	8.00	U	<	4.07	8.13	U	<	4.00	8.00	U	<	4.03	8.06	U
PFBA	1.83	3.50	4.00	J	<	3.50	4.00	U	<	3.56	4.07	U	<	3.50	4.00	U	<	3.53	4.03	U
PFBS	0.642	2.00	4.00	J	<	2.00	4.00	U	<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFDA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFDoA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFHpA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFHxA	1.62	2.00	4.00	J	<	2.00	4.00	U	<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFHxS	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFNA	<	2.00	4.00	U	<	2.00	4.00	U	<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFOA	0.889	2.00	4.00	J	<	2.00	4.00	U	<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFOS	1.49	2.00	4.00	J	4.50	2.00	4.00		<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFPeA	1.68	2.00	4.00	J	<	2.00	4.00	U	<	2.03	4.07	U	<	2.00	4.00	U	<	2.02	4.03	U
PFTeDA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFTrDA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U
PFUnDA	<	3.00	4.00	U	<	3.00	4.00	U	<	3.05	4.07	U	<	3.00	4.00	U	<	3.02	4.03	U

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DL	detection limit
ERB	equipment rinsate blank
FRB	field reagent blank
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
QC	quality control
QSM	Quality Systems Manual
Qual	interpreted qualifier
ng/l	nanogram per liter
<	analyte not detected above the LOD

Appendix F Laboratory Data
TOC and pH
Site Inspection Report, Albany AASF #3

Area of Interest	AOI01				AOI02							
Sample ID	AOI01-06-SB-02-02.7				AOI02-01-SB-03.5-04.3				AOI02-SB-DUP-4			
Sample Date	04/12/2022				04/14/2022				04/14/2022			
Depth	2-2.7 ft				3.5-4.3 ft				3.5-4.3 ft			
Analyte	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
pH	7.08	1.00	1.00	J	7.97	1.00	1.00	J	7.56	1.00	1.00	J
Total Organic Carbon (mg/kg)	4580	350	500	J+	2830	350	500	J	714	350	500	J

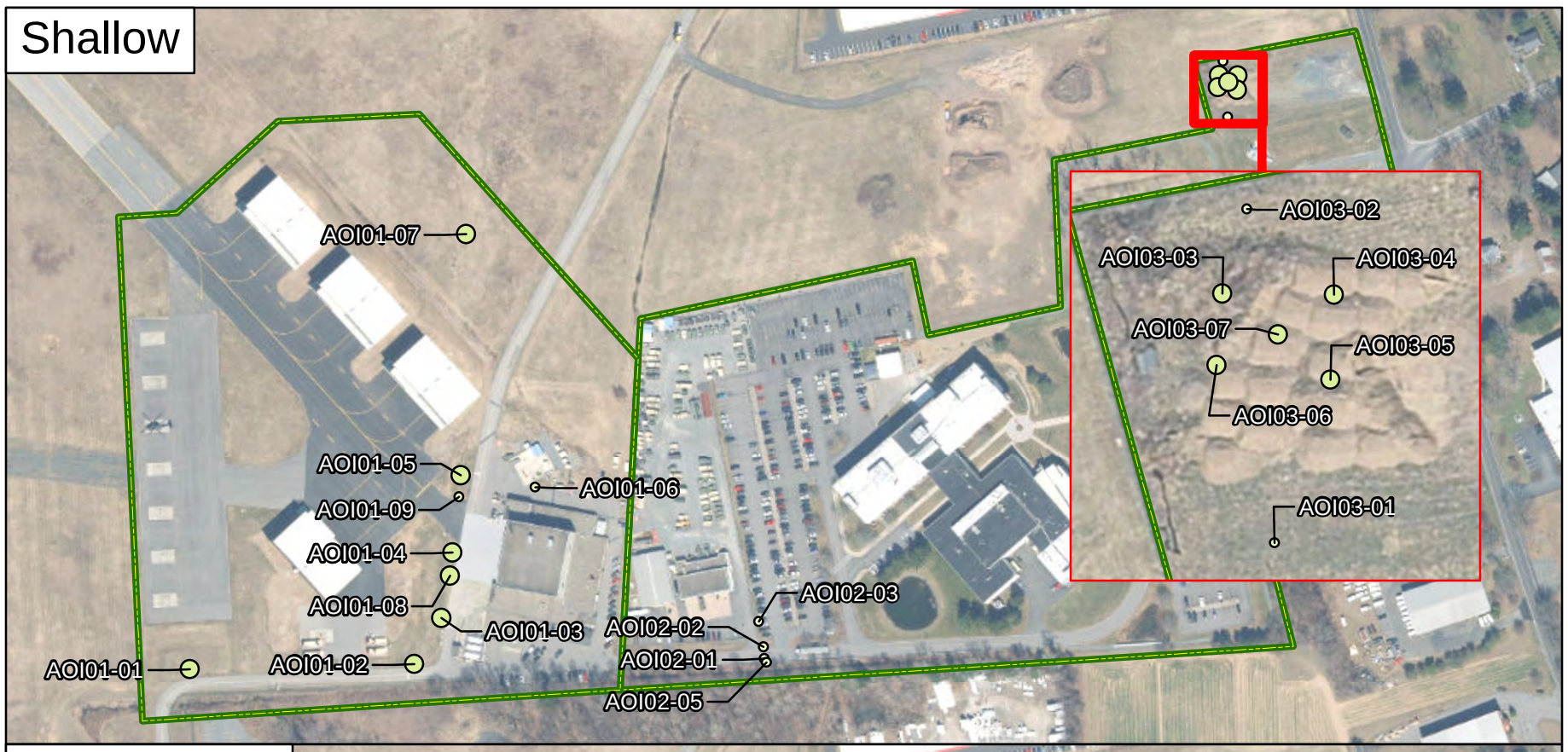
Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
D	duplicate
ft	feet
ID	identification
LOD	limit of detection
LOQ	limit of quantitation
Qual	interpreted qualifier
mg/kg	milligram per kilogram
SB	soil boring
TOC	total organic carbon
<	analyte not detected above the LOD

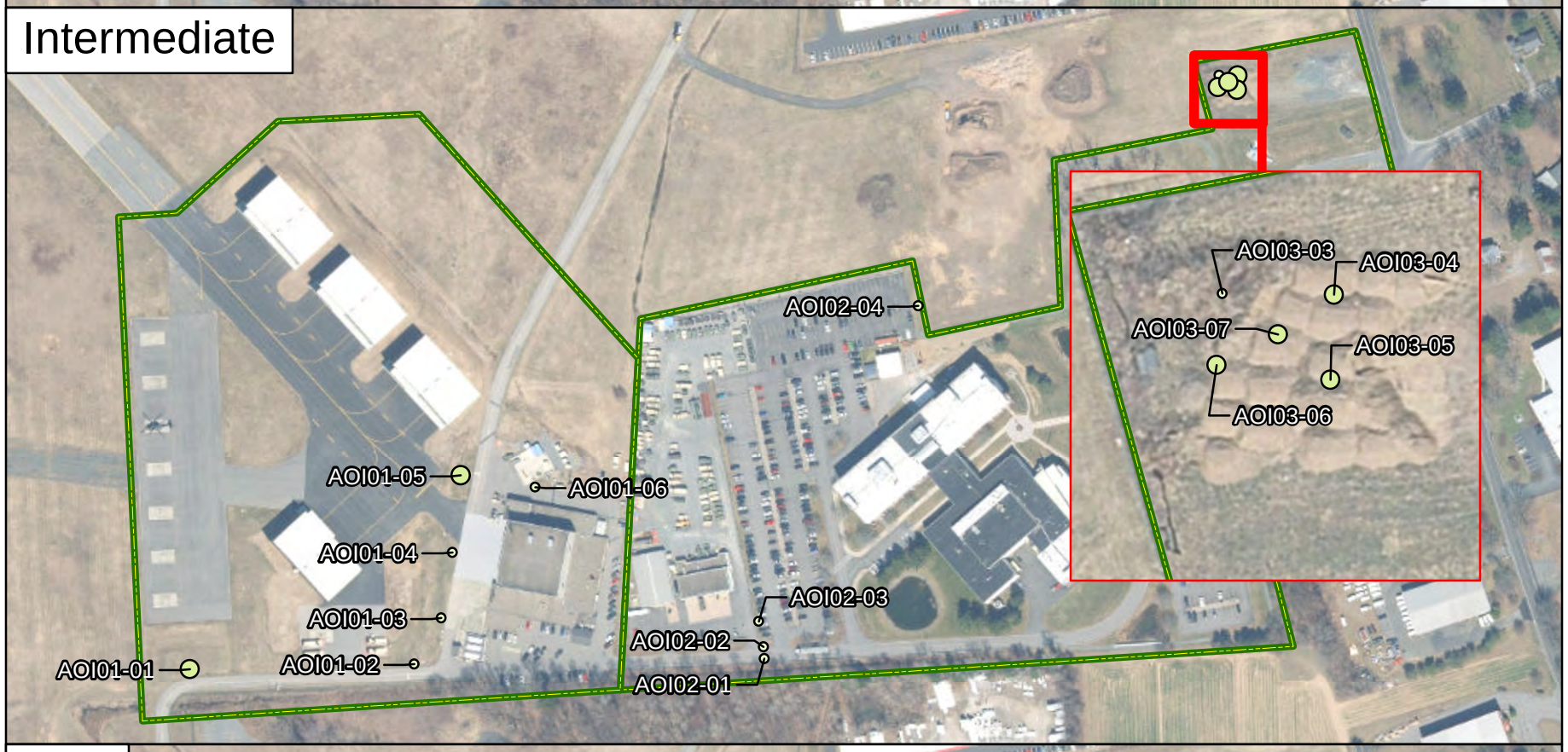
Interpreted Qualifiers

J = Estimated concentration
J+ = Estimated concentration, biased high

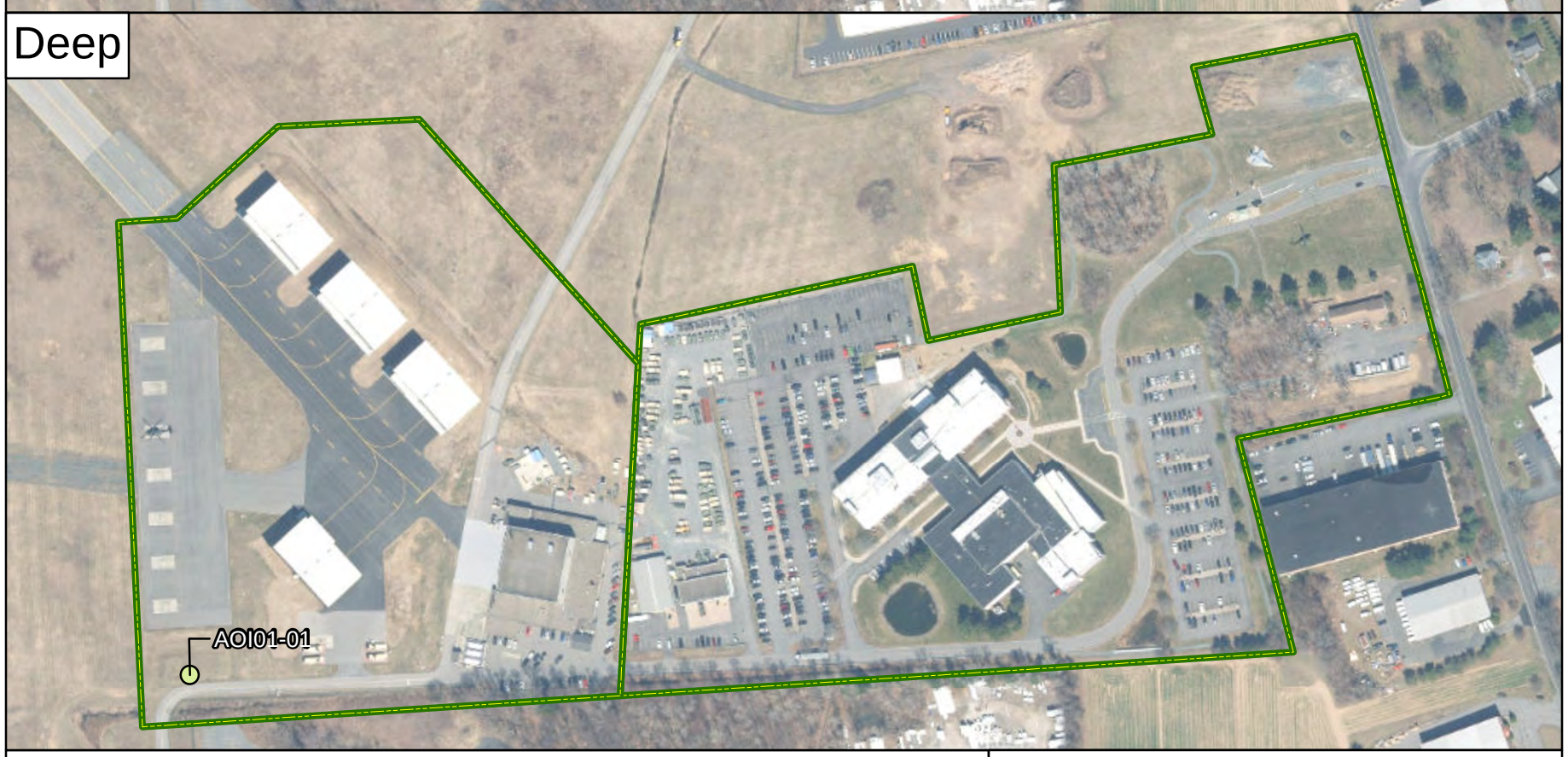
Shallow



Intermediate



Deep



Legend

Facility Boundary

PFOA Residential Soil Screening Level 0-2 ft bgs: 19µg/kg

PFOA Industrial Soil Screen Level 2-15 ft bgs: 250 µg/kg

PFOA Results (µg/Kg)

- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

N

0 150 300 600 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-1

Shallow

AOI01-07
AOI01-05
AOI01-09
AOI01-04
AOI01-08
AOI01-03
AOI01-01
AOI01-02
AOI01-06
AOI02-03
AOI02-02
AOI02-01
AOI02-05
AOI03-02
AOI03-03
AOI03-04
AOI03-07
AOI03-05
AOI03-06
AOI03-01

Intermediate

AOI01-05
AOI01-06
AOI01-04
AOI01-03
AOI01-01
AOI01-02
AOI02-04
AOI02-03
AOI02-02
AOI02-01
AOI03-03
AOI03-04
AOI03-07
AOI03-05
AOI03-06

Deep

AOI01-01

Legend

Facility Boundary

PFOS Residential Soil Screening Level 0-2 ft bgs: 13 µg/kg

PFOS Industrial Soil Screen Level 2-15 ft bgs: 160 µg/kg

PFOS Results (µg/Kg)

ND
>ND - 13
>13 - 160
>160 - 1,600
>1,600

N

0 150 300 600 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-2

Shallow

AOI01-07
AOI01-05
AOI01-06
AOI01-09
AOI01-04
AOI01-08
AOI01-03
AOI01-01
AOI01-02
AOI02-03
AOI02-02
AOI02-01
AOI02-05
AOI03-02
AOI03-03
AOI03-04
AOI03-07
AOI03-06
AOI03-05
AOI03-01

Intermediate

AOI02-04
AOI01-05
AOI01-06
AOI01-04
AOI01-03
AOI01-01
AOI01-02
AOI02-03
AOI02-02
AOI02-01
AOI03-03
AOI03-04
AOI03-06
AOI03-05
AOI03-07

Deep

AOI01-01

Legend

Facility Boundary

PFBS Residential Soil Screening Level 0-2 ft bgs: 1,900 µg/kg

PFBS Industrial Soil Screen Level 2-15 ft bgs: 25,000 µg/kg

PFBS Results (µg/Kg)

ND

>ND - 10

>10 - 1,900

>1,900 - 25,000

>25,000

N

0 150 300 600 Feet

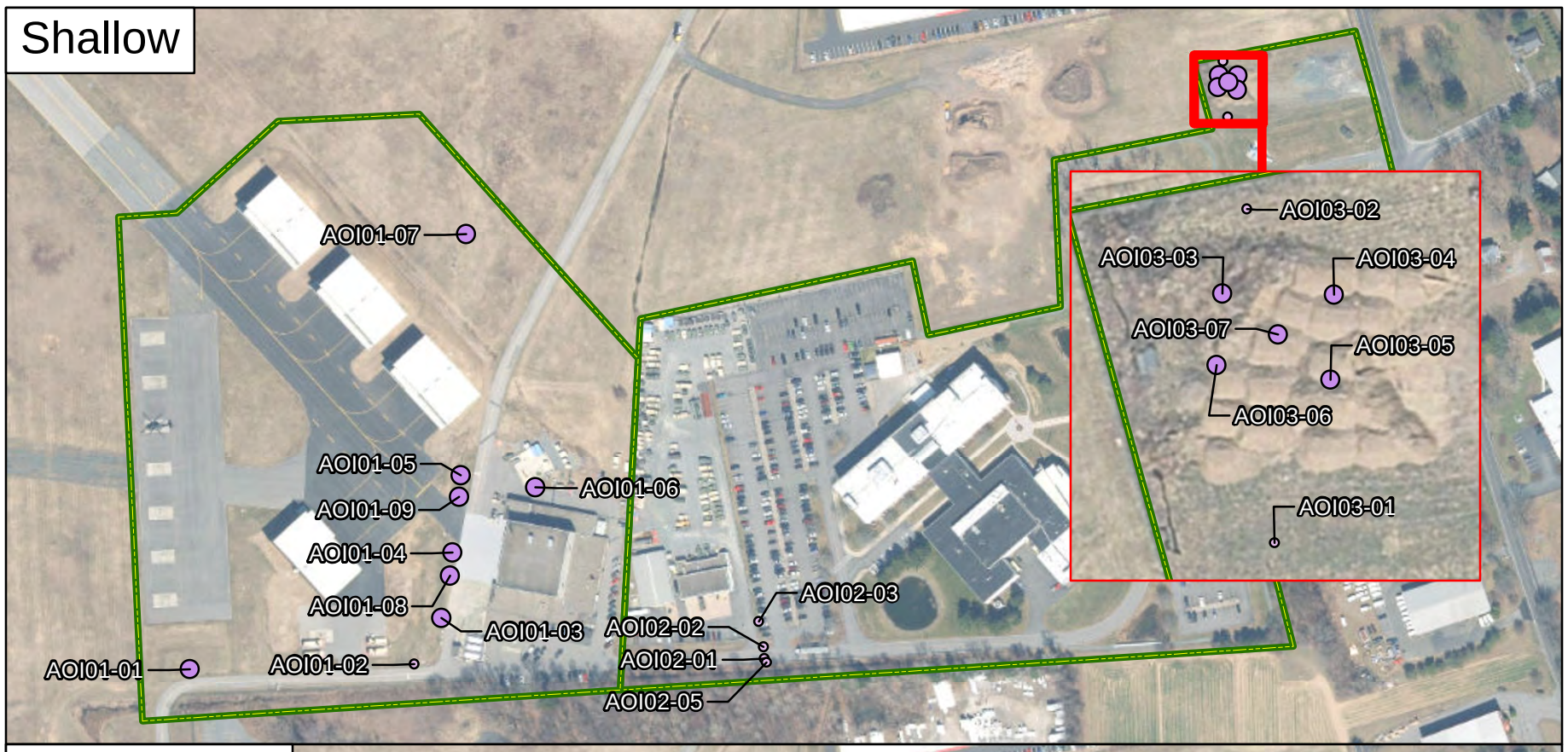
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

PFBS Detections in Soil

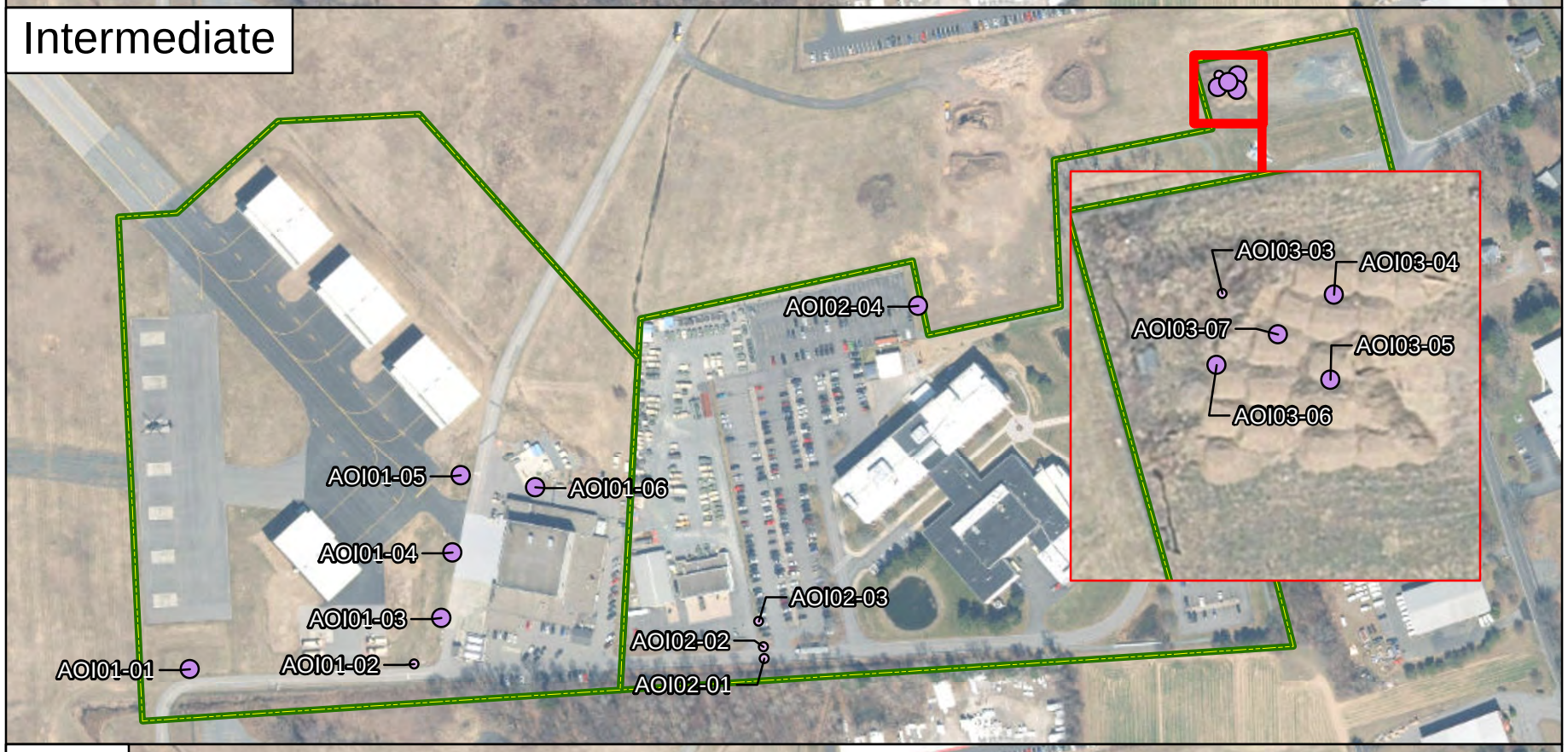
CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-3

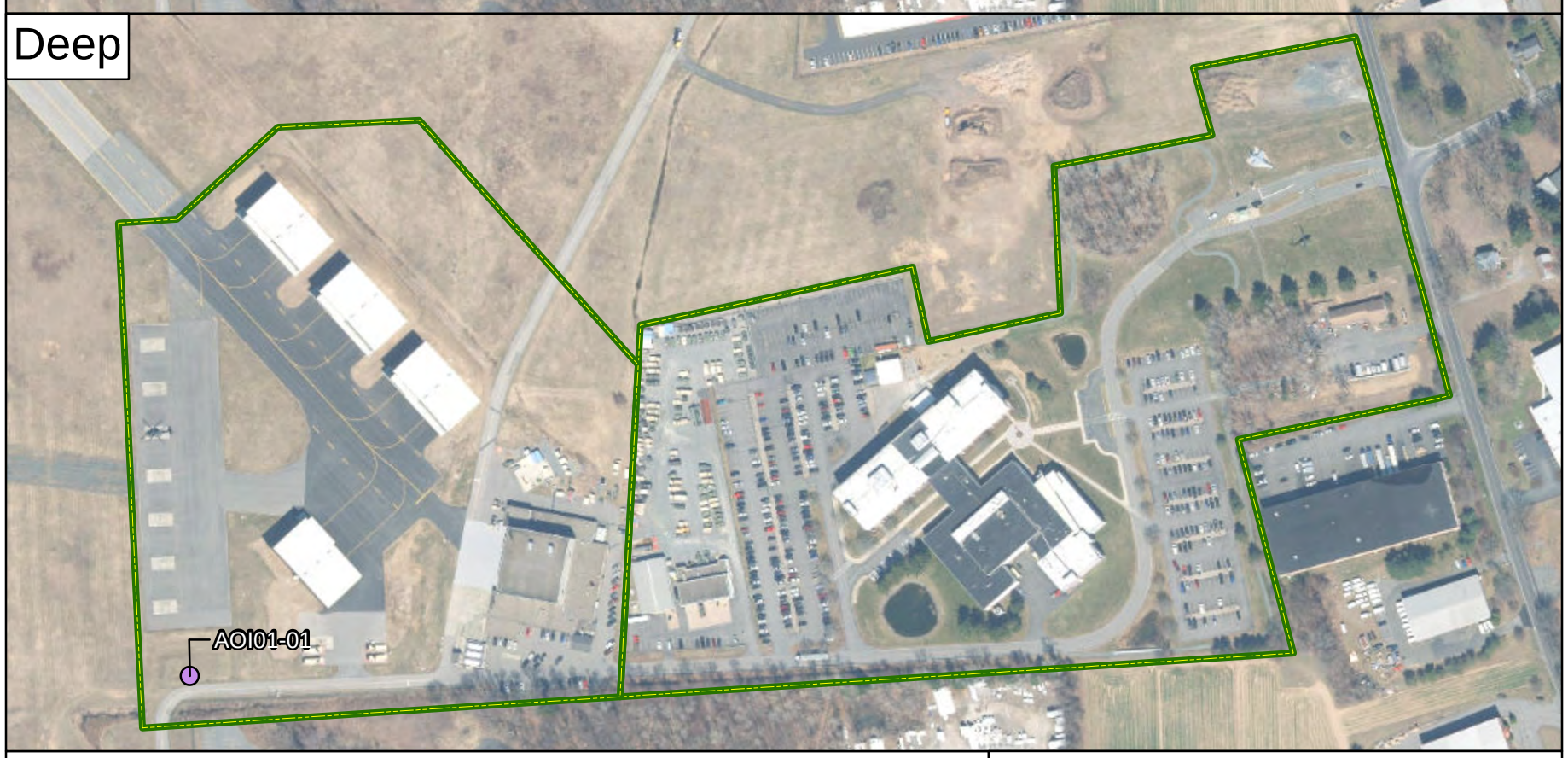
Shallow



Intermediate



Deep



Legend

Facility Boundary

PFHxS Residential Soil Screening Level 0 - 2 ftbgs: 130 µg/kg

PFHxS Industrial Soil Screen Level 2-15 ftbgs: 1,600 µg/kg

PFHxS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

N

0 140 280 560 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

PFHxS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-4

Shallow

AOI01-07
AOI01-05
AOI01-06
AOI01-09
AOI01-04
AOI01-08
AOI01-03
AOI01-01
AOI01-02
AOI02-03
AOI02-02
AOI02-01
AOI02-05
AOI03-02
AOI03-03
AOI03-04
AOI03-07
AOI03-05
AOI03-06
AOI03-01

Intermediate

AOI01-05
AOI01-06
AOI01-04
AOI01-03
AOI01-01
AOI01-02
AOI02-04
AOI02-03
AOI02-02
AOI02-01
AOI03-03
AOI03-04
AOI03-07
AOI03-05
AOI03-06

Deep

AOI01-01

Legend

Facility Boundary

PFNA Residential Soil Screening Level 0 - 2 ft bgs: 19 µg/kg

PFNA Industrial Soil Screen Level 2-15 ft bgs: 250 µg/kg

PFNA Results (µg/Kg)

ND

>ND - 19

>19 - 250

>250 - 2,500

>2,500

N

0 150 300 600 Feet

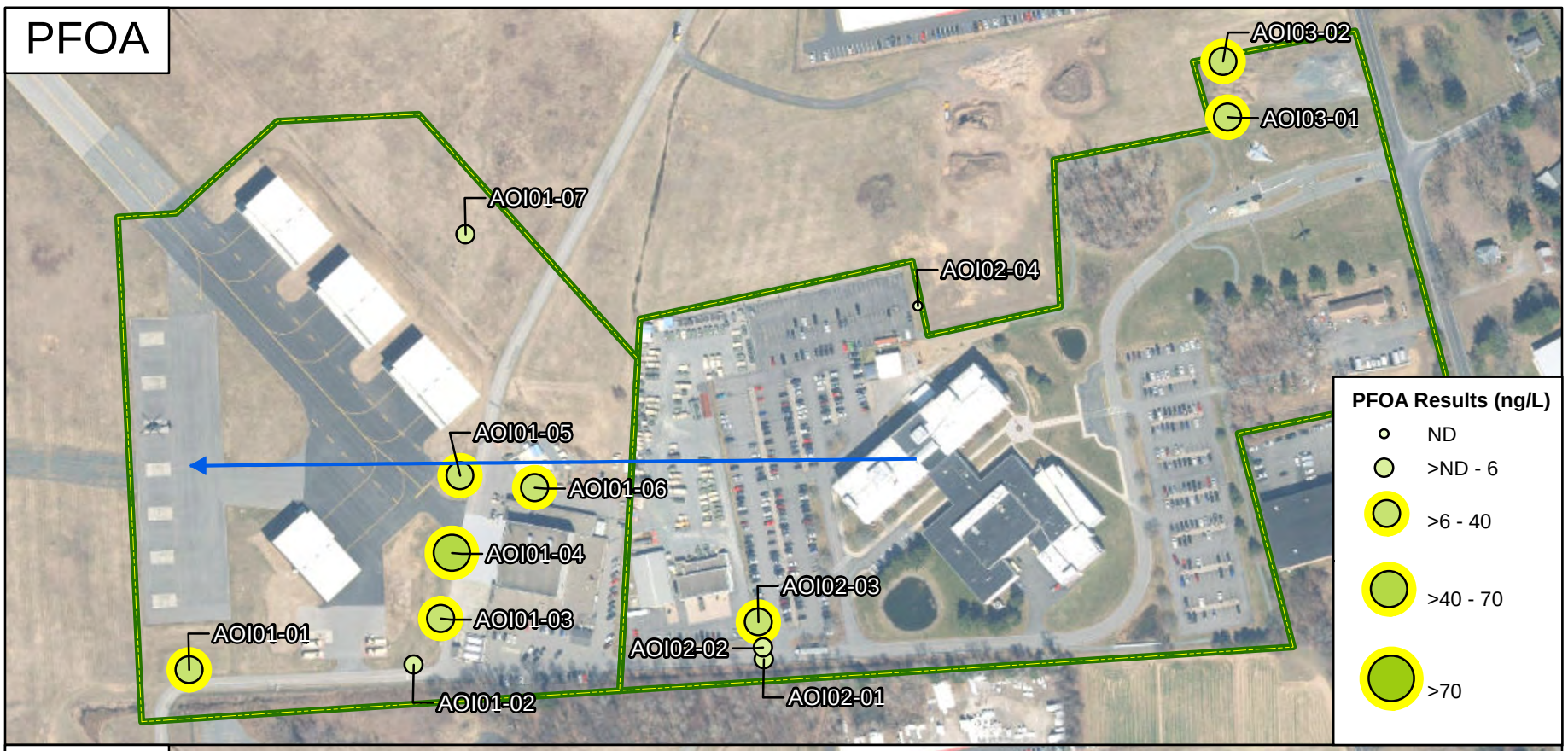
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

PFNA Detections in Soil

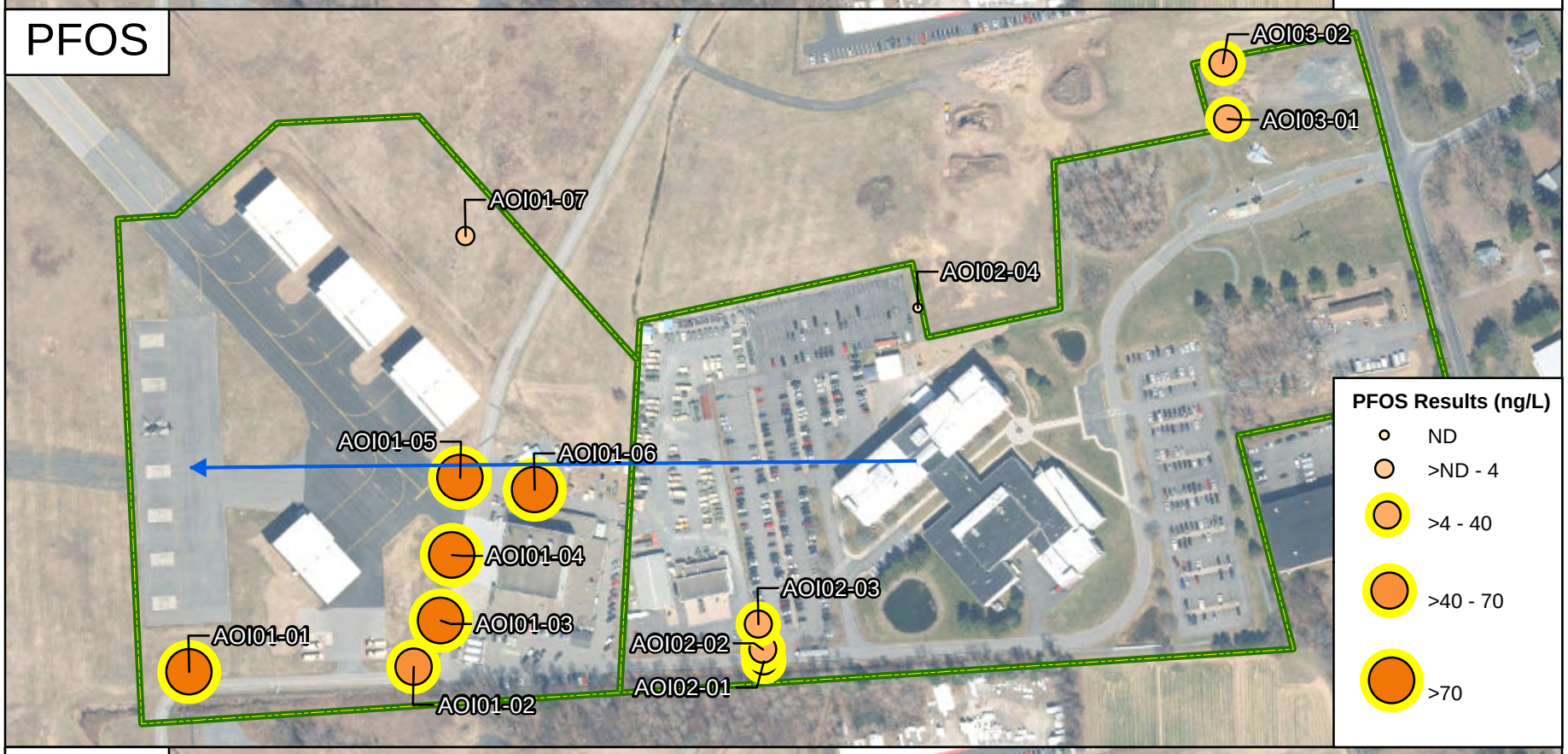
CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-5

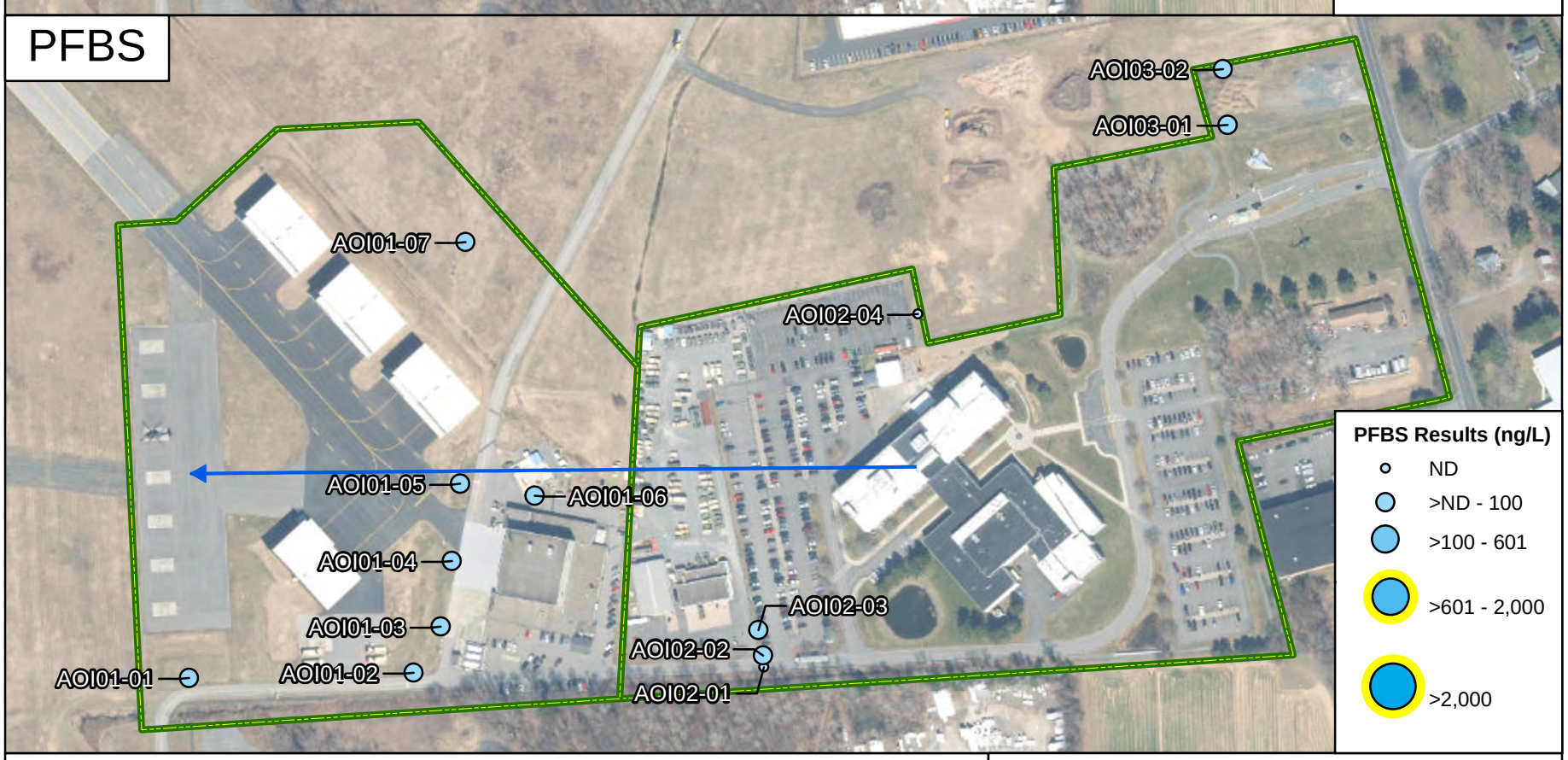
PFOA



PFOS



PFBS



Legend

- Facility Boundary
- Groundwater Flow Direction

PFOA Groundwater Screening Level: 6 ng/L

PFOS Groundwater Screening Level: 4 ng/L

PFBS Groundwater Screening Level: 601 ng/L

N

0 150 300 600 Feet

Exceedances of the OSD SL are depicted with a yellow halo.

PFOA, PFOS, and PFBS Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 300 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-6

PFHxS

AOI03-02
AOI03-01
AOI01-07
AOI02-04
AOI01-05
AOI01-06
AOI01-04
AOI02-03
AOI01-03
AOI02-02
AOI01-01
AOI01-02
AOI02-01

PFHxS Results (ng/L)
- ND
- >ND - 39
- >39 - 100
- >100 - 1,000
- >1,000

PFNA

AOI03-02
AOI03-01
AOI01-07
AOI02-04
AOI01-05
AOI01-06
AOI01-04
AOI02-03
AOI01-03
AOI02-02
AOI01-01
AOI01-02
AOI02-01

PFNA Results (ng/L)
- ND
- >ND - 6
- >6 - 100
- >100 - 1,000
- >1,000

Legend
- Facility Boundary
- Groundwater Flow Direction

PFHxS Groundwater Screening Level: 39 ng/L

PFNA Groundwater Screening Level: 6 ng/L

N

0 140 280 560 Feet

Exceedances of the OSD SL are depicted with a yellow halo.

PFHxS and PFNA Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Inspection at Albany AASF #3, NY			
REVISED	5/12/2023	GIS BY	MS	5/12/2023
SCALE	1 inch = 280 feet	CHK BY	AM	5/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/12/2023

Figure 6-7

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Appendix C
Analytical Laboratory Documentation

Available upon request

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Appendix D
Field Standard Operating Procedures

Available upon request

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Appendix E
Risk Assessment Work Plan

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FINAL

Human Health and Ecological Risk Assessment Work Plan
Albany Army Aviation Support Facility #3, NY

Remedial Investigations (RI) / Feasibility Studies (FS), Decision Documents, Time and Non-Time Critical Removal Actions (TCRA/NTCRA) for Per- and Polyfluoroalkyl Substances (PFAS) Impacted Sites, Army National Guard Installations, Nationwide

June 2025

Prepared for:

Army National Guard Bureau
111 S. George Mason Drive
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Acronyms and Abbreviations

%	percent
AASF	Army Aviation Support facility
ACP	access control point
AECOM	AECOM Technical Services, Inc.
AFD	Albany Fire Department
AFFF	aqueous film forming foam
ALB	Albany International Airport
amsl	above mean sea level
Argonne	Argonne National Laboratory
AOI	area of interest
ARAR	Applicable or Relevant and Appropriate Requirement
ARNG	Army National Guard
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemicals of concern
COPC	chemicals of potential concern
COPEC	chemicals of potential ecological concern
CSM	conceptual site model
CTE	central tendency exposure
DA	Department of the Army
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
ELCR	excess lifetime cancer risk
EPC	exposure point concentration
ERA	Ecological Risk Assessment
ESTCP	Environmental Security Technology Certification Program
ESV	ecological screening values
FMS	field maintenance shop
FOD	frequency of detection
FS	feasibility study
GLI	Great Lakes Initiative
HEAST	Health Effects Assessment Summary Tables
HFPO-DA	hexafluoropropylene oxide dimer acid
HHRA	human health risk assessment
HI	hazard index

HQ	hazard quotient
IPaC	Information for Planning and Consultation
IRIS	Integrated Risk Information System
LOAEL	lowest-observed-adverse-effect levels
MRL	minimal risk level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ng/L	nanogram per liter
NOAEL	no observed adverse effect level
NOEC	No-observed effect concentration
NYARNG	New York Army National Guard
NYDMNA	New York State Division of Military and Naval Affairs
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OEHHA	Office of Environmental Health and Hazard Assessment
OSD	Office of the Assistant Secretary of Defense
OSWER	Office of Solid Waste and Emergency Response
OWS	oil-water separator
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUdA	perfluoroundecanoic acid
PPRTV	Provisional Peer-Reviewed Toxicity Value
PRG	preliminary remediation goal
QAPP	Quality Assurance Project Plan
RAWP	risk assessment work plan
RBSL	risk-based screening level
RME	reasonable maximum exposure
RI	remedial investigation
RSL	regional screening level
SERDP	Strategic Environmental Research and Development Program

SI	Site Inspection
SL	Screening Level
SLERA	screening level ecological risk assessment
TRV	toxicity reference value
TSERAWG	Tri-Services Environmental Risk Assessment Work Group
UCL	upper confidence limit
UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UU/UE	unlimited use/unrestricted exposure

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1.0 Introduction

This Risk Assessment Work Plan (RAWP) is provided as Appendix E of the Remedial Investigation (RI) Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) (also referred to as the "QAPP") for RI activities investigating the potential impacts of per- and polyfluoroalkyl substances (PFAS) associated with historical activities at Albany Army Aviation Support Facility (AASF) #3 (also referred to as the "facility").

Albany AASF #3 is located in Latham, a hamlet within the town of Colonie, Albany County, New York. The facility is used by the New York State Division of Military and Naval Affairs (NYDMNA) and includes three parcels owned by New York State and a 22-acre area leased from Albany International Airport (ALB) by the NYDMNA. The facility is approximately 7 miles north-northwest of Albany city center, a quarter mile west of Interstate 87, and 600 feet east of ALB's Runway #1. Verdoy and the village of Colonie are 1.25 miles north and 1.75 miles southwest of the facility, respectively. The facility, ALB, and adjacent properties are zoned for 'Airport Business Area' land use. The facility location is shown on QAPP Figure 10-1. This facility is currently approximately 50 acres, consisting of developed land (buildings, paved areas, roads; approximately 25 acres) with surrounding maintained landscaping.

A Preliminary Assessment (PA) was performed under a separate contract vehicle on behalf of the United States Army National Guard (ARNG) and United States Army Corps of Engineers (USACE) (AECOM Technical Services, Inc. [AECOM], 2020). The PA evaluated whether there were potential releases to the environment related to processes at the facility that historically used PFAS. Based on the findings of the PA, the facility moved forward to the next phase of investigation. A Site Inspection (SI) was performed, also under a separate contract vehicle, on behalf of the ARNG (AECOM, 2023). The SI concluded there was a release to the environment warranting further study in an RI from three Areas of Interest (AOIs) due to the presence of PFAS at or above human health screening levels (SLs) recommended in a memorandum from the Office of the Assistant Secretary of Defense (OSD) dated July 6, 2022 (Assistant Secretary of Defense, 2022). The SI report identified the three AOIs listed below for further investigation in the RI (see QAPP Figure 10-6).

- AOI 1 – AASF #3 Hangar Release / Fire Response Unit (groundwater and soil exceedances)
- AOI 2 – Garbage Truck Fire (groundwater exceedances)
- AOI 3 – Stockpiled Soil (groundwater exceedances)

OSD released a revised memorandum in August 2023 directing the use of the May 2023 United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) as SLs for determining whether PFAS require further investigation (Assistant Secretary of Defense, 2023). The memorandum further stated that it would not be updated again and that guidance regarding future RSL updates would be posted to the OSD PFAS 101 website (Assistant Sectary of Defense, 2024a). The OSD PFAS 101 website was updated in March 2024 to direct the use of the November 2023 RSLs (USEPA, 2023) for a specific list of PFAS with RSLs derived from final, peer reviewed toxicity values that DoD will use for determining if a remedial investigation is needed, and in CERCLA risk assessments (Assistant Secretary of Defense 2024a). Note that the updated guidance did not result in a change to the SI conclusions or recommendations. The most recent RSLs posted to the OSD PFAS 101 website at the time the risk assessment is conducted will be used in the human health risk assessment (HHRA).

The term "PFAS" will be used herein to encompass the 40 PFAS included in USEPA Method 1633 (as listed in QAPP Worksheet #15). The term "relevant PFAS" will be used herein to encompass

PFAS on the Method 1633 list with USEPA RSLs derived from final, peer reviewed toxicity values that DoD will use in CERCLA risk assessments, which currently includes the following eight PFAS Assistant Secretary of Defense, 2024a):

- Hexafluoropropylene oxide dimer acid (HFPO-DA)
- Perfluorobutanesulfonic acid (PFBS)
- Perfluorobutanoic acid (PFBA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorohexanoic acid (PFHxA)
- Perfluorononanoic acid (PFNA)
- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonic acid (PFOS)

The RI project elements will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; USEPA, 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 Code of Federal Regulations [CFR] Part 300; USEPA, 1994), and in compliance with United States (US) Department of the Army (DA) requirements and guidance for field investigations, including specific requirements for sampling for PFAS. The RI will also be performed in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) requirement. New York State Department of Environmental Conservation (NYSDEC) guidance and policies will also be consulted (NYSDEC, 2010, 2023). Where differences between NYSDEC regulations and guidance occur, USEPA and Department of Defense (DoD) policy/guidance will be followed.

The RI field activities for the Albany AASF #3 will be conducted over multiple phases, including Prescriptive, Adaptive, and Final Characterization/Monitoring Phases. The QAPP describes the sampling design for the Prescriptive Phase and overall technical approach for the RI program. Future planning documents will describe additional activities to be conducted under future phases. If changes to the RAWP methodology are necessary after all phases are complete, changes will be noted in a RAWP deviation section of the risk assessment.

The objective of this RAWP is to provide the approach for the HHRA and ecological risk assessment (ERA) performed as part of the RI. These objectives include identifying the human and ecological receptors and exposure pathways to be evaluated and the sources to be used to identify appropriate SLs, exposure assumptions, and toxicity values. The risk assessment approach was developed in accordance with the USEPA and DA risk assessment guidance, as referenced in this RAWP. The RAWP was developed to provide the framework and high-level approach for conducting risk assessments, because as noted above, several phases of sampling are planned. Therefore, it is not known at this time what the final dataset will include, and the conceptual site model (CSM) will be refined as more data are collected and evaluated.

This risk assessment approach may be updated as new guidance, reference values, matrices, exposure scenarios, or exposure pathways that warrant an update are identified. In cases where more current reference sources and/or values are available at the time the HHRA or ERA calculations are being performed, the more current sources and values will be applied, as appropriate.

Additional background information and a preliminary CSM for the study area are provided in QAPP Worksheet #10.

1.1 Facility Description

Albany AASF #3 property encompasses approximately 50 acres within Albany County, New York. The facility is located within the hamlet of Latham, approximately 7 miles north-northwest from the Albany city center. As noted previously, the facility includes three parcels owned by New York State and a 22-acre area leased from ALB by the NYDMNA. Prior to 1977, the facility property was undeveloped. A small airplane hangar (Albany AASF #3 main hangar) was built shortly before 1983, which the New York Army National Guard (NYARNG) began operating immediately. Since that time, lease agreements for multiple additional parcels adjacent to the original facility property expanded to the current property. Between May and November 2020, the NYARNG constructed four new cold storage hangars (Hangars A through D) at Albany AASF #3. These newer hangars do not have fire suppression systems, and at no time was any aqueous film forming foam (AFFF) stored or used in them (AECOM, 2023).

Albany AASF #3 is a secure facility accessible through a guarded security gate off Old Niskayuna Road. Its state-owned parcels mainly house offices, parking, and storage buildings, while the leased area is used for training and aircraft maintenance. No expansion plans are currently in place, and the facility's land use is expected to remain unchanged. However, ALB intends to build a service road in spring 2025 (LaBella Associates, 2024). This road will start at the facility's southwestern corner, head south to ALB's boundary, and loop back north, ending near the ALB apron. The surrounding area is primarily used for aviation, commercial, and industrial purposes, as well as some residential use. Besides ALB, some of the closest commercial and industrial neighbors to Albany AASF #3 include a pool manufacturer, an auto glass repair company, and an industrial equipment supplier (AECOM, 2023).

QAPP Worksheet #10 provides a discussion of the facility's environmental setting, including geology, hydrogeology, hydrology, climate, and land use. The following is a summary to provide context for the risk assessments; please refer to QAPP Worksheet #10 and **Section 3.1.1** for greater detail.

The direction of regional groundwater flow in Albany County is presumed to be north towards the Mohawk River. However, groundwater elevation contours from the SI (AECOM, 2023) indicate the groundwater flow direction at the facility is primarily to the west (which is different from the anticipated flow direction to the north). The facility groundwater elevation contours from the SI are reproduced on QAPP Figure 10-4. Water in the Albany AASF #3 aquifer system is principally under water-table conditions and in hydraulic contact with the Mohawk River. The extent to which pumping of most wells induces recharge from the river is unknown (United States Geological Survey [USGS], 2002).

Albany AASF #3 is not located above a sole source aquifer. The primary surficial aquifer underlying the facility occurs in glacial lacustrine and outwash deposits, as well as in postglacial wind-blown sand and alluvial deposits. Underlying the shallow surficial aquifer is a deep complex aquifer system in the buried bedrock Colonie Channel. The Colonie Channel Aquifer consists of permeable stratified drift underlain by glacial till and overlain by lacustrine clay and silt which both act as aquicludes (i.e., inhibit flow). Precipitation that infiltrates the land surface is the sole source of recharge to the lacustrine sand aquifer and recharges the alluvial aquifer and unconfined parts of the Colonie channel aquifer (USGS, 2002). Recharge to the deep aquifer occurs through infiltration from the permeable high ground along the bedrock valley edges. Surficial groundwater depths measured in April 2022 during the SI ranged from 0.56 to 5.72 feet below ground surface (bgs). Potable water supply is discussed in **Section 2.2.1**.

The facility is in the Shakers Creek-Mohawk River Watershed, which is part of the much larger Mohawk River Basin. The Mohawk River is a major tributary to the Hudson River (USGS, 2006).

The main channel of the Mohawk River runs west to east roughly 2 miles north of the facility and forms a floodplain. Surface water resources near the Albany AASF #3 include natural streams, rivers, and open water features (see QAPP Figure 10-5). Approximately 0.75 miles west of the facility is a branch of Shaker's Creek, with headwaters that flow from south to north from Ann Lee Pond and then west to east-northeast at the end of Runway 19 of ALB. A second branch of Shaker's Creek flows south to north approximately 0.75 miles east of the facility, which converges with Shaker's Creek slightly east of ALB Runway 19. Shaker's Creek empties into the Mohawk River less than 1 mile after the convergence of the eastern branch (see QAPP Figure 10-5). These water resources near the Albany AASF #3 provide ecological habitat and are used for recreational activities.

The leased facility area stands at an elevation of approximately 280 feet above mean seal level (amsl), while the eastern state-owned facility parcels are at about 289 feet amsl. The terrain between ALB's northern boundary and the Mohawk River's southern banks, which lie at an elevation of 186 feet amsl, are characterized by rolling hills. The topography of Albany AASF #3 is shown on QAPP Figure 10-2.

The stormwater system at the leased portion of the facility routes surface runoff from the runway to a drainage ditch along the southern boundary of the facility. From this drainage ditch, the runoff travels south around the southern runway (ALB Runway 1) and then flows west-northwest before converging with Ann Lee Pond (then Shaker's Creek and eventually discharging to the Mohawk River, as described above). Stormwater from the Albany AASF #3 main hangar and vehicle parking area on the southeastern portion of the leased area are also routed to the drainage ditch along the southern boundary of the facility. Given the topography of the facility (QAPP Figure 10-2), the southern drainage ditch is anticipated to flow from east to west.

On the state-owned portion of the facility, stormwater either infiltrates the surface or is routed to stormwater features. Within the northeastern portion of the facility, including AOI 3, stormwater is anticipated to infiltrate the surface (i.e., there are no drainage structures directing flow away from these areas). Stormwater from the NYDMNA Headquarters building and several surrounding paved areas (e.g., sidewalks, eastern parking lot) are routed to the two retention ponds located southwest and northeast of the building. The retention pond located southwest of the headquarters has a stormwater overflow to a drainage ditch along the southern boundary of the facility. However, this drainage area (including the retention ponds) does not include stormwater from any of the AOIs and is not anticipated to be impacted by PFAS releases. In addition, the parking lots west of the headquarters and the two smaller buildings west of the headquarters (field maintenance shop [FMS] storage building and FMS 16) also route stormwater to the southern drainage ditch, but similarly not anticipated to be impacted by PFAS releases since this drainage area does not receive stormwater from any of the AOIs. Thus, the non-AOI stormwater features, including the NYDMNA Headquarters retention ponds, are not planned for investigation in the RI or evaluation in the risk assessments and are not discussed further in this RAWP.

In addition, the drainage ditch along the southern boundary of the leased portion of the facility may also receive facility oil-water separator (OWS) discharges. The OWS is connected to the floor drains within the AASF #3 and the catch basin at the aircraft washdown station west of the hangar and south of the apron. The OWS discharges to the Town of Colonie sanitary sewer system during washing events, and to the drainage ditch when not washing (AECOM, 2023).

AOI Descriptions

AOI 1 encompasses two potential release areas, which are each described below.

AASF #3 Hangar Release - Two incidents of firefighting foam discharge associated with the facility's fire suppression system (consists of two 200-gallon tanks and deluge system) are

documented. There have been two accidental foam releases at the hangar. Testing of the fire suppression system in 2012 caused foam to completely fill the hangar. The hangar bay doors were opened and allowed the foam to spill out onto the tarmac and into the grass (AECOM 2023). In August 2021, the hangar fire suppression system had an accidental release that resulted in the discharge of 75-100 gallons of foam. The foam spilled onto the tarmac immediately west of the hangar and reached the adjacent grassy area. Both incidents were promptly cleaned and addressed by a contractor. Clean-up activities following the incidents involved rinsing, wiping, and collection of rinse aid into drums.

Uncertainty regarding the timing and use of AFFF at the facility remains. The PA findings indicated that in 2012 the fire suppression system was primed with 3 percent (%) AFFF; however, as of August 1, 2007, the existing fire suppression system is documented as containing JET-X 2.75% high expansion foam. Based on this finding, it is unknown if the current system is the original fire suppression system or if a retrofit occurred around 2007. In addition to the fire suppression system, the AASF #3 Hangar also contains storage of two 36-gallon floor units of Ansulite 3% AFFF concentrate. NYARNG continues to perform records searches to obtain additional information.

Fire Response Unit - Albany AASF #3 had a Fire Response Unit during the 1980s that was disbanded in the early 1990s. During this time, a firetruck was reported to have been stationed in the Fire Response Unit, housed in a room attached to the northern side of the AASF #3 Hangar. The firetruck was reported to have a 150-gallon dual line of 3% AFFF and water tank and a 400-gallon Purple K tank. It is unknown where the firetruck was filled or washed or whether the firetruck leaked. There were no documented releases of AFFF within the Fire Response Unit. This unit existed between 1983 and 1992 and responded to all fire and emergency related incidents that occurred at the Albany AASF #3 and ALB, in conjunction with the Albany Fire Department (AFD).

AOI 2 (~0.05 acres) encompasses the area where a fire occurred in the back of a garbage truck, southeast of the AASF #3 Hangar, in May 2017; the Colonie Fire Department responded to the incident. While the use of AFFF during the emergency response was not documented, photographs of the incident appear to show foam being used. A stormwater drop inlet is located immediately north of the AOI 2 release area in the grass on the north side of the road. Historical photographs show that booms and socks were used to protect materials from the garbage truck fire from flowing into the stormwater drain.

AOI 3 encompasses 80 cubic yards of soil removed from within the footprint of the potential release area at AOI 1 during the construction of the four new cold storage hangars in 2020 (Hangars A through D) at the facility. As noted earlier, these newer hangars do not have fire suppression systems, and at no time was any AFFF stored or used in them. During construction activities, soil was removed to approximately 4 feet bgs in portions of the grassy area between the Albany AASF #3 main hangar and Hangar D. Soil was also excavated in this area during construction of an underground stormwater detention system to the east of Hangar D. Additionally, in the grassy area between the main hangar and Hangars C and D, a pit was dug at each side of the taxiway/roadway in order to bore under the taxiway and roadway at a depth of approximately 6 feet bgs. Excavated soil was used as backfill material at the same location. Any excess soil from the excavation work was stockpiled to the north of the facility's access control point (ACP) and investigated as AOI 3. The soil stockpile has since been removed.

1.2 Data Selection and Evaluation

Samples collected during the SI (AECOM, 2023) were analyzed for a subset of 18 PFAS (including the relevant PFAS listed in **Section 1.0** except HFPO-DA, PFBA, and PFHxA) by liquid chromatography with tandem mass spectrometry compliant with Quality Systems Manual (QSM)

5.3 Table B-15 (DoD, 2019). SI data will not be used in the risk assessments; per OSD (Assistant Secretary of Defense, 2024b), methods other than USEPA Method 1633 cannot be used for risk assessment purposes. Analytical data from the SI (AECOM, 2023) within the investigation area and across the facility were used to refine the approach for the Prescriptive Phase as described in the QAPP.

As described in **Section 1.0**, the RI activities for the facility will be conducted over multiple mobilizations. During the Prescriptive Phase, soil and groundwater samples will be collected and analyzed for PFAS from multiple intervals at biased sampling locations surrounding known impacted areas as identified during the SI. Prescriptive Phase soil and groundwater samples will be analyzed using ASTM D8421, a screening level method. Confirmation samples using USEPA Method 1633 will be collected at a rate of 10%. The ASTM screening level data will not be used in the risk assessments, consistent with OSD policy (Assistant Secretary of Defense, 2024b). The screening level soil and groundwater data will be used to refine and inform the Adaptive Phase, which will collect the USEPA Method 1633 data necessary for the risk assessments. In addition, surface water and sediment samples may be collected during the Prescriptive Phase and analyzed for PFAS using USEPA Method 1633 from two locations within the southern drainage ditch, if standing water is present at the time of sampling. Worksheet #11 of the QAPP discusses data quality objectives for the program.

The Adaptive Phase scope will largely be based on the results of the Prescriptive Phase and will include on-site step-in and step-out refinement borings/wells at sources where warranted. The previous detections of PFAS at the facility are summarized in QAPP Worksheet #10, and the full analyte lists for the RI are identified in QAPP Worksheet #15. Final data selection for evaluation in the risk assessments will be conducted after all the analytical data are available. QAPP Worksheet #14 describes the field sampling tasks for the Prescriptive Phase, and QAPP Worksheet #17 provides the sampling design and rationale for each medium and area for the Prescriptive Phase. The following summarizes the general approach for evaluating the USEPA Method 1633 data for the risk assessments.

Groundwater

The HHRA will only use data from permanent monitoring wells (USEPA, 2014b) and only results from samples analyzed using USEPA Method 1633. The ERA will not use groundwater data given that there are no complete exposure pathways between groundwater and ecological receptors (depth to groundwater observed during the SI ranged from 0.56 to 5.72 feet bgs [AECOM, 2023]).

Soil

Soil data collected for the risk assessments (USEPA Method 1633) will be divided into multiple depth intervals for evaluation in the risk assessments, as applicable. The NYSDEC guidelines for human health exposure suggest 0 to 2 inches for surface soil screening. However, due to the amount of soil turnover that has occurred during the facility's constructions and operations, 0 to 0.5 feet is more representative of surface soil exposure and will be used as the surface soil interval for the HHRA. For the ERA, surface soil will be defined as soil collected at two depth intervals per the NYSDEC guidance: 0 to 0.5 feet bgs including any vegetative cover and greater than 0.5 to 2 feet bgs (NYSDEC, 2010).

Subsurface soil for the HHRA will be defined as any soil sample collected at a depth greater than 0.5 feet bgs. Consistent with typical USEPA risk assessment practice (USEPA, 1989), soils deeper than 15 feet bgs or the top of the water table, whichever is shallower, will not be included in the HHRA because receptors are not likely to contact these deeper soils. Given the shallow water table at the facility, it is likely that subsurface soil samples will be collected to about 4 feet bgs.

For future scenarios in which development of the area, resulting in the mixing of surface and subsurface soils, may occur, the combined surface and subsurface soil interval will be evaluated in the HHRA (including samples collected between the ground surface and the top of the water table). This process represents a conservative evaluation of potential human exposure for purposes of the HHRA.

As most ecological exposures occur at the surface, the potential for exposure to PFAS in subsurface soils (greater than 2 feet bgs [above the water table]) will only be evaluated in the ERA if large burrowing animals are expected to be present (burrows may extend below the surface soil horizon) or if protected status (federal or state) burrowing animals may be present and are known to burrow below the surface soil horizon. Subsurface exposure by burrowing animals primarily occurs through incidental soil ingestion while digging and grooming.

Exposure areas consisting of one or more PFAS AOI may be defined in the risk assessments based on proximity to one another, similarity of exposure potential, and the nature and extent of PFAS in each area.

Sediment and Surface Water

If standing water is present in the drainage ditch along the southern boundary of the facility at the time of sampling, co-located surface water and sediment samples may be collected and analyzed for PFAS (USEPA Method 1633) at three locations. If standing water is not present, then two soil (ephemeral sediment) samples will be collected from the ditch and analyzed for PFAS. The results of these Prescriptive Phase samples, if collected, will be used to assess the need for additional surface water and sediment sampling during the Adaptive Phase. If additional data are deemed necessary and collected during the Adaptive Phase, applicable USEPA Method 1633 data will be used in both the HHRA and the ERA.

1.3 Summary Statistics

For each medium/exposure area, the USEPA Method 1633 data will be compiled into summary statistics as discussed below for evaluation in the risk assessments. For each chemical detected at least once within an area/medium/depth interval (i.e., surface soil [0 to 0.5 feet bgs and 0.5 to 2 feet bgs], subsurface soil, etc.), the summary statistics will include the minimum and maximum detected concentrations, average detected concentration, location of maximum detected concentration, frequency of detection (FOD), and the range of detection limits calculated in accordance with USEPA Risk Assessment Guidance for Superfund (USEPA, 1989).

For sample locations in which a duplicate sample was also collected, the duplicate sample results for each chemical/medium/area combination will be processed prior to the calculation of summary statistics and exposure point concentrations (EPCs) (further discussed in **Section 2.2.3**). Duplicates will be resolved as follows:

- When both the primary and duplicate are detected, their average will be reported and used to represent the censored concentration (USEPA, 2009), which will be used in the risk assessments, including to calculate summary statistics and exposure point concentrations.
- When both the sample and duplicate are non-detects, the sample with the lower limit of detection will be used; and
- When one of the pair is reported as not detected and the other is detected, the detected result will be used.

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2.0 Human Health Risk Assessment

A facility specific HHRA will be conducted to evaluate whether exposure to PFAS attributable to past operations at the facility may pose a potential cancer risk and/or noncancer hazard to human health above USEPA acceptable levels defined in the NCP [40 US CFR § 300.430] (USEPA, 1991; USEPA, 1994). The evaluation will include quantitative estimation of potential cancer risk and noncancer hazard to current and potential future human receptors that contact facility related PFAS in relevant media. The HHRA will be conducted in accordance with the USEPA, DoD, and DA risk assessment guidance and policies, as applicable, and as referenced throughout this RAWP. Guidance/policies include, but are not limited to, the following:

- USEPA. 1989. *Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A).* Interim Final. Office of Emergency and Remedial Response. US Environmental Protection Agency, Washington, D.C. EPA 540/1-89/002.
- USEPA. 1991. *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions.* Office of Solid Waste and Emergency Response (OSWER) Directive #9355.0-30. April.
- USEPA. 2003. *Human Health Toxicity Values in Superfund Risk Assessments.* OSWER Directive 9285.7-53. Washington, DC. 5 December.
- USEPA. 2001a. *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments).* Final. Publication 9285.7-047. December.
- USEPA. 2004. *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).* Final. OSWER No. 9285.7-02 EP. Office of Emergency and Remedial Response. August.
- USEPA. 2014a. *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors.* Office of Superfund Remediation and Technology Innovation. OSWER Directive 9200.1-120. February 2014, updated September 2015.
- DoD. 2012. *Defense Environmental Restoration Program (DERP) Management Manual*, DoDM 4715.20. 9 March.
- DoD. 2024. *DoD Instruction 4715.18. Emerging Chemicals of Environmental Concern*. Office of the Under Secretary of Defense for Acquisition and Sustainment. Effective September 4, 2019. Change 1 Effective February 9, 2024
- Assistant Secretary of Defense. 2023. *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program.* United States Office of the Assistant Secretary of Defense. August.
- Assistant Secretary of Defense. 2024a. *PFAS 101, Regional Screening Levels Used in DoD Cleanups.* United States Department of Defense. Available online at: https://www.acq.osd.mil/eie/eer/ecc/pfas/pfas101/rsl.html. Accessed December 13.
- Assistant Secretary of Defense. 2024b. *Establishing a Consistent Methodology for the Analysis of Per-and Polyfluoroalkyl Substances in Matrices Other than Drinking Water.* Office of the Assistant Secretary of Defense. May.

- DA. 1999. *Risk Assessment Handbook, Volume I: Human Health Evaluation.* Engineer Manual. Department of the Army, U.S. Army Corps of Engineers. Washington, DC 20314-1000. EM 200-1-4. 31 January.

The HHRA conclusions will inform risk management decisions. If the results of the HHRA indicate potential risk/hazard above acceptable levels, as defined in the NCP [40 CFR § 300.430] (USEPA, 1991; USEPA, 1994), federal and state cleanup standards will be evaluated to determine if they are Applicable or Relevant and Appropriate Requirements (ARARs) as part of the Feasibility Study (FS). A weight of evidence evaluation that considers the HHRA results and ARARs will be conducted to determine the final list of chemicals of concern (COCs) for remedial action. The HHRA will be used to inform the development of risk-based concentrations to be considered in conjunction with federal and state-specific ARARs in the selection of Preliminary Remediation Goals (PRGs) in the FS.

References cited herein are based on the most current versions of sources available as of the date of this RAWP. In the case that updates to references become available, the most current version of the references available at the time the HHRA is initiated will be used and appropriately referenced in the HHRA.

USEPA's four step HHRA paradigm (USEPA, 1989) will be followed to conduct the HHRA, as follows. Each of the HHRA steps is discussed in further detail in the following subsections.

- Data Evaluation
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization

2.1 Data Evaluation

The data evaluation step involves identification and summarization of facility data appropriate for use in the HHRA (described in **Section 1.2** for both the HHRA and the ERA as well as the selection of chemicals of potential concern (COPCs) for quantitative evaluation in the HHRA, described below.

COPCs are a subset of the complete list of chemicals detected in environmental media (e.g., soil, groundwater) that are carried through the quantitative risk assessment process. The HHRA COPC selection process may consider low FOD, low toxicity and low concentration, consistency with background (if available), and whether the chemical is likely to be present due to laboratory contamination. PFAS are the only potential facility related COPCs being evaluated under the scope of this RI. While a detailed statistical evaluation of background is not included under the current scope of this RI, available information, such as data from upgradient or reference locations, will be reviewed and incorporated as appropriate. The COPC selection process is described below.

Chemicals will not be eliminated as COPCs based on low FOD alone, consistent with USEPA guidance (USEPA, 1989). Other lines of evidence to be considered include whether a COPC is also identified in other facility media and if historical and/or current facility-related activities support the presence of the chemical in the affected medium.

PFAS COPCs will be identified based on a comparison of the maximum detected concentrations of relevant PFAS per media/area/depth interval (as applicable) to human health SLs. As discussed

previously, if cleanup action is determined to be necessary based upon the results of the HHRA, federal and state ARARs will be incorporated into the selection of PRGs in the FS.

The SLs and toxicity values current at the time the HHRA is conducted will be used (i.e., based on the RSLs posted to the OSD PFAS 101 website, as described in **Section 1.0**). The potential risks associated with PFAS lacking final toxicity values from the hierarchy of sources presented in USEPA guidance (USEPA, 2003) and DoD Instruction 4715.18 (DoD, 2024) will be discussed qualitatively in the Uncertainty Analysis of the HHRA. Relevant PFAS (i.e., those with final toxicity values in the RSL table posted to the OSD PFAS 101 website at the time the HHRA is initiated) detected at concentrations greater than the associated SLs will be identified as COPCs and will be quantitatively evaluated in the HHRA. Relevant PFAS that are either not detected in a particular medium or that are detected at concentrations less than the associated SLs will be excluded from being COPCs and will not be evaluated further in the HHRA.

The human health SLs to be used in the COPC selection are discussed by media below. SLs are discussed for soil and groundwater, sediment, and surface water. **Section 2.2** provides a more detailed discussion of the preliminary human health CSM and the potential exposure pathways.

Soil SLs

Soil SLs used in the HHRA will be equal to the USEPA RSLs for residential soil, in accordance with the memorandum from the OSD (Assistant Secretary of Defense, 2023) and any updates based on the OSD PFAS 101 website. This method is considered conservative for the nonresidential exposure scenarios, where receptors are assumed to be exposed to soil fewer days per year and for fewer years than what is assumed for a residential scenario. The RSLs will be based on a target risk level of 1E-6 and a target hazard quotient (HQ) of 0.1 (where both are available, the lower value will be selected) to account for potential cumulative effects per target organ. If the USEPA RSLs are updated, the most current version referenced on the OSD PFAS 101 website will be used in the HHRA, as applicable.

A comparison to SLs protective of the soil to groundwater migration pathway will not be included in the HHRA. Analytical groundwater data will be available and evaluated directly. Soil COPCs will be compared with groundwater COPCs to serve as an indicator of whether PFAS are potentially migrating from soil to groundwater.

Groundwater SLs

Groundwater SLs used in the HHRA will be equal to the USEPA RSLs for tap water, in accordance with the memorandum from the OSD (Assistant Secretary of Defense, 2023) and any updates based on the OSD PFAS 101 website. The tap water RSLs based on a target HQ of 0.1 or a cancer risk level of 1E-6 (where both are available, the lower value will be selected) will be used to select COPCs in groundwater. In the absence of published screening levels for the construction worker pathway (incidental ingestion and dermal contact with groundwater in an excavation trench), the tap water RSLs will conservatively be used as SLs for this pathway as well.

Sediment SLs

Published human health sediment SLs for PFAS are not available from the DoD (Assistant Secretary of Defense, 2023) or the USEPA RSL table. Proxy sediment SLs for COPC selection will be set to the residential soil RSLs described above multiplied by a factor of 10 to estimate

changes in exposure (e.g., reduced ingestion rate, lower exposure frequency) when assuming a recreational or occupational scenario compared to a residential scenario.

Surface Water SLs

Published human health surface water SLs for PFAS are not available from the DoD (Assistant Secretary of Defense, 2023) or the USEPA RSL table. As discussed in **Section 2.2.1**, the Mohawk River is a source of potable water for the Latham Water District. The exact location of the intake is not publicly available, and it is not known if the intake is upstream or downstream of the facility. Therefore, the tap water RSLs will conservatively be used to select surface water COPCs.

2.2 Exposure Assessment

The purpose of the exposure assessment is to provide a quantitative estimate of the magnitude and frequency of potential exposure to COPCs by a receptor. Potentially exposed individuals and the pathways through which those individuals may be exposed to COPCs are identified based on the physical characteristics as well as the current and reasonably foreseeable future uses of the facility. The extent of a receptor's exposure is estimated by constructing exposure scenarios that describe the potential pathways of exposure to COPCs and the activities and behaviors of individuals that might lead to contact with COPCs in the environment. This information is identified based on the preliminary facility-specific CSM, which is presented in the QAPP Worksheet #10 and summarized below.

2.2.1 Summary of Human Health CSM

As discussed in **Section 1.1**, the facility is located on approximately 50 acres and is a controlled access facility accessible only through a guarded gate. Non-military land uses in off-facility areas adjoining the facility include residential, commercial, aviation, and industrial use, where access is open to the public.

The AOI areas are mostly covered by pavement, buildings, landscaping, and heavy vegetation, leaving few areas of exposed soil and little potential for soil exposure. Therefore, human exposure to PFAS in AOI soil is expected to be low under the current scenario. Soil contact is possible in the future if ground-disturbing activities take place or if there is redevelopment.

Current human receptors at the facility include on-facility workers and approved visitors (e.g., National Guard trainees. Outdoor workers may contact exposed surface soil in the AOIs while performing maintenance or other similar activities. If the drainage ditches contain water, outdoor workers may also contact surface water and sediment while performing maintenance. Indoor workers, visitors, and trainees may also contact soil in the AOIs but are anticipated to have a lower exposure potential as compared to outdoor workers who would presumably be present more frequently and perform more soil-intense activities, such as landscaping. Therefore, the outdoor worker scenario is considered protective of these other receptor types, and indoor workers, visitors, and trainees are not included as separate receptors. The facility does not have any areas that are currently used recreationally. Therefore, an on-facility recreational scenario is only included under a hypothetical future use scenario. Further, entry to the facility by trespassers is considered unlikely under the current scenario. However, it is conservatively assumed that trespassers may access soil at the facility under a future scenario where access is no longer controlled. If the drainage ditches contain water, trespassers may also contact surface water and sediment while traversing the facility. Construction/utility workers may also be present and access soil and shallow groundwater (in an excavation trench) in the future if redevelopment or utility activities were to occur.

No potable water wells are located on the facility; however, a review of NYSDEC's publicly available geospatial data indicated that 21 domestic and 14 irrigation wells exist within a 4-mile radius of the facility (NYSDEC, 2001; New York State, 2023), as shown on QAPP Figure 10-3. Domestic wells ranged in depth from 53 to 623 feet bgs, and irrigation wells ranged from 100 to 500 feet bgs.

Drinking water for the facility is supplied by the Latham Water District. The Latham Water District serves a population of 85,590 and sources raw water from the Mohawk River and five groundwater supply wells (Latham Water District, 2023). The five supply wells are located on the Mohawk View Water Treatment Plant property at 100 Onderdonk Avenue in Latham (see QAPP Figure 10-3). In the 1930's the Latham Water District began sourcing drinking water from the Colonie Channel Aquifer (see **Section 1.1**). However, it is unknown if the Latham Water District's current wellfield on the southern shore of the Mohawk River pulls from the shallow alluvial sand and gravel of the Mohawk River flood plain or the deeper Colonie Channel Aquifer. Latham Water District's Mohawk River intake is approximately halfway between Crescent Dam and Lock No. 7 (Maswick, 1995). The exact location of the intake is not publicly available. The Latham 2023 annual drinking water quality report indicates that PFAS were not detected in finished water. Therefore, there are no current exposures to PFAS in drinking water at the facility.

The Latham Water District also sampled PFAS in raw water from the supply wells in 2022 (Latham Water District, 2023). PFAS were detected in 3 of the supply wells, with maximum detected concentrations as follows:

- PFBA: 2.9 nanograms per liter (ng/L)
- Perfluoropentanoic acid (PFPeA): 2.2 ng/L
- PFOS: 8.6 ng/L

The facility uses the Town of Colonie sanitary sewer system; there are no septic systems present at the facility (AECOM, 2023).

There is also potential for PFAS migration from the stormwater infrastructure to surface water via the drainage ditch along the southern boundary of the facility. Advective-dispersive transport of PFAS in groundwater from potential upgradient source areas may also contribute to potential PFAS contamination at the facility that, combined with PFAS contamination from the AOIs, may expose human receptors to PFAS in groundwater and surface water at and downgradient from the facility. If migration pathways for PFAS to these water bodies are confirmed, additional data may be collected during the Adaptive Phase and evaluated in the HHRA.

The HHRA will conservatively evaluate an unlimited use/unrestricted exposure (UU/UE) scenario to inform future risk-management decisions in the FS, if applicable. This scenario includes the evaluation of a hypothetical future on-facility residential scenario and the evaluation of groundwater data collected from permanent monitoring wells as a source of drinking water for hypothetical future on-facility residents and future outdoor workers. Future indoor workers may also be exposed to PFAS in drinking water, however the assumptions regarding their drinking water exposure are the same as outdoor workers.

A remedial response will not necessarily be taken based on the results of the future UU/UE scenario, given it is not a reasonably anticipated future use for the facility, per the DoD DERP Management Manual, which states "The DoD Component shall consider current and reasonably anticipated future land uses in risk assessments. The DoD Component does not have to assume that the reasonably anticipated future land use is residential." (DoD, 2012).

2.2.2 Potential Exposure Scenarios

The receptors and exposure pathways that may be evaluated in the HHRA are presented in the table below. They were identified based on current and potential future land use based on the preliminary facility specific CSM. Because the CSM will be refined during each sampling phase, the table below presents some scenarios that may ultimately be incomplete. For example, surface water and sediment samples will only be collected if surface water is present at the time of sampling. The data will be used to evaluate the need for further sampling. Therefore, potential surface water and sediment exposure pathways are listed below. If these pathways are determined to be complete, they will be evaluated in the HHRA. If the pathways are not complete, they will not be evaluated quantitatively.

For purposes of the HHRA, it is conservatively assumed that future land-use scenarios may involve some level of construction to convert the area to the desired use (e.g., commercial, other industrial, recreational, residential). Under this scenario, it is assumed that current subsurface soils may be brought to the surface and become available for exposure by future receptors. Potential exposure to airborne particles in outdoor air (from soil) will not be quantitatively evaluated in the HHRA because toxicity values for the inhalation exposure route are not available from USEPA's sources for PFAS; therefore, quantitative assessment of the inhalation exposure pathway cannot be performed. The associated uncertainties will be qualitatively discussed in the HHRA.

Area	Receptor	Exposure Pathway(s)
On-facility	Outdoor Worker	Current: • Exposure to surface soil (0-0.5 feet bgs) through incidental ingestion and dermal contact. • Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.
		Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to monitoring well groundwater[(a)] via ingestion as drinking water. • Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.
	Construction/Utility Worker	Future: • Exposure to combined surface and subsurface (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to groundwater seeping into an excavation trench via incidental ingestion and dermal contact where groundwater depth is less than or equal to 15 feet bgs, representing the maximum depth of typical excavations.
	Trespasser (Adolescent)	Future: • Exposure to surface soil (0-0.5 ft bgs) through incidental ingestion and dermal contact. Exposure to surface soil only for this receptor assumes that the site is not redeveloped, but that access is no longer restricted. • Exposure to surface water and sediment in drainage ditch through incidental ingestion and dermal contact.

Area	Receptor	Exposure Pathway(s)
	Recreational User (Adult and Child)	Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. Exposure to combined surface and subsurface soil for this receptor assumes that the site is redeveloped to include recreational and/or green space features.
	Hypothetical Resident (Adult and Child)	Future: • Exposure to combined surface and subsurface soil (ground surface to the top of the water table) through incidental ingestion and dermal contact. • Exposure to groundwater[(a)] via ingestion of drinking water and dermal contact during bathing/showering.
Off-facility (b)	Hypothetical Recreational User (Adult and Child)	Current/Future: • Exposure to surface water and sediment through incidental ingestion and dermal contact if off-facility water body used for recreation is potentially affected by installation activities. • The fish consumption exposure pathway will be qualitatively evaluated.
	Commercial/Industrial Worker	Current/Future: • Exposure to groundwater[(a)] via ingestion of drinking water.
	Resident (Adult/Child)	Current/Future: • Exposure to groundwater[(a)] via ingestion of drinking water and dermal contact during bathing/showering.

Notes:

(a) Site groundwater is not currently used as a source of drinking water. The evaluation of on-facility groundwater (represented by permanent monitoring well data) as a future source of potable water will be performed for informational purposes to represent an unrestricted groundwater use scenario. The evaluation will include a drinking water scenario for residents, outdoor workers, and commercial/industrial workers, and household use of potable water, including showering/bathing, for a resident.

(b) Off-facility sampling is not currently planned. These potential receptors would only be evaluated if off-facility migration pathways for PFAS are confirmed and if off-facility data are collected during the Adaptive Phase.

The quantitative exposure assumptions for the reasonable maximum exposure (RME) scenario that will be used in the HHRA were selected in accordance with USEPA guidance (e.g., USEPA, 1989, 2002a, 2004, 2011, 2014a, 2017, 2019a, 2019b). The RME provides an estimate of the upper range of exposure in a population (the 90th percentile or greater of expected exposure, consistent with USEPA, 2019b) and is based on a combination of the upper-bound and central estimates of exposure parameters. USEPA guidance states that regulatory decisions are made using the results of the RME evaluation (USEPA, 1989). Exposure assumptions may differ from default values to factor in facility-specific considerations. Adjustments to the proposed exposure assumptions may be made based on additional facility-specific information and refinement of the human health CSM during the HHRA. If changes to the proposed exposure assumptions are made, the associated rationale will be provided in the HHRA report. **Figure 1** presents the human receptors, exposure areas, exposure media, and exposure pathways that will be evaluated in the HHRA. **Table 1** through **Table 7** present the quantitative exposure assumptions that will be used for the RME scenario.

A central tendency exposure (CTE) scenario, which uses average exposure parameters to calculate an average exposure to an individual, may be considered in the HHRA if (1) the RME

scenario for the associated receptor indicates a potential risk/hazard in excess of acceptable levels, as defined by the NCP [40 CFR § 300.430] (USEPA, 1991; USEPA, 1994); and (2) the CTE scenario is more reflective of a site-specific exposure scenario. If the CTE scenario is included, site-specific exposure parameters will be developed and documented in the HHRA report.

For each receptor and exposure area, the RME exposure dose will be estimated for each COPC via each exposure pathway by which the receptor is assumed to be exposed. Exposure doses for oral and dermal exposure will be calculated using the following USEPA guidance (USEPA 1989 and 2004). In the absence of dermal toxicity values, oral toxicity values will be use with appropriate adjustments (USEPA, 2004). The potential uncertainty associated with this assumption will be discussed in the HHRA.

2.2.3 Exposure Point Concentrations

EPCs for the risk assessments will be calculated using only data collected using USEPA Method 1633 (Assistant Secretary of Defense, 2024b). EPCs for evaluation of soil, groundwater, surface water, and sediment will generally be equal to the 95 % upper confidence limit (UCL) on the arithmetic mean concentration (USEPA, 2002b) per exposure area. Detection limits for results reported as not detected will be entered into the software without adjustment; ProUCL uses statistical methods to evaluate non-detects versus simple substitution (e.g., one-half detection limit). For datasets in which a reliable 95% UCL cannot be calculated using USEPA's ProUCL software, in which case it provides a warning or other message indicating a UCL is not recommended, the maximum detected concentration will be used as the EPC for evaluation of the RME scenario.

The most current version of USEPA's ProUCL software available at the time the HHRA starts will be used to calculate the ProUCL-recommended UCL. The general approach to be used for calculation of EPCs is discussed with respect to media, as presented below. Because the sampling will occur over several phases, the total number of samples and the locations of samples that may be available for use in the HHRA are not currently known. The approach for developing EPCs will be refined after all the data to be used in the HHRA are available.

Groundwater

In accordance with USEPA guidance (USEPA, 2014b, facility-wide groundwater EPCs will be calculated for COPCs in groundwater using analytical groundwater data from permanent monitoring wells identified as being within the core of the plume, if present. In the absence of a clearly defined plume, professional judgment will be used to determine the appropriate dataset for calculation of reasonably conservative groundwater EPCs.

Soil

Soil EPCs will be calculated for COPCs in surface soil (0-0.5 feet bgs) and combined soil (ground surface to the top of the water table) for each exposure area.

Surface Water and Sediment

EPCs for surface water and sediment will be developed separately for different water bodies or drainage areas, as applicable.

2.3 Toxicity Assessment

The purpose of the toxicity or dose-response assessment is to identify the types of adverse health effects a chemical may potentially cause and to define the relationship between the dose of a chemical and the likelihood or magnitude of an adverse effect (response) (USEPA, 1989). Both USEPA and DoD guidance regarding the hierarchy of sources of human health dose-response values in risk assessment will be followed (USEPA, 2003 and DoD, 2024), as follows:

- Tier 1: USEPA's Integrated Risk Information System (IRIS).
- Tier 2: Provisional Peer-Reviewed Toxicity Values (PPRTVs) obtained from USEPA via the USEPA National Center for Environmental Assessment in Cincinnati, Ohio.
- Tier 3: Other sources of dose-response values will be selected in accordance with USEPA guidance (USEPA, 2013) and include, but are not limited to, California Environmental Protection Agency's Office of Environmental Health and Hazard Assessment (OEHHA) Toxicity Criteria Database, Minimal Risk Levels (MRLs) published by the Agency for Toxic Substances and Disease Registry (ATSDR). The Health Effects Assessment Summary Tables (HEAST) are a Tier 3 source but are no longer updated and therefore not relevant to PFAS.

Only PFAS with final, peer reviewed toxicity values that DoD will use in CERCLA risk assessments will be considered in the HHRA.

USEPA guidance for early life exposure to carcinogens (USEPA, 2005a) requires that potential cancer risks from chemicals that act by a mutagenic mode of action be calculated differently than chemicals that do not act via a mutagenic mode of action. PFAS are not considered to be mutagenic; therefore, adjustments to the calculation of potential risks will not be required.

Default values provided by USEPA's RSL table will be used for the gastrointestinal absorption fraction (1 or 100%) and dermal absorption factor (0.1 or 10%) to assess potential risk to PFAS COPCs in soil. These estimates are uncertain and may result in an overestimation or underestimation of potential risk. Dermal exposure to PFAS is considered a minor exposure pathway due to studies that suggest dermal absorption of these chemicals is slow and does not result in significant absorption (ATSDR, 2021). The uncertainties associated with the toxicity values used will be discussed in the HHRA.

2.4 Risk Characterization

Risk characterization combines estimates of exposure with toxicity data to develop estimates of the probability that an adverse effect will occur under the specified conditions of exposure. Estimates of potential carcinogenic risks are expressed as probabilities of developing cancer reported as excess lifetime cancer risk (ELCR). Current HHRA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances. Non-carcinogenic hazards are reported as pathway-specific hazard indices (HIs), which are the sum of individual COPC HQs for that pathway. Because the RfDs for PFAS may be derived from studies where test subjects were exposed to mixtures of PFAS, cumulative hazards may be inappropriate. As a first approximation, all COPCs will be included in the cumulative HI calculation. If the HI exceeds 1, a review of the RfDs will be conducted to determine if it is appropriate to sum them. Further, in cases where the HI exceeds 1, HIs will be calculated separately for COPCs that have similar systemic effects (i.e., per target organ endpoint). USEPA (1991) states that where the cumulative incremental current or future potential ELCR to an individual is less than 1E-4, action generally is not warranted unless there are adverse environmental impacts. USEPA also considers noncancer hazards by using a target HI per target organ of 1 (USEPA, 1991). For each

associated exposure scenario (i.e., receptor/medium/exposure area) with a potential ELCR greater than 1E-4 and/or a HI greater than 1, preliminary COCs will be selected from those COPCs contributing the most to the cumulative ELCR greater than 1E-4 or target organ HI greater than 1 (at one significant figure).

A weight-of-evidence approach will be used to determine final COCs. Other lines of evidence that may be considered in selecting final COCs include nature and extent, other regulatory requirements, and background. If final COCs are identified, then additional action may be warranted, such as an FS (not included under the scope of this RI). PRGs would be derived in the FS such that the resulting cumulative cancer risk is less than 1E-4 and the target organ HI is less than 1.

2.5 Uncertainty Analysis

Within any of the steps of the HHRA process, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. Every assumption introduces some degree of uncertainty into the HHRA process. Regulatory HHRA methodology requires that conservative assumptions be made throughout the HHRA to ensure that public health is protected. Therefore, when all the assumptions are combined, it is much more likely that potential risks are overestimated rather than underestimated.

The assumptions that introduce the greatest amount of uncertainty in the HHRA, both facility-specific and those inherent to the HHRA process, will be discussed in the uncertainty section of the HHRA. Examples of facility-specific uncertainties are those associated with sampling/analysis methods, the COPC selection process, estimation of EPCs, representativeness of the exposure scenarios and input parameters, the availability of toxicity values, etc. Examples of uncertainties inherent to the HHRA process are the extrapolation of toxicity from animal studies to humans, from high to low doses, and the specific models used to develop dose-response values; the combination of upper-bound exposure estimates with upper-bound toxicity estimates, etc. Most of the uncertainties associated with the HHRA will be discussed in qualitative terms because, for most of the assumptions, there is not enough information to assign a numerical value to the uncertainty that can be factored into the calculation of potential risk.

3.0 Ecological Risk Assessment

The purpose of the ERA will be to evaluate potential ecological effects of exposures to facility-related PFAS detected in on- and off-facility media, including soil, sediment, and/or surface water, as applicable. The outcome of the ERA will provide input to remedial decision-making that will protect the health of local populations and communities of biota. The ERA will be conducted in accordance with USEPA and USACE risk assessment guidance and policies, as applicable.

The framework for the ERA will be consistent with USEPA methodology based on the following key guidance documents:

- USEPA. 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments - Interim Final.* US Environmental Protection Agency, OSWER, Office of Emergency and Remedial Response. EPA 540/R-97/006. June.
- USEPA. 1998. *Guidelines for Ecological Risk Assessment*. US Environmental Protection Agency, Washington, D.C. EPA/630/R-95/002F. April.
- USEPA. 2001b. *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments*. ECO Update, Intermittent Bulletin. US Environmental Protection Agency, OSWER. EPA 540/F-01/014. Publication 9345.0-14.
- Tri-Services Environmental Risk Assessment Work Group (TSERAWG). 2008. *A Guide to Screening Level Ecological Risk Assessment*. TSERAWG TG-090801.
- USEPA. 2005b. *Guidance for Developing Ecological Soil Screening Levels – Revised Draft*, OSWER Directive 9285.7-55. February.
- DA. 2010. *Risk Assessment Handbook, Volume II: Environmental Evaluation*. Engineer Manual. Department of the Army, U.S. Army Corps of Engineers. Washington, DC 20314-1000. EM 200-1-4. 31 December.

The PFAS technical documents and tools developed by the DoD Environmental Security Technology Certification Program (ESTCP) and Strategic Environmental Research and Development Program (SERDP) and published guidance from the Argonne National Laboratory (Argonne) will also be considered for assessing ecological risk due to exposure to PFAS:

- Grippo, M., J. Hayse, I. Hlohowskyj, and K. Picel. 2024. *Derivation of PFAS Ecological Screening Values.* Argonne National Laboratory. Updated October.
- Conder, J., J. Arblaster, E. Larson, J. Brown, and C. Higgins. 2020. *Guidance for Assessing the Ecological Risks of PFASs to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites*. SERDP Project ER18-1614. January.
- Divine, C., J. Zodrow, M. Frenchmeyer, K. Dally, E. Osborn, and P. Anderson. 2020. *Approach for Assessing PFAS Risk to Threatened and Endangered Species.* SERDP Project ER18-1653. March.

The Argonne report (Grippo et al. 2024) is the most recently released ERA guidance for PFAS. The ecological screening values (ESVs) derived in the Argonne report were developed in consultation with an interagency team of subject-matter experts from across the DoD services through the DoD Tri-Services ERA Work Group, including experts from the USEPA ERA Forum, to support screening-level assessments at US Air Force, Navy, Army, and other DoD sites. Although the latter two guidance documents listed above emphasize protection of threatened and endangered species, which may or may not be relevant to a given site, information provided

therein can also be applied in ERAs for common species. These documents represent the most comprehensive ERA tools currently available. New ecotoxicity data are continuously being generated for PFAS, and additional sources of screening benchmarks and toxicity reference values (TRVs) will be consulted at the time of the ERA to ensure that the most recent toxicity data are used in the risk characterization.

Given the rapidly evolving nature of PFAS ecotoxicity and exposure evaluation methods, and regulatory and DoD guidance, significant developments may occur within the project's timeframe. To the extent reasonable and relevant, such developments will be incorporated in the proposed ERA.

A tiered approach will be followed that incorporates different levels of assessment complexity and provides an opportunity to off-ramp from the ERA process prior to proceeding to the next tier based on the available findings. The tiered approach may be implemented in its entirety depending on the level and magnitude of risk that is determined in prior tiers. This approach consists of the following two tiers as summarized below:

- Tier 1 – Screening-Level Ecological Risk Assessment (SLERA) and
- Tier 2 – Baseline Ecological Risk Assessment (BERA).

Tier 1 – Screening-Level Ecological Risk Assessment

The primary objective for a SLERA is to determine which, if any, exposure pathways and chemicals of potential ecological concern (COPECs) warrant immediate action or require further evaluation in a more refined ERA. The SLERA consists of Steps 1 and 2 of the eight-step EPA ERA (USEPA, 1997) process and includes the following activities:

- Identification and summarization of relevant datasets,
- Development of a preliminary CSM that identifies potentially complete exposure pathways for ecological receptors, and
- Comparison of EPCs to ecological SLs to identify COPECs.

Based on the outcome of the SLERA, certain media, COPECs, and pathways may be eliminated from further evaluation due to the level of conservatism built into the SLERA process. If potentially complete and significant ecological exposure pathways are identified, and maximum concentrations of certain COPECs exceed the generic SLs, additional evaluation may be recommended.

Prior to beginning problem formulation in the BERA (Step 3), the results of the SLERA may be refined in Step 3a, as described below. The decision to continue beyond the SLERA does not indicate the potential for adverse ecological effects or that risk reduction is necessary; rather, it indicates that a more focused evaluation and characterization of the potential for risk and accompanying uncertainty is needed (DA, 2010).

Tier 2 – Baseline Ecological Risk Assessment

The primary purpose of the BERA is to assess the potential for adverse effects on the focused list of ecological receptors due to exposure to the COPECs identified upon completion of the SLERA. The BERA includes Steps 3 through 7 of the eight-step EPA ERA process (USEPA, 1997) and uses facility-specific information whenever possible.

Step 3a provides a refinement of the conservative assumptions and resulting risk estimates (e.g., HQs) identified in the SLERA. This step is conducted to refine some of the conservative

assumptions used in the SLERA and assess whether more realistic assumptions would reduce the HQs to below unity prior to implementing a facility specific BERA with associated sampling and analyses. A weight-of-evidence evaluation that considers the Step 3a results, available habitat, wildlife management goals for the areas evaluated, and other relevant factors as appropriate will be conducted to determine whether a BERA is recommended.

Steps 3b through 7 are conducted for pathways and COPECs retained after the completion of Step 3a. These steps include refining the endpoints to be evaluated, the laboratory and field methods to be used to collect additional data, the statistical analyses to be used for evaluating data, and the methods to be used for estimating and characterizing the potential for adverse effects on ecological receptors.

For the Albany AASF #3 evaluation, it is anticipated that a SLERA and Step 3a SLERA refinement will be completed, as needed, using the data collected under the RI using USEPA Method 1633. If Step 3a identifies the need for further evaluation, an additional sampling effort may be proposed to support the BERA and additional BERA details will be provided prior to the sampling effort. Risk management decisions related to performing a BERA and the need for additional facility-specific sampling efforts to support a BERA will be made by the project team.

The following sections provide additional details for the ERA in the context of the following fundamental ERA components:

- Problem Formulation,
- Ecological Effects Assessment and Exposure Assessment, and
- Risk Characterization.

Facility-specific details are provided in the CSM presented in the QAPP (Worksheet #10) and in the ecological CSM figure (**Figure 2**).

3.1 Problem Formulation

The Problem Formulation provides the framework for the ERA and serves to define the risk assessment objectives and identify the ecological receptors, exposure pathways, and endpoints to be evaluated. These components are presented in the following sections.

3.1.1 Environmental Setting

Sections 1.0 and 1.1 provide a facility description, including land use, hydrogeology, and hydrology. As discussed in **Section 1.1**, the overall facility encompasses approximately 50 acres (0.078 square miles) in the hamlet of Latham within Albany County. The facility does not have any significant areas of ecological habitat. The location of the three AOIs are presented in the QAPP Figure 10-6. AOIs 1 and 2 are both within the highly developed portion of the facility. AOI 1 is within the leased western portion of the facility, with the hangars, paved runway, paved aircraft parking apron, paved aircraft washdown station, paved vehicle parking lot, and adjacent landscaping (i.e., actively mowed, disturbed, and maintained grassy areas). AOI 2 is located on the state-owned portion of the facility and is comprised entirely of a paved road; it is approximately 270 feet southwest of the headquarters and adjacent to vehicle parking lots and the southern drainage ditch. AOI 3, located in the northeastern portion of the NYDMNA property, was previously comprised of a soil stockpile that had revegetated similar to the surrounding area (i.e., grassy vegetation) but did not appear to be regularly maintained (i.e., mowed). The entire above grade soil stockpile was removed in October 2024 (i.e., the area is now at-grade with the surrounding area). It is anticipated that revegetation will occur, and that the former stockpile area will be

mowed/maintained with the surrounding area. The highly developed conditions and/or maintained vegetation at these AOIs limit direct exposure to soil. Thus, ecological exposures to PFAS in all three AOIs are expected to be low under current conditions.

The facility stormwater system was described in **Section 1.1**. In the vicinity of AOIs 1 and 2, surface runoff is routed to the drainage ditch located along the southern boundary of the facility, which exits the facility at the southwestern corner, travels south around the ALB runway, then veers west-northwest before converging with Ann Lee Pond. This pond is connected to Shaker's Creek, which discharges to the Mohawk River. Surface runoff in the vicinity of AOI 3 is anticipated to infiltrate the ground surface given the topography, heavy vegetation, and lack of stormwater drainage structures in the vicinity. Regional groundwater flow is presumed to be north toward the Mohawk River; however, groundwater flow at the facility appears to be primarily to the west toward Shaker's Creek. Depth to surficial groundwater measured at the facility during the SI ranged from 0.56 to 5.72 feet bgs. Thus, natural recharge to the shallow surficial groundwater aquifer underlying the facility is occurring through surface infiltration (e.g., at AOI 3).

Terrestrial habitat for wildlife is limited to due to the continuing military land uses and presence of actively mowed, disturbed, and maintained areas. The facility does not have any significant areas of ecological habitat and the fragmented areas of maintained landscaping/grassy areas are expected to offer limited habitat for foraging by ecological receptors. Terrestrial plants and soil invertebrates in the landscaped areas at the facility could serve as minimal food sources for small birds and mammals if areas with viable habitat occur on-facility. Animal species that may occur in these marginal habitats include the eastern gray squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis virginiana*), American robin (*Turdus migratorius*), common grackle (*Quiscalus quiscula*), and American crow (C*orvus brachyrhynchos*). A habitat assessment will be conducted to assess whether on-facility terrestrial habitat may be present.

The stormwater drainage ditch is ephemeral and not expected to provide habitat for ecological receptors. However, the ditch could provide habitat for some species depending on the frequency and duration of standing water and growth of natural vegetation. The southern stormwater drainage ditch is dry most of the time; however, the ditch is seasonally flooded during and after rainfall events and snowmelt.. Given the ephemeral nature of water in the stormwater ditch, the soil substrate may be considered sediment only seasonally, and the ditch may not support aquatic or sediment-dependent receptors (e.g., aquatic invertebrates, benthic invertebrates). However, the drainage ditch, with a woody vegetated area to the south, may support wetland vegetation and terrestrial receptors (e.g., amphibians, birds, and mammals).

As described above, the stormwater drainage ditch along the southern boundary of the facility connects off-facility to the ALB stormwater drainage ditch system, which converges with Ann Lee Pond, which is connected to Shaker's Creek, a tributary of the Mohawk River. Ann Lee Pond (approximately 0.6 miles southwest of the facility), Shaker's Creek (branches approximately 0.75 miles west, 0.75 miles east, and 1 mile north of the facility), and the Mohawk River (approximately 2 miles north of the facility) provide nearby riparian and aquatic habitat. The riparian habitat along the banks of these off-facility aquatic features includes trees and shrubs that are expected to support a community of terrestrial and aquatic-dependent wildlife. Species that may occur in the riparian habitat include the raccoon (*Procyon lotor*), mink (*Neovison vison*), beaver (*Castor canadensis*), white-tailed deer (*Odocoileus virginianus*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), belted kingfisher (*Megaceryle alcyon*), northern cardinal (*Cardinalis cardinalis*), eastern garter snake (*Thamnophis sirtalis*), snapping turtle (*Chelydra serpentina*), and northern leopard frog (*Lithobates pipiens*). The aquatic community in the pond, creek, and river may include fish species such as the eastern blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), pumpkinseed (*Lepomis gibbosus*), tessellated darter (*Etheostoma olmstedi*), white sucker (*Catostomus commersonii*), bluegill (*Lepomis macrochirus*), largemouth

bass (*Micropterus nigricans*), smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), logperch (*Percina* spp.), and walleye (*Sander vitreus*), as well as benthic invertebrates such as mussels and crayfish.

As described in QAPP Worksheet #14, a habitat assessment will be performed as part of the RI. The habitat assessment will occur within the same timeframe as the field sampling. Field staff will assess the characteristics of the available habitats associated with the AOI sampling locations and downgradient areas where PFAS may have migrated. The habitat assessment will evaluate the vegetation cover in and around the AOIs and will be used to assess whether on-facility terrestrial habitat may be present. Habitat conditions within the stormwater drainage ditch will be considered to determine if ecological habitat is provided by this feature and whether to evaluate solid material from the ditch, if collected, as soil or sediment. The habitat assessment will also evaluate if semi-aquatic or aquatic habitat conditions are present. If surface water is not collected from the stormwater drainage ditch and the habitat assessment findings do not indicate that aquatic habitat is present for extended periods, the solid material from these drainage ditch will be considered soil. If the stormwater ditch is not maintained, it may provide terrestrial habitat for ecological receptors.

Field staff will record any observations of common species (including the presence of burrows, scat, nests, etc.) and characteristics of vegetation communities and habitats in the area. Field staff will also be familiar with the habitat requirements and appearance of the federal and state listed species identified in **Section 3.1.1.1** as having the potential to occur in the area and will record any related observations.

3.1.1.1 Threatened/Endangered Species and Critical Habitat

Albany AASF #3 is a highly developed facility with landscaped areas that are primarily comprised of maintained grassy areas and is unlikely to provide habitat for rare species.

A desktop review was conducted for information regarding the potential presence of habitat for threatened, endangered, or other special concern species near Albany AASF #3. To identify federal listed species with the potential for exposure to PFAS at the facility, the United States Fish and Wildlife Service (USFWS) online *Information for Planning and Consultation* (IPaC) system (USFWS, 2024a) was queried for a list of federal endangered, threatened, proposed, or candidate species and designated critical habitats that may occur in the vicinity. The IPaC report is included in **Attachment A-1**. The following table identifies the species from the IPaC report and evaluates for each species the potential for suitable habitat to be present at the AOIs.

The table below identifies the federally listed species with the potential to occur in the vicinity of the facility and whether the AOIs are likely to provide suitable habitat for those species.

Species [a]	Federal Status [a,b]	Preferred Habitat [c]	Notes Regarding Suitability of Available Habitat at AOIs [d]	Suitable Habitat at AOIs?
Northern long-eared bat (*Myotis septentrionalis*)	E	In non-hibernating season (summer and parts of spring and fall): roost singly or in colonies in cavities or crevices of live or dead trees. In winter: hibernate in caves or mines.	The developed facility does not provide suitable habitat. Potential for suitable habitat off-facility along the riparian wooded habitat adjacent to Shaker's Creek and Mohawk River.	No
Tricolored bat (*Perimyotis subflavus)*	PE	In non-hibernating season (summer and parts of spring and fall): roost singly or in colonies in leaf clusters of live or recently dead hardwood trees, sometimes in other trees or structures. In winter: hibernate in caves or mines.	The developed facility does not provide suitable habitat. Potential for suitable habitat off-facility along the riparian wooded habitat adjacent to Shaker's Creek and Mohawk River.	No
Karner blue butterfly (*Lycaeides melissa samuelis*)	E	In the northern range of wild lupine (*Lupinus perennis*) habitat. Wild lupine habitat is found within a patchwork of pine and scrub oak stands, which are scattered among open grassy areas. Caterpillars feed only on the leaves of the wild lupine plant. Adults feed on the nectar of flowering plants.	The developed facility does not provide suitable habitat. Preferred habitat and wild lupine occur off-facility.	No
Monarch butterfly (*Danaus plexippus*)	C	Fields and other open areas with herbaceous vegetation. Caterpillars feed only on milkweed (*Asclepias* species). Adults feed on nectar of milkweed and other flowering plants.	The developed facility does not provide suitable habitat. Preferred habitat and milkweed occur off-facility.	No

Notes:

(a) Source: *Information for Planning and Consultation* (IPaC) report for the site (USFWS, 2024a)
(b) Listing status: E = endangered; PE = proposed for listing as endangered; C = candidate for listing
(c) Source: Habitat information accessed via links to species profiles provided in IPaC report (USFWS, 2024a)
(d) Source: interpretation of aerial photos

The designated proposed critical habitat for the Karner blue butterfly is a pine barrens habitat within Albany County, New York (USFWS, 2024a). The area is bounded by the Pennsylvania Central Railroad tracks on the northeast, Rapp Road on the southeast, the New York State Thruway on the southwest, and Old State Road and Karner Road on the northwest (43 CFR§

28938-28945). This proposed critical habitat is approximately 2.5 miles southeast of the facility. No critical habitat has been designated by the USFWS for the other three species (USFWS, 2024a).

To identify state listed species with the potential for exposure to PFAS at the facility, the New York online Nature Explorer (NYSDEC, 2024) was queried, for the entire county and for a 1-mile radius from the approximate center of the facility (see **Attachment A-2)**. Within Albany County, the restricted plants and animals list consists of 8 species of vascular plants and 21 species of animals, including 3 butterflies/moths, 1 fish, 1 amphibian, 3 reptiles, 9 birds, and 4 mammals. One of the mammals, the northern long-eared bat, is also federal listed and was discussed above. Given their habitat requirements, none of the terrestrial species with state status are likely to occur in the developed and landscaped areas of the facility, and none of these species has been reported as occurring within a 1-mile radius of the facility (see **Attachment A-2**).

As noted above, field staff conducting habitat assessments will be familiar with the habitat requirements and appearance of the federal and state listed species identified as having the potential to occur in the vicinity of the AOIs and will record any observations regarding their presence or absence.

3.1.2 Selection of Receptors and Exposure Pathways

Potentially complete exposure pathways for ecological receptors within the three AOIs will be evaluated in the SLERA. Soil, sediment, surface water, and groundwater may have been impacted by PFAS releases associated with historical ARNG activities on the facility.

Each exposure pathway includes a potential source of COPECs, an environmental medium, and a potential exposure route. In accordance with agency guidance, incomplete routes of exposure will not be evaluated. This approach is used to focus the assessment on exposure pathways that are considered potentially complete and for which there are adequate data pertaining to the receptors, their exposures, and their susceptibility to toxic effects.

Co-located surface water and sediment samples may be collected from two locations within the facility's southern stormwater drainage ditch under the Prescriptive Phase, but only if surface water is present at the time of sampling. If standing water is not present, then two soil (ephemeral sediment) samples will be collected from the drainage ditch and analyzed for PFAS. The data will be used to evaluate the need for further sampling. If necessary, additional sediment and surface water samples will be collected during the Adaptive Phase in a later mobilization that would be described in future planning documents. Therefore, potential surface water and sediment exposure pathways are discussed below and will only be evaluated for areas where habitat is available to support ecological receptors. If these exposure pathways are determined to be complete, they will be evaluated in the ERA. If the pathways are not complete, they will not be evaluated quantitatively.

Based on the current understanding of facility conditions (e.g., lack of viable terrestrial habitat; ephemeral stormwater drainage ditch along southern property boundary), it is assumed that potentially complete exposure pathways for ecological receptors are not present on-facility. The findings of the habitat assessment will be used to assess whether on-facility terrestrial habitat may be present. When terrestrial habitat is present, the primary exposure pathways for ecological receptors in upland areas with are exposures through direct contact with surface soil by terrestrial receptors (e.g., plants, soil invertebrates, amphibians, reptiles, birds, and/or mammals). Indirect contact (via bioaccumulation) is a potentially complete pathway of exposure for amphibians, reptiles, birds, and mammals through ingestion of plants and prey contaminated by uptake of PFAS from soil. Incidental ingestion of soil is also a potentially complete exposure pathway for terrestrial animals. While most terrestrial ecological exposures occur within surface soil (USEPA,

2015), burrowing wildlife (e.g., birds, mammals, reptiles), if present, may also be exposed to subsurface soil. Given that the developed conditions at AOIs 1 and 2 and the mowed, disturbed, and maintained grass landscape at AOI 1 and AOI 3 (see **Section 3.1.1**), exposure pathways to subsurface soil for soil invertebrates or deeply rooted plants are not expected to be complete or uptake is expected to be insignificant below the biologically active zone in surface soil (USEPA, 2015).

The primary exposure pathways for receptors in semi-aquatic or aquatic habitats associated with the stormwater drainage (if sufficient water and viable habitat is present to support aquatic life) and/or the off-facility water features are exposures through direct contact with sediment and surface water by amphibians, reptiles, benthic invertebrates, and aquatic organisms (e.g., aquatic plants, invertebrates). Indirect contact (via bioaccumulation) is also a potentially complete pathway of exposure for amphibians, reptiles, aquatic organisms (e.g., invertebrates and fish), benthic invertebrates, and aquatic-dependent birds and mammals consuming plants and prey that accumulate PFAS. Fish are not expected to be present in the drainage ditch, but fish in the Ann Lee Pond, Shaker's Creek, and the Mohawk River may be exposed to PFAS if off-facility migration pathways are complete.

There are no complete pathways for direct exposure of ecological receptors to groundwater at Albany AASF #3. However, ecological exposure to PFAS present in groundwater may occur if groundwater discharges or seeps into a water feature (e.g., the drainage ditch seasonally, off-facility Ann Lee Pond, Shaker's Creek, Mohawk River).

As previously described, PFAS may have migrated from one or more AOIs via stormwater into the southern stormwater drainage system. Given the likely ephemeral presence of water in the facility's southern drainage ditch, this feature is unlikely to support an aquatic or benthic community. Based on the findings of the habitat assessment to be conducted during the RI field effort (e.g., the presence of riparian or wetland plants or standing water other than after a rainfall event), the substrate of the ditch may be treated as either soil or sediment for the purpose of evaluating ecological exposures to PFAS. If the habitat assessment indicates that semi-aquatic habitat is present in the stormwater drainage ditch, then ecological receptors may seasonally contact PFAS in surface water and sediment within this semi-aquatic habitat.

In addition, PFAS may have migrated from the facility via the stormwater drainage ditch to the off-facility ALB stormwater drainage system and potentially to the downgradient off-facility aquatic habitats (e.g., Ann Lee Pond, Shaker's Creek, Mohawk River). Groundwater flow at the facility appears to primarily be to the west, toward Shaker's Creek, and PFAS may have migrated via groundwater transport and discharged into the creek. If migration pathways for PFAS from Albany AASF #3 to these off-facility water bodies are confirmed, then, semi-aquatic habitats associated with the off-facility drainage ditches and aquatic habitats of the off-facility water features (pond, creek, river), will be evaluated in the SLERA. The off-facility pond, creek, and river are expected to support water-column and benthic receptors (e.g., fish and invertebrates) and aquatic-dependent wildlife (e.g., birds and mammals that feed on the aquatic food web).

The following exposure pathways will be evaluated in the SLERA only if they are determined to be complete based on the findings of the habitat assessment (i.e., if viable habitat is identified):

- Soil invertebrates, amphibians, and reptiles exposed to PFAS in surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs) via direct contact and incidental ingestion.
- Terrestrial plants exposed to PFAS in surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs) via root uptake.

- Terrestrial birds and mammals exposed to PFAS through incidental ingestion of surface soil and by ingestion of contaminated plants and prey items impacted by bioaccumulation of PFAS from surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs). When water is present within the southern drainage ditch, terrestrial birds and mammals may be exposed to PFAS through ingestion of surface water as drinking water.

- If present, large burrowing animals may be exposed to PFAS in subsurface soils (greater than 2 feet bgs [above the water table]) through incidental soil ingestion while digging and grooming; thus, if this exposure pathway is potentially complete, it will be qualitatively evaluated.

- Amphibians, reptiles, and aquatic organisms (e.g., aquatic plants, aquatic invertebrates) exposed to PFAS in surface water and sediment associated with the stormwater drainage ditch along the southern boundary of the facility and/or downgradient water bodies via direct contact, ingestion, or bioaccumulation.

- Aquatic-dependent birds and mammals exposed to PFAS through incidental ingestion of sediment, incidental or intentional ingestion of surface water, and ingestion of contaminated plant and prey items impacted by bioaccumulation of PFAS from sediment or surface water associated the stormwater drainage ditch along the southern boundary of the facility and/or downgradient water bodies.

Some potentially complete exposure pathways may be considered qualitatively in the SLERA if appropriate methods for quantifying exposure or effects are not available. These include most exposure pathways for amphibians, reptiles, and benthic invertebrates (due to a lack of receptor-specific toxicity data for most PFAS) and trophic transfer/bioaccumulation exposure pathways for aquatic organisms and benthic invertebrates (due to a lack of pathway-specific exposure and toxicity data).

3.1.3 Selection of Ecological Endpoints

Based on the identification of potentially complete exposure pathways, assessment endpoints and measures of effect were identified. Assessment endpoints describe the characteristics of an ecosystem that have an intrinsic environmental value to be protected. Typically, assessment endpoints and receptors are selected based on consideration of their potential for exposure, susceptibility to toxic effects, ecological significance, economic importance, and/or societal relevance. Assessment endpoints usually focus on protection at the population level for common species and at the individual level only for rare species (e.g., federal or state listed species). The SLERA represents a very conservative, screening-level assessment that considers the available habitat within the exposure areas (e.g., AOIs, downgradient areas) and the management goals of the facility, as appropriate. The assessment endpoints are stated in generic terms in the SLERA. More specific assessment endpoints will be developed in a BERA, as needed.

Based on the general exposure pathways identified for the AOIs, the assessment endpoints on the table below and their associated measures of effect will be addressed in the SLERA through comparison of media concentrations to appropriate screening values. In an ERA, the potential for adverse effects is typically evaluated at the population or community level rather than the individual level. Protection at the individual level will be afforded to special status species if present in the vicinity of areas impacted by PFAS. Field staff will assess the available habitats and potential for the presence of special status species as part of the habitat assessment conducted in the vicinity of the sampling locations.

In the SLERA, an exceedance of a screening value does not indicate that an adverse effect is occurring, only that further evaluation is needed. If concentrations of certain PFAS exceed

available screening values, additional evaluation may be conducted in a SLERA refinement step (referred to as Step 3a and described in **Section 3.5**). Observations made during the habitat assessment described in QAPP Worksheet #14 may be considered in the characterization of potential adverse effects, if identified, based on comparisons to screening values.

Assessment Endpoint	Measure of Effect
Protection and maintenance of indigenous terrestrial plant and soil invertebrate communities within viable upland habitat at levels similar to those of nearby communities not exposed to facility related PFAS.	Comparison of concentrations of PFAS in surface soil[1] to soil screening values derived for the protection of plants and soil invertebrates. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for plants and soil invertebrates that warrant further evaluation in Step 3a.
Protection and maintenance of terrestrial bird populations that may forage within viable upland habitat at levels similar to those of nearby populations not exposed to facility related PFAS.	Comparison of concentrations of PFAS in surface soil[1] to soil screening values derived for the protection of birds. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for terrestrial birds that warrant further evaluation in Step 3a.
Protection and maintenance of terrestrial mammal populations, including burrowing mammals[2], that may forage within viable upland habitat at levels similar to those of nearby populations not exposed to facility related PFAS.	Comparison of concentrations of PFAS in surface soil[1] to soil screening values derived for the protection of mammals. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for terrestrial mammals that warrant further evaluation in Step 3a.
Protection and maintenance of benthic invertebrate communities, if present in potentially impacted aquatic habitats, at levels similar to those of nearby communities not exposed to facility related PFAS.	Comparison of concentrations of PFAS in sediment from aquatic habitats to freshwater sediment screening values derived for the protection of invertebrates. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for benthic invertebrates that warrant further evaluation in Step 3a.
Protection and maintenance of aquatic organism communities (e.g., plants, invertebrates, amphibians), if present in potentially impacted aquatic habitats, at levels similar to those of nearby communities not exposed to facility related PFAS.[2]	Comparison of concentrations of PFAS in surface water from aquatic habitats to freshwater surface water screening values. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for aquatic organisms that warrant further evaluation in Step 3a.

Assessment Endpoint	Measure of Effect
Protection and maintenance of aquatic-dependent wildlife populations (i.e., birds and mammals) that may forage within potentially impacted aquatic habitats at levels similar to those of nearby populations not exposed to facility related PFAS.[2]	Comparison of concentrations of PFAS in surface water and sediment from aquatic habitats to surface water and sediment screening values derived for the protection of birds and mammals. PFAS with detected concentrations above screening values will be identified as preliminary COPECs for aquatic-dependent wildlife that warrant further evaluation in Step 3a.

[1] The two surface soil depth intervals (i.e., 0 to 0.5 feet bgs and greater than 0.5 to 2 feet bgs) will be screened separately.

[1] Given that depth to groundwater ranges from 0.56 to 5.72 feet bgs at the facility, burrowing animals (if present) would be anticipated to have relatively shallow burrow depths. Thus, potential exposure to subsurface soil (greater than 2 feet bgs [above the water table]) by burrowing animals will be evaluated qualitatively in the SLERA, if warranted.

[2] Fish are not expected to be present within the stormwater drainage ditch but are expected to be present in the downgradient, off-facility aquatic habitats of the Ann Lee Pond, Shaker's Creek, and Mohawk River.

In cases where receptor-specific PFAS screening values are not available, exposure pathways will be discussed qualitatively. For example, screening values for reptiles or amphibians are generally not available so quantitative evaluations are not possible.

3.1.4 Conceptual Site Model

The problem formulation step supports the development of an ecological CSM that describes the origin, fate and transport, exposure pathways, and receptors of concern for the COPECs identified. The ecological CSM provides a clear and concise description of how ecological receptors may contact facility related COPECs via release mechanisms and exposure to soil, sediment, and/or surface water. The ecological CSM provides the framework for the ERA and will be used to identify appropriate exposure pathways and receptors for evaluation. **Figure 2** provides the preliminary ecological CSM for the terrestrial and aquatic habitats potentially associated with the AOIs. Because the CSM will be refined during each sampling phase, the preliminary CSM figure may identify potentially complete pathways that may ultimately be incomplete.

As described in QAPP Worksheet #10, PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. The ERA will not use groundwater data given that there are no complete exposure pathways between groundwater and ecological receptors. If migration pathways from Albany AASF #3 groundwater to surface water are confirmed, the surface water data collected as part of the RI will be representative of exposure concentrations for aquatic biota, if present, and will be used to assess these ecological receptors.

Based on the current understanding of facility conditions (e.g., lack of viable terrestrial habitat), it is assumed that potentially complete exposure pathways for terrestrial ecological receptors are not present on-facility; however, the habitat assessment will be used to assess whether on-facility terrestrial habitat may be present. If viable terrestrial habitat is identified, then the primary exposure pathways will be evaluated. Primary exposure pathways include PFAS in surface soil (0 to 0.5 feet bgs and 0.5 to 2 feet bgs) may be contacted directly by terrestrial plants, soil invertebrates, amphibians, reptiles, birds, and mammals living in the soil or on the soil surface. Terrestrial wildlife may be exposed to PFAS in surface soil through incidental ingestion of soil while foraging, feeding, or grooming and through ingestion of contaminated plants and prey. Other potentially complete but minor pathways, like direct contact with subsurface soil (greater than 2 feet bgs [above the water table]), will be discussed qualitatively for burrowing animals.

The stormwater drainage ditch along the southern boundary of the facility is ephemeral and not expected to provide habitat for ecological receptors; therefore, it is assumed that potentially complete exposure pathways for on-facility aquatic and semi-aquatic ecological receptors are not present. However, if viable habitat is identified by the habitat assessment these pathways will be evaluated. The facility's southern drainage ditch receives stormwater from the leased portion of the facility, including AOI 1. In addition, AOI 2 is located just north of the southern drainage ditch, and there is the potential for surface runoff to the ditch. PFAS in surface water and sediment within the potential semi-aquatic habitats associated with the stormwater drainage ditch may be contacted directly by aquatic plants and aquatic and benthic invertebrates (if sufficient water is present to support aquatic life) living in the water column or in contact with sediment, as well as by aquatic-dependent wildlife (amphibians, reptiles, birds, and mammals). The stormwater ditch along the southern boundary of the facility connects with the ALB drainage ditch system, which discharges to Ann Lee Pond. This pond has connectivity to Shaker's Creek, which is a tributary of the Mohawk River. Thus, PFAS potentially present in surface water and sediment within downgradient, off-facility aquatic habitats (e.g., Ann Lee Pond, Shaker's Creek, Mohawk River) may be contacted directly by aquatic plants, aquatic and benthic invertebrates, and fish living in the water column or in contact with sediment, as well as by aquatic-dependent wildlife (amphibians, reptiles, birds, and mammals). Wildlife foraging within aquatic habitats could also be exposed to chemicals in these media through incidental ingestion of sediment, intentional ingestion of water by drinking, and by ingestion of contaminated plants and prey. Incidental ingestion and bioaccumulation are also potentially complete exposure pathways for amphibians, reptiles, aquatic organisms (e.g., invertebrates and fish), and benthic invertebrates.

The findings of the habitat assessment described in QAPP Worksheet #14 will be used to refine or confirm the receptors and exposure pathways identified in the preliminary CSM.

3.2 Screening-Level Ecological Effects Assessment and Exposure Assessment

This phase of the SLERA is based on the CSM developed in the problem formulation and characterizes potential ecological exposures and corresponding effects. The ecological exposure assessment involves the identification of potential exposure pathways and an evaluation of the magnitude of exposure by identified ecological receptors. The ecological effects assessment describes the potential adverse effects to ecological receptors from exposure to COPECs in environmental media. The data and methods that will be used to identify and characterize ecological exposure and effects are described in the following subsections.

Although it is currently understood that ecological exposure pathways are incomplete for soil (due to the lack of viable on-facility habitat), the approach for the assessment of soil is included in this section in the event that the habitat assessment identifies terrestrial exposure pathways that should be considered. Similarly, it is understood that the stormwater drainage features are ephemeral, such that they do not provide viable habitat that could support aquatic ecological receptors. The approach for the assessment of surface water and sediment is included in the event that the habitat assessment identifies on-facility aquatic or semi-aquatic exposure pathways that should be considered or if off-facility migration pathways to aquatic habitats are identified (e.g., Ann Lee Pond, Shaker's Creek, Mohawk River).

3.2.1 Data Evaluation and Identification of COPECs

COPECs will be identified by comparing media-specific concentrations to screening values protective of a range of ecological receptors. Analytical data will be grouped and evaluated for inclusion in the SLERA, as discussed in **Section 1.2**. COPECs will be identified by exposure area,

medium, and depth interval (as appropriate). The soil sampling design for the Prescriptive Phase of sampling is described in QAPP Worksheet #17. As noted previously, surface water and sediment samples may be collected the stormwater drainage ditch along the southern boundary of the facility during the Prescriptive Phase, but only if surface water is present. If standing water is not present, then two soil (ephemeral sediment) samples will be collected from the ditch and analyzed for PFAS. If necessary, additional sediment and surface water samples will be collected during the Adaptive Phase in a later mobilization that would be described in future planning documents. Similar to the HHRA COPC selection process, preliminary PFAS COPECs will be identified in the SLERA based on a comparison of the maximum detected concentrations of each detected PFAS per medium/area/depth interval (as applicable) to the ESVs. UCLs calculated using the most current version of USEPA's ProUCL software may be used to refine the SLERA findings in Step 3a (as described in **Section 3.5**). The ESVs used for preliminary screening of soil, sediment, and surface water concentrations will be based on conservative endpoints and sensitive ecological effects data so that they are protective of a wide range of potential ecological receptors.

PFAS detected at concentrations above the ESVs will be identified as preliminary COPECs for further evaluation in the Tier 2 Step 3a refinement (as described in **Section 3.5**).

3.2.2 Ecological Effects Assessment

The preliminary ecological effects evaluation is an investigation of the relationship between the exposure to a chemical and the potential for adverse effects resulting from exposure. In this step, conservative ESVs for the ecological media of interest are identified.

Receptor- and media-specific ESVs will be used in the SLERA to identify preliminary COPECs and evaluate the potential for adverse effects on ecological receptors. These ESVs will be based on conservative endpoints and sensitive ecological effects data and will be used for a preliminary screening of PFAS levels to determine if there is a need to conduct further analyses or investigations.

The selected ESVs will focus on protecting most of the exposed receptors (e.g., 95% of exposed taxa) from adverse effects related to survival, growth, and reproduction under conditions of chronic or sensitive life-stage exposure. Currently, ESVs for PFAS are still evolving and lack general consensus; however, there is extensive and increasing literature on biological uptake, bioaccumulation, and ecological toxicity of PFAS. USEPA has not published ESVs for PFAS[1], but DoD-funded studies under the ESTCP and SERDP have resulted in recent publications containing ecological SLs for soil, sediment, and surface water. In addition, PFAS ESVs have been developed under the Interagency Agreement between the U.S. Department of Energy, Air Force Civil Engineer Center, and Argonne (Grippo et al., 2024). These will be the primary sources used to identify ESVs.

The following key sources will be used to select the ESVs for the various media to be sampled. The lowest of the available ESVs for each medium will be selected for the SLERA, and the more facility-specific of these ESVs will be considered for the Tier 2 Step 3a refinement, as needed. ESVs derived by Conder et al. (2020) and Divine et al. (2020) emphasize protection of threatened and endangered species, which may or may not be relevant to all sites. The use of these ESVs will be evaluated in the Tier 2 Step 3a refinement.

[1] USEPA published draft aquatic life ambient water quality criteria for PFOS and PFOA in April 2022. These criteria will be considered in the ERA if they are finalized before the ERA is initiated.

Soil

- Conder et al., 2020 and Divine et al., 2020. No-observed-effect concentration (NOEC) values based on survival, reproduction, or growth as the endpoint for terrestrial plants and soil invertebrates.
- Grippo et al., 2024. Geometric mean NOEC values with regard to growth or germination as the typical endpoint for terrestrial plants; and survival, reproduction, or growth as the endpoint for soil invertebrates.
- Divine et al., 2020. Risk-based screening levels (RBSLs) derived using no-observed-adverse-effect levels (NOAELs) for terrestrial wildlife and food-web models based on consumption of plant and prey items impacted by PFAS in soil. RBSLs were derived for the meadow vole (*Microtus pennsylvanicus*), short-tailed shrew (*Blarina brevicauda*), little brown bat (*Myotis lucifugus*), long-tailed weasel (*Mustela frenata*), American goldfinch (*Spinus tristis*), house wren (*Troglodytes aedon*), and red-tailed hawk (*Buteo jamaicensis*).
- Grippo et al., 2024. Geometric mean NOAEL-based ESV for terrestrial wildlife derived using food web models based on consumption of plant and prey items impacted by PFAS in soil. ESVs were derived for the meadow vole, short-tailed shrew, long-tailed weasel, mourning dove (*Zenaida macroura*), American woodcock (*Scolopax minor*), and red-tailed hawk.

Surface Water

- Conder et al., 2020. Freshwater aquatic life protection values referred to as the 5% hazardous concentration. These values are protective of 95% of aquatic species, which reflects the level of protection afforded by USEPA's National Recommended Water Quality Criteria for Aquatic Organisms (USEPA, 2022a).
- Divine et al., 2020. Chronic recommended water quality RBSLs for aquatic life derived using USEPA's Water Quality Guidance for the Great Lakes System methodology (USEPA, 2012).
- Grippo et al., 2024. Freshwater ESVs for aquatic life derived by following the two-tiered approach described in the Great Lakes Initiative (GLI) guidance (USEPA, 1995a, 1995b, 1995c). Final chronic freshwater ESVs for PFOA and PFOS are Tier I ESVs, while the remaining are Tier II ESVs.
- Divine et al., 2020. NOAEL-based RBSLs for aquatic wildlife derived using food-web models based on consumption of plant and prey items impacted by PFAS in water. RBSLs were derived for the muskrat (*Ondatra zibethicus*), little brown bat, river otter (*Lontra canadensis*), harbor seal (*Phoca vitulina*), mink (*Neovison vison*), red-winged blackbird (*Agelaius phoeniceus*), tree swallow (*Tachycineta bicolor*), and brown pelican (*Pelecanus occidentalis*).
- Grippo et al., 2024. Geometric mean NOAEL-based ESV for aquatic-dependent birds and mammals derived using food web models based on consumption of plants and prey items impacted by PFAS in surface water. A two-tiered methodology was used to develop the ESVs, based on the 1995 GLI Tier I and Tier II guidance for deriving water quality criteria to protect wildlife (USEPA, 1995b, 1995c). ESVs were derived for the belted kingfisher (*Megaceryle alcyon*), herring gull (*Larus argentatus*), osprey (*Pandion haliaetus*), mallard (*Anas platyrhynchos*), spotted sandpiper (*Actitis macularius*), mink, and river otter.
- USEPA, 2024. USEPA's final freshwater chronic (criterion continuous concentration) ambient water quality criteria for PFOS and PFOA.

Sediment

- Grippo et al., 2024. ESVs were not developed for sediment because they found that the science is not yet mature enough to develop them. Recent literature from Conder et al. (2020) and Divine et al. (2020) were reviewed and, likewise, lacked available data for deriving empirically-based SLs for benthic invertebrates.

- Divine et al., 2020. NOAEL-based RBSLs for aquatic wildlife derived using food web models based on consumption of plant and prey items impacted by PFAS in sediment. RBSLs were derived for the same aquatic-dependent wildlife listed above for surface water.

The Argonne ESV guidance (Grippo et al., 2024) is a living document that is expected to undergo revisions as the state of the science progresses, and key updates may or may not be completed by the time the SLERA is performed. In that case, the selection of Argonne ESVs will consider scientific confidence in the Argonne ESVs and new developments in PFAS ecotoxicity.

In addition to the sources of screening levels listed above, new literature sources may be considered given the ongoing research and publications on PFAS ecotoxicity. Based on a lack of toxicity information, not all individual PFAS compounds can be evaluated quantitatively in the SLERA. The basis of the selected ESVs and associated data limitations (e.g., ESVs based on limited data) will be discussed in the uncertainty section of the SLERA report. As none of the sources of PFAS ESVs listed above, including Argonne, provide ESVs protective of freshwater macroinvertebrate communities in direct contact with sediments, this exposure scenario will be qualitatively discussed in the uncertainty section. This discussion may include a cautionary assessment of the PFOS estuarine sediment ESVs for direct toxicity in Simpson et al. (2021), and general assessment for the remaining PFAS detected in sediment for which no direct toxicity ESVs are available.

In general, PFOS has been the focus of most regulatory interest with less toxicity data available for PFOA, PFBS, and other PFAS. In the recent SERDP studies cited above (Conder et al., 2020 and Divine et al., 2020) and Argonne report (Grippo et al. 2024), toxicity data, and other chemical-specific parameters necessary to develop terrestrial and aquatic ecological benchmarks were compiled to establish SLs for several additional PFAS.

In soil, in addition to PFOA, PFOS, and PFBS, screening values are also available for perfluorodecanoic acid (PFDA), PFNA, perfluoroheptanoic acid (PFHpA), PFHxS, PFBA, and PFHxA. For sediment and surface water, wildlife-based screening values are available for PFOA, PFOS, PFBS, PFNA, PFHxA, PFHxS (surface water only) and PFBA. For aquatic life, screening values are available for a longer list of PFAS chemicals in addition to PFOS, PFOA, and PFBS: perfluorododecanoic acid (PFDoA), perfluoroundecanoic acid (PFUdA), PFDA, PFNA, PFHxS, PFHpA, PFHxA, PFPeA, and PFBA.

Table 8 presents the PFAS ESVs for soil for plants and invertebrates. **Table 9** presents the wildlife-ESVs for soil, surface water, and sediment. **Table 10** presents the surface water ESVs for aquatic life.

There is notable uncertainty inherent in the food-chain-based ESVs protective of birds and mammals, which tend to be overly stringent. For example, surface water SLs available in the literature incorporate conservative bioaccumulation factors and biomagnification factors to estimate tissue levels in fish from water, are based on conservative avian and mammalian toxicity values, and typically assume receptors consume an exclusive diet of contaminated fish (Divine et al., 2020; Giesy et al., 2010; Dutch National Institute for Public Health and the Environment, 2010). Similarly, a soil ESV based on a small mammal consuming a diet of contaminated earthworms is

also likely to be overly conservative for most sites (Divine et al., 2020; Environment and Climate Change Canada, 2017). The uncertainties related to the selected ESVs will be discussed in the context of the potential to result in an over- or under-prediction of potential adverse effects in the exposure areas.

3.2.3 Ecological Exposure Assessment

In order to conclude whether a chemical has the potential to impact an ecological receptor, a relevant chemical concentration or dose must first be determined. That concentration or dose is then compared to the ecological effects levels presented above (i.e., the ESVs). For the SLERA, the maximum detected concentration will be evaluated as the EPC. In the Tier 2 Step 3a refinement, a more realistic estimate of receptor exposures will be considered (e.g., using concentrations based on the 95% UCL).

Mechanisms for exposure of a representative species to PFAS depend on the physical and behavioral characteristics of the organism. Most exposure mechanisms for aquatic/benthic invertebrates, soil invertebrates, and plants can be loosely termed “direct contact.” Soil invertebrates can absorb chemicals from moist soil through external body surfaces or by intake of food or soil.

Wildlife species may be exposed to PFAS in soil, sediment, and surface water directly through ingestion (incidental or intentional) of these media or indirectly by ingestion of food organisms contaminated by direct uptake or food-web transfer. Most biological activity occurs at the soil surface, with deep-rooted plants and burrowing animals potentially contacting soil below the surface.

Step 2 of the of the eight-step ERA process is the screening level exposure estimate and comparison to risk-based ESVs. In this step, the maximum detected concentrations in the relevant media will be compared to the associated ESVs. Data treatment and calculation of summary statistics for the ERA will be consistent with the rules described in **Section 1.3**. Maximum detected concentrations will be identified per exposure area and medium and will be used as the EPC for all ecological receptors in the SLERA.

3.2.4 SLERA Calculations

HQs will be calculated for each PFAS analyte in each medium (e.g., surface soil, subsurface soil, surface water, and/or sediment) by dividing the maximum detected concentrations by the relevant ESVs for terrestrial and aquatic ecological receptors using the following formula:

$$\text{HQ} = \text{Maximum detected concentration} \div \text{ESV}$$

Individual PFAS that exceed their respective ESVs (i.e., HQs greater than 1), and analytes, media, and receptor groups without ESVs, will be retained for further evaluation in the Tier 2 Step 3a COPEC refinement.

Due to the consistently applied conservative assumptions implicit in a SLERA, an HQ above 1 based on the maximum detected concentration as the EPC does not necessarily indicate unacceptable ecological risk. It merely indicates that a potential for adverse effects exists, and that additional consideration is warranted. If the resulting HQ is equal to or less than 1, the potential for adverse effects due to that chemical can be considered negligible and, therefore, may be dropped from further consideration for that exposure pathway (DA, 2010).

The selection of preliminary COPECs is the final part of the SLERA. Chemicals selected as preliminary COPECs based on an ESV exceedance will be further evaluated in Step 3a to

determine if they should be retained as final COPECs. The preliminary COPECs will be selected if the comparison of soil, sediment, or surface water data to ESVs results in HQs above 1. The COPEC refinement process in Step 3a is discussed in **Section 3.5**.

3.3 Screening-Level Risk Characterization

The results of the ecological effects assessment and exposure assessment will be analyzed and interpreted to determine whether particular exposure pathways, receptors, and chemicals can be eliminated from further evaluation. The screening-level risk characterization will integrate the results of the effects assessment and exposure assessment through the calculation of HQs and provide interpretation of the ecological significance of the findings. Aspects of ecological significance that may be considered to help place the SLERA results into a broader ecological context include the management goal plans in place for the facility, the nature and magnitude of effects, the spatial and temporal patterns of effects, and the potential for recovery once a stressor has been removed. If the potential for adverse effects on ecological receptors is implied through the screening process using literature-based inputs, facility-specific validation studies (e.g., toxicity testing) conducted in the field or laboratory may be needed to verify these findings in a subsequent step of the BERA.

The documentation of the risk characterization will include a summary of assumptions, uncertainties (both generic and facility-specific), strengths and weaknesses of the analysis phase of work, and justification of conclusions regarding the ecological significance of the estimated (i.e., risk of harm) or actual (i.e., evidence of harm) potential for adverse effects. Some uncertainties bias the results of the risk assessment toward excessive (unacceptable) risk, while others may result in bias toward insignificant (acceptable) risk. All discussions of uncertainty will include examination and review of several aspects of the SLERA including, but not limited to, sampling, data quality, study design, selection of representative species, estimates of exposure, and selection of ESVs. The uncertainty section of the SLERA will identify limitations and assumptions and relate them to the potential effects these uncertainties may have on the overall conclusions of the ERA. As mentioned previously, the assumptions inherent in the derivation of ESVs for PFAS that are protective of birds and mammals, which may be highly conservative, are of particular interest in the uncertainty assessment. This is due to the strong influence of facility-specific conditions on the bioaccumulation and bioavailability potential of PFAS, as well as the relevance of the types of species upon which the ESVs are based relative to the avian and mammalian species actually present at or near the facility.

3.4 SLERA Scientific/Management Decision Point

Consistent with USEPA guidance (1997), a scientific/management decision point will be determined based on the outcome of the SLERA (Steps 1 and 2 of the eight-step USEPA process) to establish that (1) there is adequate information to conclude that ecological risks are negligible and therefore there is no need for remediation on the basis of ecological risk, (2) the information is not adequate to make a decision and the ecological risk process will continue to Step 3, or (3) the information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted (e.g., additional sampling or analysis).

If the decision is made that further investigation is warranted for any specific receptors/pathways, a sub-tier of Step 3 (Step 3a) of the USEPA's eight-step ERA process may be conducted. USEPA (2001b) and DoD guidance (TSERAWG, 2008; DA, 2010) provide the basis to introduce sub-tiers into the SLERA process and the approach is described in the following sub-section.

3.5 BERA Step 3a SLERA Refinement

Step 3a, a sub-tier of Step 3 (referred to as a refinement of the SLERA by TSERAWG [2008] and DA [2010]), serves to refine the list of preliminary COPECs identified in the conservative evaluation conducted in Steps 1 and 2 by considering additional facility-specific factors. It is anticipated that any preliminary COPECs identified in soil, surface water, or sediment will be further evaluated in Step 3a. The refinement step may include comparisons against background concentrations (if available) or re-evaluation of parameters considered in the SLERA (e.g., the assumption of 100% bioavailability).

Only COPECs, pathways, and receptors retained after the Step 3a refinement process would potentially be considered for further evaluation in a BERA. In many cases, the Step 3a refinement provides the basis for defining potential risk drivers, which may be further evaluated for remedial decisions, or alternatively, a complete BERA may be initiated, which applies USEPA Step 3b through Step 8 of the ERA process. It is currently unknown if Step 3a will be warranted for any ecological receptors evaluated in the SLERA, but if so, the following discussion provides the proposed approach.

The purpose of Step 3a is to re-evaluate preliminary COPECs identified in the SLERA to identify and eliminate from further consideration those preliminary COPECs that were identified due to the use of overly conservative exposure scenarios (e.g., maximum concentrations) or effects levels (e.g., NOAEL-based ESVs). Using more realistic Step 3a assumptions, the SLERA HQs described in **Section 3.2.4** will be recalculated for the pathways and preliminary COPECs retained at the end of the SLERA, and a qualitative weight-of-evidence evaluation will be conducted to determine whether a BERA is recommended.

It is anticipated that the Step 3a re-evaluation/refinement process will include these steps:

- Calculate alternative EPCs based on 95% UCLs (rather than maximum concentrations).
- Revise ESV comparisons for community level receptors (e.g., plants and invertebrates) using alternative EPCs and alternative, less-conservative ESVs, if available, for the particular medium and receptor group (e.g., lowest-observed-effect concentrations rather than NOECs).
- Evaluate food-web exposure assumptions and TRVs upon which the bird and mammal ESVs are based to identify exposure and effects inputs that may not be applicable to facility conditions. These inputs may include uptake factors, exposure durations, area use factors, and both NOAEL-based TRVs and TRVs based on lowest-observed-adverse-effect levels (LOAELs). Sources for uptake factors and LOAEL-based TRVs will include those used to derive NOAEL-based RBSLs considered in the SLERA as well as other sources available in the literature (e.g., Zodrow, et al., 2020; Narizzano, et al., 2021).
- Revise ESV comparisons for avian and mammalian receptors using alternative EPCs and less conservative avian and mammalian ESVs (e.g., ESVs adjusted to be more representative of receptors or conditions present at the facility). The development of facility-specific dose and hazard estimates for wildlife receptors may also be considered.
- Identify COPECs with HQs less than 1 in the Step 3a ESV comparisons and eliminate these COPECs from further evaluation.
- For COPECs with an HQ greater than 1, compare media concentrations to background levels (if available). Identify COPECs present at concentrations below or consistent with

background levels and discuss the potential contribution of background on the calculated risks.

- For COPECs with a HQ greater than 1, consider bioavailability; identify COPECs likely to be biologically unavailable, and discuss the potential contribution of background on the calculated risks.
- Review FOD to identify COPECs with low detection frequencies (and sufficient data for acceptable exposure area characterization). If a COPEC was detected in only a very small percentage of the samples collected (5% or less), the potential for adverse effects identified in the SLERA may be overestimated, and further evaluation of the COPEC may not be warranted.
- Conduct a qualitative weight-of-evidence evaluation that considers the Step 3a ESV comparisons, available habitat within the areas evaluated, wildlife management goals for the areas evaluated, and other relevant factors, as appropriate, to determine whether a BERA is recommended.

After the re-evaluation/refinement, the decision criteria for Step 3a include:

- If the Step 3a refinement does not identify the potential for adverse effects associated with the preliminary COPECs, then a no further action designation is warranted, and the facility exits the ERA process.
- If the re-evaluation of the conservative exposure assumptions identifies the potential for adverse effects associated with the preliminary COPECs, the BERA process continues to Step 3b and subsequent steps, or to remedial decisions.

In the event a BERA is warranted, this evaluation will be focused on only those receptors, pathways, and PFAS of potential concern identified following the weight-of-evidence assessment in Step 3a. The BERA would consider more detailed aspects related to the COPECs, receptors, and exposure pathways retained at the end of Step 3a and could include food-web modelling, toxicity testing, additional habitat assessments, or collection of other facility-specific data.

3.6 Completing Steps 3b through Step 7

It is anticipated that the ERA for the exposure areas will be completed through the Step 3a phase, and a full Tier 2 BERA will not be warranted. If this is not the case, risk management decisions related to performing a BERA and the need for additional facility-specific sampling efforts to support a BERA will be made by the project team.

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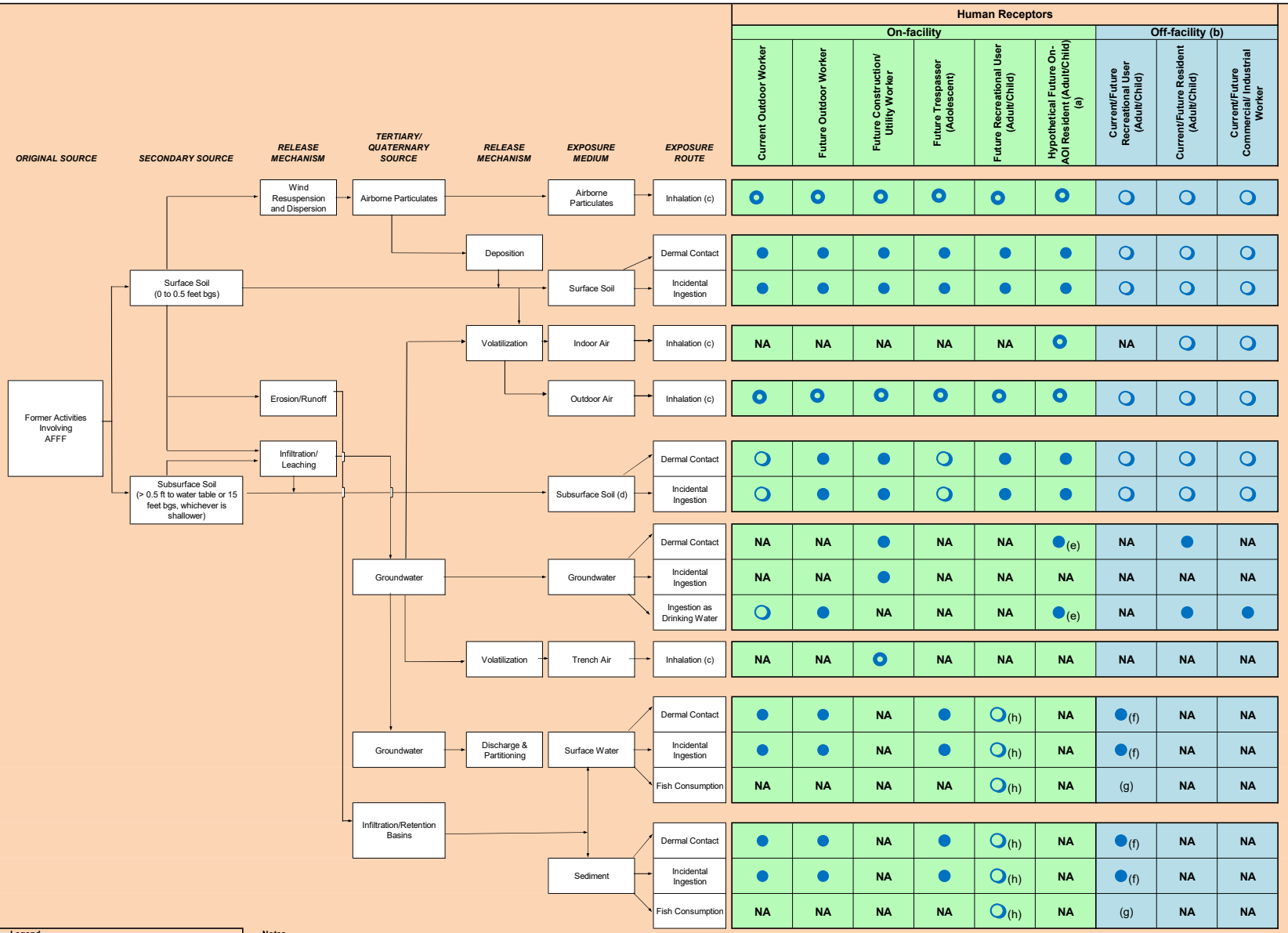
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Figures

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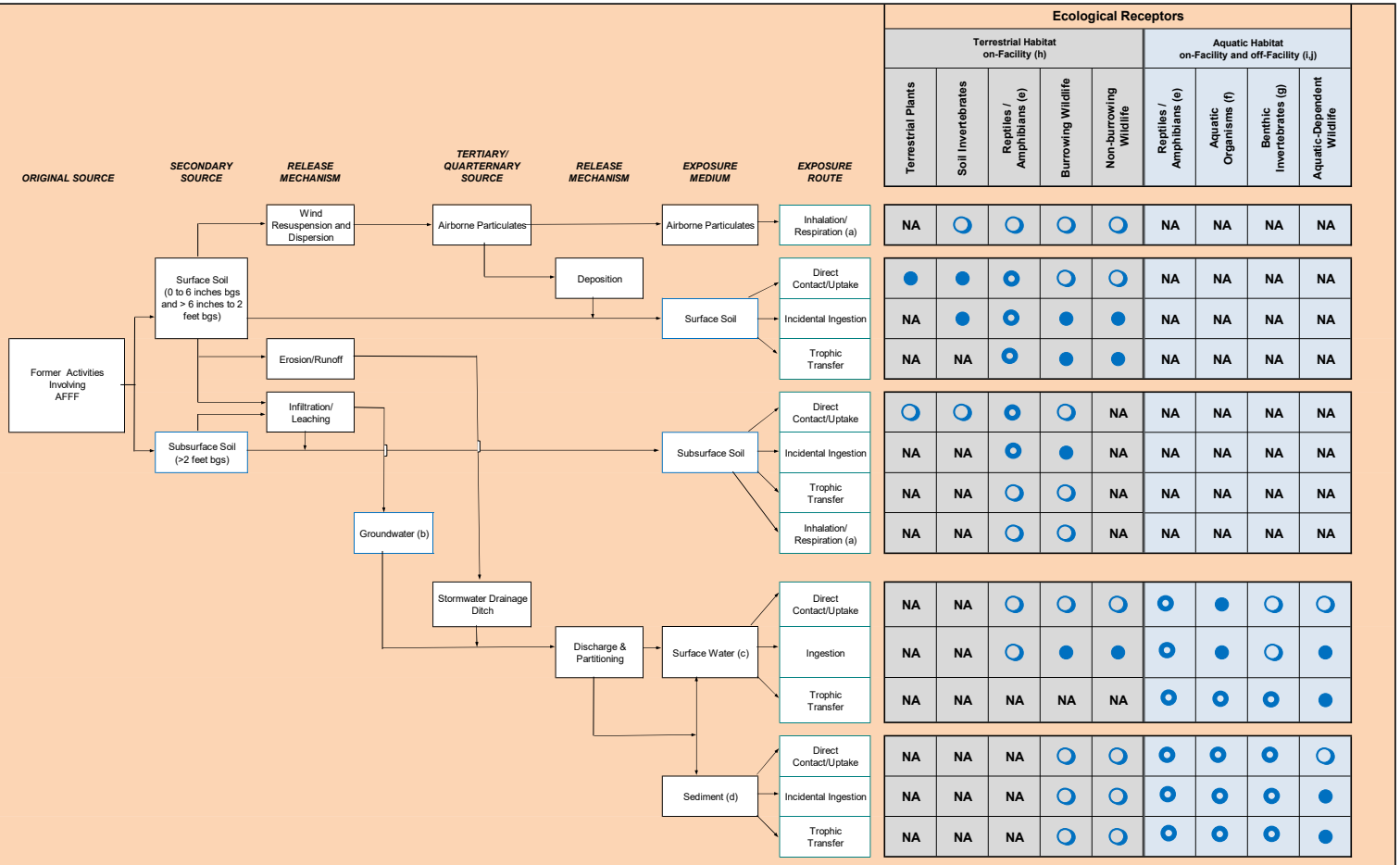
- Potentially complete pathway
- Potentially complete pathway but exposure not quantifiable; discussed in the report text.
- Incomplete or insignificant pathway
- NA Not Applicable

Notes

AFFF - Aqueous film forming foams.
AOI - Area of interest.
bgs - below ground surface.
HHRA - Human health risk assessment.
PFAS - Per- and polyfluoroalkyl substances.

(a) An on-facility resident is not a reasonable anticipated future use at the facility. However, for purposes of the HHRA, an unlimited use/unrestricted exposure (UU/UE) scenario will be conservatively evaluated for informational purposes.
(b) Off-facility sampling is not currently planned. These potential receptors would only be evaluated if off-facility migration pathways for PFAS are confirmed and if off-facility data are collected during the Adaptive Phase.
(c) Potential exposure via inhalation will not be quantitatively evaluated in the HHRA because toxicity values for the inhalation exposure route are not available for PFAS. The associated uncertainties will be discussed in the uncertainty analysis of the HHRA.
(d) It is conservatively assumed that there could be future redevelopment of the facility, and current subsurface soils may be brought to the surface and become available for exposure under a future use scenario.
(e) Site groundwater is not currently used as a source of drinking water. The evaluation of on-facility groundwater (represented by permanent monitoring well data) as a future source of potable water will be performed for informational purposes to represent an unrestricted groundwater use scenario.
(f) If the Prescriptive Phase data indicate potential off-facility impact to waterbodies used recreationally, additional data may be collected.
(g) The fish consumption pathway will be qualitatively evaluated.
(h) There are no surface water bodies used recreationally on the facility.

Project No. 60668768	Risk Assessment Workplan	HUMAN HEALTH CONCEPTUAL SITE MODEL	Figure 1
	Albany AASF #3		



Legend

- Potentially complete pathway
- Potentially complete pathway but exposure not quantifiable; discussed in the report text.
- Incomplete or insignificant pathway
- NA Not Applicable

Notes

AFFF - Aqueous film forming foams.
bgs - below ground surface.
PFAS - Per- and polyfluoroalkyl substances.

(a) Inhalation/respiration of airborne particulates (dust) is expected to be minor compared to soil exposure pathways.
(b) There are no direct, complete, ecological exposure pathways to groundwater. However, exposure to PFAS present in groundwater may occur when it discharges or seeps into a surface water body (e.g., Ann Lee Pond, Shaker's Creek).
(c) Potential exposures will be evaluated for surface water associated with the stormwater drainage feature if water is present and viable habitat identified (see footnote i), and for off-facility aquatic habitats if off-facility migration pathways are identified (see footnote j).
(d) If conditions within the stormwater drainage feature are dry at the time of sampling and viable terrestrial habitat is present, then surface soil samples will be collected and will be evaluated as part of the surface soil exposure pathway.
(e) Amphibians and reptiles may be exposed to PFAS in terrestrial or aquatic habitats; however, media-specific screening values may not be available to evaluate these pathways. Therefore, these exposure pathways will be considered qualitatively.
(f) If viable aquatic habitat is present in the stormwater drainage feature, aquatic plants and invertebrates may be present. Aquatic plants, invertebrates, and fish may be present in off-facility aquatic habitats (e.g., Ann Lee Pond, Shaker's Creek). These exposure pathways will be evaluated only if aquatic habitat and off-facility migration of PFAS are identified. Aquatic screening values based on trophic transfer may not be available; therefore, this pathway will be considered qualitatively.
(g) Benthic invertebrates may be exposed to PFAS in sediment; however, sediment screening values based on direct contact, incidental ingestion, and trophic transfer may not be available and screening values are not available for most PFAS. When PFAS-specific screening values are not available, these pathways will be considered qualitatively.
(h) Given the lack of on-facility viable upland habitat, on-facility terrestrial exposure pathways are not expected to be complete. This assumption will be confirmed during the habitat assessment and these exposure pathways will be evaluated only if applicable.
(i) The on-facility stormwater drainage features are maintained and are not expected to provide habitat for ecological receptors; therefore, on-facility aquatic and semi-aquatic exposure pathways are not expected to be complete. This assumption will be confirmed during the habitat assessment and these exposure pathways will be evaluated only if applicable.
(j) Off-facility sampling is not currently planned. The Prescriptive Phase data for on-facility media will aid in determining if there are off-facility migration pathways. If off-facility migration pathways are identified, sampling in downgradient water bodies, such as Ann Lee Pond and Shaker's Creek, may be warranted during a later mobilization and would be described in future planning documents.

Project No. 60717766	Risk Assessment Workplan		
Albany AASF #3 Latham, New York		ECOLOGICAL CONCEPTUAL SITE MODEL	Figure 2

Tables

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Table 1
Values Used for Daily Intake Calculations - Soil
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Soil
Exposure Media:	Surface soil; Combined Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Outdoor Worker	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
	Current/Future			IR	Ingestion Rate	100	mg/day	USEPA, 2014	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	250	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	25	year	USEPA, 2014	
				FI	Fraction Ingested from Site	1	unitless	(1)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Resident	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
	Future			IR	Ingestion Rate	100	mg/day	USEPA, 2014	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014	
				FI	Fraction Ingested from Site	1	unitless	(1)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	200	mg/day	USEPA, 2014	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014	
				FI	Fraction Ingested from Site	1	unitless	(1)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Trespasser	Adolescent	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
	Future	(7 to <16 years)		IR	Ingestion Rate	100	mg/day	USEPA, 2014 (2)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	52	days/yr	(3)	BW x AT
				ED	Exposure Duration	9	years	(4)	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	44	kg	USEPA, 2011 (6)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	
Incidental Ingestion	Recreational User	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
	Future			IR	Ingestion Rate	100	mg/day	USEPA, 2014 (2)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	70	days/yr	(7)	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014 (2)	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 1
Values Used for Daily Intake Calculations - Soil
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Soil
Exposure Media:	Surface soil; Combined Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Recreational User Future	Child	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	200	mg/day	USEPA, 2014 (8)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	70	days/yr	(7)	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014 (8)	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Construction/Utility Worker Future	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	330	mg/day	USEPA, 2002	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	125	days/yr	(9)	BW x AT
				ED	Exposure Duration	0.5	year	(9)	
				FI	Fraction Ingested from Site	1	unitless	(1)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	183	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal Contact	Outdoor Worker Current/Future	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	3,527	cm^2	USEPA, 2014 (10)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.12	mg/cm^2-event	USEPA, 2014 (11)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	250	days/yr	USEPA, 2014	
				ED	Exposure Duration	25	year	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal Contact	Resident Future	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	6,032	cm^2	USEPA, 2014 (13)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.07	mg/cm^2-event	USEPA, 2014 (14)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	
		Child	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	2,373	cm^2	USEPA, 2014 (15)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.2	mg/cm^2-event	USEPA, 2014 (16)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 1
Values Used for Daily Intake Calculations - Soil
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Soil
Exposure Media:	Surface soil; Combined Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Trespasser Future	Adolescent (7 to <16 years)	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) = $\frac{CS \times SA \times AF \times ABS \times EV \times EF \times ED \times CF}{BW \times AT}$
				SA	Surface Area	3,693	cm^2	USEPA, 2011 (17)	
				AF	Adherence Factor	0.07	mg/cm^2-event	USEPA, 2004 (19)	
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	52	days/yr	(3)	
				ED	Exposure Duration	9	years	(4)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	44	kg	USEPA, 2011 (6)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal Contact	Recreational User Future	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) = $\frac{CS \times SA \times AF \times ABS \times EV \times EF \times ED \times CF}{BW \times AT}$
				SA	Surface Area	6,032	cm^2	USEPA, 2014 (13)	
				AF	Adherence Factor	0.07	mg/cm^2-event	USEPA, 2014 (14)	
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	70	days/yr	(7)	
				ED	Exposure Duration	20	years	USEPA, 2014 (2)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) = $\frac{CS \times SA \times AF \times ABS \times EV \times EF \times ED \times CF}{BW \times AT}$
				SA	Surface Area	2,373	cm^2	USEPA, 2014 (15)	
				AF	Adherence Factor	0.2	mg/cm^2-event	USEPA, 2014 (16)	
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	70	days/yr	(7)	
				ED	Exposure Duration	6	years	USEPA, 2014 (8)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 1
Values Used for Daily Intake Calculations - Soil
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Soil
Exposure Media:	Surface soil; Combined Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Construction/Utility Worker Future	Adult	On-facility AOIs	CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	3,527	cm^2	USEPA, 2014 (10)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.3	mg/cm^2-event	USEPA, 2004 (18)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(12)	
				EF	Exposure Frequency	125	days/yr	(9)	
				ED	Exposure Duration	0.5	year	(9)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	183	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Notes:
< = Less than.
AOI = Area of Interest.
USEPA = United States Environmental Protection Agency.
(1) Professional judgment; conservatively assumes 100 percent of soil ingested is from the Site.
(2) Default value for adult resident.
(3) Assumes exposure to soil may occur for an average of 1.5 days per week for 8 months of the year (i.e., April through November; 35 weeks) when the ground is not frozen or snow-covered, based on professional judgment.
(4) Exposure duration reflects age-range of 7 to <16 years.
(5) Assumes 50 percent of soil ingested is from the associated area, based on professional judgment.
(6) Weighted average body weight for adolescent ages 6 to <16 years old used to represent the 7 to <16 year old adolescent.
(7) Assumes exposure to soil may occur for 2 days per week for 8 months of the year (i.e., April through November; 35 weeks) when the ground is not frozen or snow-covered, based on professional judgment.
(8) Default value for child resident.
(9) Construction/utility activities are assumed to occur for 125 days over the course of a 6 month period, based on professional judgment.
(10) Represents the weighted mean surface area for males and females ages 21+, including head, hands, and forearms (USEPA, 2011; Table 7-2).
(11) Represents the arithmetic mean of weighted average of body-specific (hands, forearms, and face) mean adherence factors for adult commercial/industrial activities (USEPA, 2011; Table 7-20).
(12) Professional judgement; assumes one event per day.
(13) Represents the weighted mean surface area for male and female adults, including head, hands, forearms, and lower legs (USEPA, 2011; Table 7-2).
(14) Represents the geometric mean (50th percentile) of weighted average body-specific (hands, forearms, lower legs, and head) adherence factors for gardeners (USEPA, 2004; Exhibit C-2).
(15) Represents the weighted mean surface area for males and females ages 0 to <6 years old, including head, hands, forearms, lower legs, and feet (USEPA, 2011; Table 7-2).
(16) Represents the geometric mean (50th percentile) of weighted average body-specific (hands, forearms, lower legs and face) adherence factors for children playing (wet soil) (USEPA, 2004; Exhibit C-2).
(17) Represents the weighted mean surface area for males and females ages 7 to <16 years old, including hands, forearms, lower legs, and head (USEPA, 2011; Table 7-2). See Table 5 for calculation.
(18) Represents the geometric mean (50th percentile) of weighted average body-specific (face, forearms, and hands) adherence factors for construction workers (USEPA, 2004; Exhibit C-2).
(19) Represents the geometric mean (50th percentile) of weighted average body-specific (hands, forearms, lower legs, and head) adherence factors for ages 7 to <16 years old (USEPA, 2004; Exhibit C-2). See Table 5 for calculation.

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USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.

Table 2
Values Used for Daily Intake Calculations - Groundwater
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Outdoor Worker	Adult	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
	Future			IR	Ingestion Rate	1.25	liters/day	USEPA, 2014 (1)	CW x IR x EF x ED x CF
				EF	Exposure Frequency	250	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	25	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Ingestion	Commercial/Industrial Worker	Adult	Off-facility**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
	Current/Future			IR	Ingestion Rate	1.25	liters/day	USEPA, 2014 (1)	CW x IR x EF x ED x CF
				EF	Exposure Frequency	250	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	25	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Ingestion	Resident	Adult	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
	Future		Off-facility**	IR	Ingestion Rate	2.5	liters/day	USEPA, 2014	CW x IR x EF x ED x CF
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
			Off-facility**	IR	Ingestion Rate	0.78	liters/day	USEPA, 2014	CW x IR x EF x ED x CF
				EF	Exposure Frequency	350	days/yr	USEPA, 2014	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Ingestion	Construction/Utility Worker	Adult	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
	Future			IR	Ingestion Rate	0.011	liters/day	USEPA, 2019 (2)	CW x IR x EF x ED x CF
				EF	Exposure Frequency	125	days/yr	(3)	BW x AT
				ED	Exposure Duration	0.5	years	(3)	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	183	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal Contact	Resident	Adult	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
	Future		Off-facility**	DA_{event}	Dermal Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	Intake (mg/kg/day) =
				SA	Surface Area	19,652	cm^2	USEPA, 2014 (4)	
				ET	Event Time	0.71	hour/event	USEPA, 2014	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	20	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 2
Values Used for Daily Intake Calculations - Groundwater
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe(s):	Current; Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Resident	Child	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
	Future		Off-facility**	DA_{event}	Dermal Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	Intake (mg/kg/day) =
				SA	Surface Area	6,365	cm^2	USEPA, 2014 (4)	
				ET	Event Time	0.54	hour/event	USEPA, 2014	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	350	days/year	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal Contact	Construction/Utility Worker	Adult	On-facility AOIs	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
	Future			DA_{event}	Dermal Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	Intake (mg/kg/day) =
				SA	Surface Area	3,527	cm^2	USEPA, 2014 (5)	
				ET	Event Time	4	hour/event	(6)	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	125	days/yr	(3)	
				ED	Exposure Duration	0.5	years	(3)	See below for DAevent equations
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	183	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Notes:
AOI = Area of Interest.
USEPA = United States Environmental Protection Agency.
*** Off-facility sampling is not currently planned. These potential receptors would only be evaluated if off-facility migration pathways for PFAS are confirmed and if off-facility data are collected during the Adaptive Phase.*
(1) Equal to half of the default ingestion rate for a residential adult recommended by USEPA (2014).
(2) Upper percentile value for wading/splashing used as a proxy for potential ingestion during excavation activities, assuming one groundwater contact event per day. Value obtained from Dorevitch et al, 2011, and recommended by USEPA (2019; Table 3-96).
(3) Construction/utility activities are assumed to occur for 125 days over the course of a 6 month period, based on professional judgment.
(4) Weighted average of full body surface area, adults and children, males and females.
(5) Represents the weighted mean surface area for males and females ages 21+, including head, hands, and forearms (USEPA, 2011; Table 7-2).
(6) Construction worker is assumed to contact groundwater in an excavation trench for half of a typical 8-hour workday.

DAevent will be calculated in accordance with the equations below from USEPA, 2004 (Note that CW units were converted to ug/L).

Equation 3.2, Organics, ET < t*:

DA-event (Absorbed dose per event[mg/cm^2-event]) =

$$2 \times FA \times Kp \times CW \times \text{Square Root}\left[(6 \times \tau_{event} \times ET)/\pi\right]$$

Equation 3.3, Organics, ET >t*:

DA-event (Absorbed dose per event[mg/cm^2-event]) =

$$FA \times Kp \times CW \times \{[ET / (1 + B)] + (2 \times \tau_{event}) \times [(1 + 3B + 3B^2) / (1 + B)^2]\}$$

DAevent Equation parameters not defined in table above:
Kp - Dermal Permeability Coefficient
B - Relative Contribution of Permeability Coefficient
FA - Fraction Absorbed
t* - Time To Steady State
τ_{event} - Lag Time

Sources:

Dorevitch et al, 2011. Water ingestion during water recreation. Water Res 45(5):2020−2028.
USEPA, 2004. Risk Assessment Guidance for Superfund. Part E, Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.
USEPA, 2019. Update for Chapter 3 of the Exposure Factors Handbook. Ingestion of Water and Other Selected Liquids. EPA/600/R-18/259F. February 2019.

Table 3
Values Used for Daily Intake Calculations - Sediment
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Outdoor Worker	Adult	Drainage ditch	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	50	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	35	days/yr	(2)	BW x AT
				ED	Exposure Duration	25	years	USEPA, 2014	
				FI	Fraction Ingested from Site	1	unitless	(3)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Trespasser (Wading Scenario)	Adolescent	Drainage ditch	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	50	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	26	days/yr	(17)	BW x AT
				ED	Exposure Duration	9	years	(18)	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	1	unitless	--	
				BW	Body Weight	44	kg	USEPA, 2011 (19)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Recreational Swimmer	Adult	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	50	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	52	days/yr	(4)	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	90	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	52	days/yr	(4)	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	chemical Specific	unitless	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Recreational Wader	Adult	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	50	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	35	days/yr	(2)	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	Chemical Specific	unitless	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 3
Values Used for Daily Intake Calculations - Sediment
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Recreational Wader	Child	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	90	mg/day	USEPA, 2017 (1)	CS x IR x EF x ED x CF x FI x RBA
				EF	Exposure Frequency	35	days/yr	(2)	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014	
				FI	Fraction Ingested from Site	0.5	unitless	(5)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				RBA	Relative Bioavailability Factor	1	unitless	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal	Outdoor Worker	Adult	Drainage ditch	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	2,694	cm^2	USEPA, 2011 (6)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.3	mg/cm^2-event	USEPA, 2011 (7)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	25	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal	Trespasser (Wading Scenario)	Adolescent	Drainage ditch	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	1,534	cm^2	USEPA, 2011 (20)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.7	mg/cm^2-event	USEPA, 2004 (21)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	26	days/yr	(17)	
				ED	Exposure Duration	9	years	(18)	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	44	kg	USEPA, 2011 (19)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	
Dermal	Recreational Swimmer	Adult	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	4,780	cm^2	USEPA, 2011 (9)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.4	mg/cm^2-event	USEPA, 2011 (10)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	2,057	cm^2	USEPA, 2011 (11)	CS x SA x AF x ABS x EV x EF x ED x CF
				AF	Adherence Factor	0.3	mg/cm^2-event	USEPA, 2004 (15)	BW x AT
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 3
Values Used for Daily Intake Calculations - Sediment
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Recreational Wader	Adult	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	2,275	cm^2	USEPA, 2011 (13)	$\frac{CS \times SA \times AF \times ABS \times EV \times EF \times ED \times CF}{BW \times AT}$
				AF	Adherence Factor	0.6	mg/cm^2-event	USEPA, 2011 (14)	
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CS	Chemical Concentration in Sediment	Chemical Specific	mg/kg	--	Intake (mg/kg-day) =
				SA	Surface Area	852	cm^2	USEPA, 2011 (12)	$\frac{CS \times SA \times AF \times ABS \times EV \times EF \times ED \times CF}{BW \times AT}$
				AF	Adherence Factor	0.7	mg/cm^2-event	USEPA, 2004 (16)	
				ABS	Dermal absorption fraction	Chemical Specific	unitless	--	
				EV	Event Frequency	1	event/day	(8)	
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	1.00E-06	kg/mg	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Notes:

*** There are no waterbodies within the facility used for recreational purposes, and off-facility sampling is not currently planned. If the Prescriptive Phase data indicate potential off-facility impact to waterbodies used recreationally, additional data may be collected.*

Parameters are presented for both a wader and a swimmer. Exposure parameters will be refined to be specific to the water body of interest.

< = Less than.

AOI = Area of Interest.

USEPA = United States Environmental Protection Agency.

(1) Equal to the recommended upper percentile daily soil ingestion rates for soil for adults (as applicable) (USEPA, 2017; Table 5-1). Value does not include indoor settled dust component which is not applicable to sediment.

(2) Assumes wading 1 day per week for 8 months out of the year (35 weeks) from April through November (when ground is not frozen or covered with snow).

(3) Assumes 100 percent of sediment ingested is from the associated area, based on professional judgment.

(4) Assumes swimming may occur for 2 days per week for the 6 warmest months (i.e., May through October; 26 weeks) per year.

(5) Assumes 50 percent of sediment ingested is from the associated area, based on professional judgment.

(6) Represents the weighted mean surface area for male and female adults (USEPA, 2011; Table 7-12 and 7-13). Assumes contact with sediment by face, forearms, and hands. See Table 6 for calculation.

(7) Represents the geometric mean weighted adherence factor for reed gatherers (USEPA, 2011; Table 7-20). Assumes contact with sediment by hands and forearms. See Table 6 for calculation.

(8) Professional judgment; assumes one event per day.

(9) Represents the weighted mean surface area for male and female adults (USEPA, 2011; Table 7-12 and 7-13). Assumes contact with sediment by hands, lower legs, and feet. See Table 6 for calculation.

(10) Represents the geometric mean weighted adherence factor for reed gatherers (USEPA (2011, Table 7-20). Assumes contact with sediment by hands, lower legs, and feet. See Table 6 for calculation.

(11) Represents the weighted mean surface area for males and females ages 0 to <6 years old (USEPA, 2011; Table 7-2). Assumes contact with sediment by hands, forearms, lower legs, and feet. The skin surface area for a 1 to <7 year old child is used to represent potential exposure by a recreational child, since a <1 year old child is likely to have limited exposure to sediment. See Table 7 for calculation.

(12) Represents the weighted mean surface area for males and females ages 0 to <6 years old (USEPA, 2011; Table 7-2). Assumes contact with sediment by hands and feet. The skin surface area for a 1 to <7 year old child is used to represent potential exposure by a recreational child, since a <1 year old child is likely to have limited exposure to sediment. See Table 7 for calculation.

(13) Represents the weighted mean surface area for male and female adults (USEPA, 2011; Table 7-12 and 7-13). Assumes contact with sediment by hands and feet. See Table 6 for calculation.

(14) Represents the geometric mean weighted adherence factor for reed gatherers (USEPA (2011, Table 7-20). Assumes contact with sediment by hands and feet. See Table 6 for calculation.

(15) Represents the geometric mean weighted adherence factor for children playing in wet soil (USEPA, 2004; Exhibit 3-3). Assumes contact with sediment by hands, forearms, lower legs, and feet. See Table 7 for calculation.

(16) Represents the geometric mean weighted adherence factor for children playing in wet soil (USEPA, 2004; Exhibit 3-3). Assumes contact with sediment by hands and feet. See Table 7 for calculation.

(17) Assumes wading may occur for 1 day per week for the 6 warmest months (i.e., May through October; 26 weeks) per year.

(18) Exposure duration reflects age-range of 7 to <16 years.

(19) Weighted average body weight for adolescent ages 6 to <16 years old used to represent the 7 to <16 year old adolescent.

(20) Represents the weighted mean surface area for males and females ages 7 to <16 years old (USEPA, 2011; Tables 7-12 and 7-13). Assumes contact with sediment by hands and feet. See Table 5 for calculation.

(21) Represents the geometric mean weighted adherence factor for children playing in wet soil (USEPA, 2004; Exhibit C-2). Assumes contact with sediment by hands and feet. See Table 5 for calculation.

Sources:

USEPA, 2004. Risk Assessment Guidance for Superfund. Part E, Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

USEPA, 2011. Exposure Factors Handbook. September 2011.

USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.

USEPA, 2017. Update for Chapter 5 of the Exposure Factors Handbook. Soil and Dust Ingestion. EPA/600/R-17/384F. September.

Table 4
Values Used for Daily Intake Calculations - Surface Water
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Outdoor Worker	Adult	Drainage ditch	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.0448	liters/day	USEPA, 2019 (1)	CW x IR x EF x ED x CF / BW x AT
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	25	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Trespasser (Wading Scenario)	Adolescent	Drainage ditch	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.011	liters/day	(1)	CW x IR x EF x ED x CF / BW x AT
				EF	Exposure Frequency	26	days/yr	(10)	
				ED	Exposure Duration	9	years	(11)	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	44	kg	USEPA, 2011 (12)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Incidental Ingestion	Recreational Swimmer	Adult	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.286	liters/day	(3)	CW x IR x EF x ED x CF / BW x AT
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.250	liters/day	(5)	CW x IR x EF x ED x CF / BW x AT
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 4
Values Used for Daily Intake Calculations - Surface Water
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Incidental Ingestion	Recreational Wader	Adult	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.0224	liters/day	USEPA, 2019 (1)	CW x IR x EF x ED x CF
				EF	Exposure Frequency	35	days/yr	(2)	BW x AT
				ED	Exposure Duration	20	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	Intake (mg/kg-day) =
				IR	Ingestion Rate	0.022	liters/day	USEPA, 2019 (1)	CW x IR x EF x ED x CF
				EF	Exposure Frequency	35	days/yr	(2)	BW x AT
				ED	Exposure Duration	6	years	USEPA, 2014	
				CF	Conversion Factor	0.001	mg/ug	--	
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal	Outdoor Worker	Adult	Drainage ditch	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
				DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	2,694	cm^2	USEPA, 2011 (6)	
				ET	Event Time	4	hour/event	(7)	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	25	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	9,125	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal	Trespasser	Adolescent	Drainage ditch	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
	(Wading Scenario)			DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	1,534	cm^2	USEPA, 2011 (13)	
				ET	Event Time	1	hour/event	(14)	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	26	days/yr	(10)	
				ED	Exposure Duration	9	years	(11)	
				BW	Body Weight	44	kg	USEPA, 2011 (12)	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	3,285	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 4
Values Used for Daily Intake Calculations - Surface Water
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Recreational Swimmer	Adult	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
				DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	19,652	cm^2	USEPA, 2014	
				ET	Event Time	2.6	hour/event	USEPA, 1989	DAevent x SA x EV x EF x ED / BW x AT
				EV	Event Frequency	1	event/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	20	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
		Child	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
				DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	6,365	cm^2	USEPA, 2014	
				ET	Event Time	2.6	hour/event	USEPA, 1989	DAevent x SA x EV x EF x ED / BW x AT
				EV	Event Frequency	1	event/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/yr	(4)	
				ED	Exposure Duration	6	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year
Dermal	Recreational Wader	Adult	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
				DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	6,077	cm^2	USEPA, 2011 (8)	
				ET	Event Time	2	hour/event	(2)	DAevent x SA x EV x EF x ED / BW x AT
				EV	Event Frequency	1	event/day	USEPA, 2004	
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	20	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	80	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	7,300	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Table 4
Values Used for Daily Intake Calculations - Surface Water
Reasonable Maximum Exposure
Risk Assessment Workplan
Albany AASF #3, NY

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point(s)	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Recreational Wader	Child	To be determined**	CW	Chemical Concentration in Water	Chemical Specific	ug/L	--	
				DA	Dose Absorbed per Unit Area per Event	Chemical Specific	mg/cm^2-event	--	Intake (mg/kg/day) =
				SA	Surface Area	2,057	cm^2	USEPA, 2011 (9)	
				ET	Event Time	2	hour/event	(2)	DAevent x SA x EV x EF x ED
				EV	Event Frequency	1	event/day	USEPA, 2004	BW x AT
				EF	Exposure Frequency	35	days/yr	(2)	
				ED	Exposure Duration	6	years	USEPA, 2014	See below for DAevent equations
				BW	Body Weight	15	kg	USEPA, 2014	
				ATc	Averaging Time - cancer	25,550	days	USEPA, 2014	ATc = Lifetime (70 years) x 365 days/year
				ATnc	Averaging Time - noncancer	2,190	days	USEPA, 2014	ATnc = ED (year) x 365 days/year

Notes:
*** There are no waterbodies within the facility used for recreational purposes, and off-facility sampling is not currently planned. If the Prescriptive Phase data indicate potential off-facility impact to waterbodies used recreationally, additional data may be collected. Parameters are presented for both a wader and a swimmer. Exposure parameters will be refined to be specific to the water body of interest.*
AOI = Area of Interest.
USEPA = United States Environmental Protection Agency.
(1) Upper percentile value for wading/splashing, multiplied by wading event time (see dermal assumptions). Value obtained from Dorevitch et al, 2011, and recommended by USEPA (2019; Table 3-96).
(2) Assumes wading for 1 day per week for 8 months out of the year (35 weeks) for 2 hours per day from April through November (when ground is not frozen or covered with snow).
(3) Based on the age-weighted upper percentile water ingestion rate for a 20 year exposure duration from age 6 to 21+ (USEPA, 2019; Table 3-7) of 0.11 L/hr multiplied by swimming event time (see dermal assumptions).
(4) Assumes swimming may occur for 1 days per week for the 6 warmest months (i.e., May through October; 26 weeks) per year.
(5) Based on the upper percentile water ingestion rate for children (ages 6 to 11) of 0.096 liters/hour (USEPA, 2019; Table 3-7) multiplied by swimming event time (see dermal assumptions).
(6) Represents the weighted mean surface area for male and female adults (USEPA, 2011; Table 7-12 and 7-13). Assumes contact with surface water by face, forearms, and hands. See Table 6 for calculation.
(7) Assumes contact with water for half of 8-hour workday.
(8) Represents the weighted mean surface area for males and females (USEPA, 2011). Assumes contact with surface water by hands, forearms, lower legs, and feet. See Table 6 for calculation.
(9) Represents the weighted mean surface area for young child (1 - <7 years, USEPA, 2011). Assumes contact with surface water by hands, forearms, lower legs, and feet. See Table 7 for calculation.
(10) Assumes wading may occur for 1 day per week for the 6 warmest months (i.e., May through October; 26 weeks) per year.
(11) Exposure duration reflects age-range of 7 to <16 years.
(12) Weighted average body weight for adolescent ages 6 to <16 years old used to represent the 7 to <16 year old adolescent.
(13) Represents the weighted mean surface area for males and females ages 7 to <16 years old (USEPA, 2011; Tables 7-12 and 7-13). Assumes contact with surface water by hands and feet. See Table 5 for calculation.
(14) Assumes exposure to surface water may occur for 1 hour per event, while walking/wading in the waterbodies, based on professional judgement.

DAevent will be calculated in accordance with the equations below from USEPA, 2004 (Note that CW units were converted to ug/L).

Equation 3.2, Organics, ET < t*:
DA-event (Absorbed dose per event[mg/cm²-event]) =
$2 \times FA \times Kp \times CW \times \text{Square Root}[(6 \times \tau_{event} \times ET)/\pi]$

Equation 3.3, Organics, ET >t*:
DA-event (Absorbed dose per event[mg/cm²-event]) =
$FA \times Kp \times CW \times \{[ET / (1 + B)] + (2 \times \tau_{event}) \times [(1 + 3B + 3B^2) / (1 + B)^2]\}$

DAevent Equation parameters not defined in table above:
Kp - Dermal Permeability Coefficient
B - Relative Contribution of Permeability Coefficient
FA - Fraction Absorbed
t* - Time To Steady State
τ_{event} - Lag Time

Sources:

Dorevitch et al, 2011. Water ingestion during water recreation. Water Res 45(5):2020−2028.
USEPA, 1989. Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2004. Risk Assessment Guidance for Superfund. Part E, Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.
USEPA, 2011. Exposure Factors Handbook. September 2011.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.
USEPA, 2019. Update for Chapter 3 of the Exposure Factors Handbook. Ingestion of Water and Other Selected Liquids. EPA/600/R-18/259F. February 2019.

Table 5

Calculation of Body Surface Area Exposed and Soil Adherence Factor for Future Trespasser (Adolescent)

Risk Assessment Workplan
Albany AASF #3, NY

Adolescent (7 to <16 years, from 7th birthday to the day before 16th birthday)									
Mean Surface Area by Body Part, m^2 (EFH, Table 7-2, USEPA, 2011)									
Age	legs	lower legs (a)		feet	head	face (j)	hands	arms	forearms
7<8 (data 6<11)	0.311	0.124	(b)	0.073	0.066	0.022	0.051	0.151	0.059 (d)
8<9 (data 6<11)	0.311	0.124	(b)	0.073	0.066	0.022	0.051	0.151	0.059 (d)
9<10 (data 6<11)	0.311	0.124	(b)	0.073	0.066	0.022	0.051	0.151	0.059 (d)
10<11 (data 6<11)	0.311	0.124	(b)	0.073	0.066	0.022	0.051	0.151	0.059 (d)
11<12 (data 11<16)	0.483	0.193	(c)	0.105	0.073	0.024	0.072	0.227	0.086 (e)
12<13 (data 11<16)	0.483	0.193	(c)	0.105	0.073	0.024	0.072	0.227	0.086 (e)
13<14 (data 11<16)	0.483	0.193	(c)	0.105	0.073	0.024	0.072	0.227	0.086 (e)
14<15 (data 11<16)	0.483	0.193	(c)	0.105	0.073	0.024	0.072	0.227	0.086 (e)
15<16 (data 11<16)	0.483	0.193	(c)	0.105	0.073	0.024	0.072	0.227	0.086 (e)
Average (age 7 to <16) (cm^2)	**4,066**	**1,626**		**908**	**699**	**233**	**627**	**1,932**	**741**
Soil: hands, forearms, lower legs, and head (cm^2) =									**3,693**
Sediment and Surface Water (wading): hands and feet (cm^2) =									**1,534**

Body Part	Body Surface Area Exposed to Soil (cm^2)	Soil Loading Rate (l) (mg/cm^2)		Total Soil Mass (mg)
Head	699	0.052	(g)	36
Hands	627	0.190		119
Forearms	741	0.052	(h)	39
Lower legs (a)	1,626	0.033	(i)	54
Total	3,693	–		248
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =				**0.07**

Body Part	Body Surface Area Exposed to Sediment (cm^2)	Soil Loading Rate (f) (mg/cm^2)		Total Soil Mass (mg)
Hands	627	0.656		411
Feet	908	0.656	(k)	596
Total	1,534	–		1,007
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =				**0.7**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
(a) Lower leg surface area = leg surface area x average of the ratios of the lower leg to the leg (EFH Table 7-8), average of male and female, consistent with methods used in USEPA, 2014.
(b) Ratios of the lower leg to the leg for the 6, 8 and 10 year-olds (0.4) (Table 7-8).
(c) Ratio of the lower leg to the leg for the 12 and 14 year-olds (0.4) (Table 7-8).
(d) Surface area for the arm x average of the ratios of the forearm to the arm for 6, 8 and 10 year-olds (0.39) (EFH Table 7-8).
(e) Surface area for the arm x average of the ratios of the forearm to the arm for 12 and 14 year-olds (0.38) (EFH Table 7-8).
(f) Data from USEPA (2004, Exhibit C-2). Geometric mean value, children playing in wet soil.
(g) Data for head are not available. Therefore, face data are used as a proxy.
(h) Data for forearms are not available. Therefore, arm data are used as a proxy.
(i) Data for lower legs are not available. Therefore, leg data are used as a proxy.
(j) Surface area of the face is assumed to be one-third of the head.
(k) Data for feet are not available. Therefore, hand data are used as a proxy.
(l) Data from USEPA (2004, Exhibit C-2). Geometric mean value for gardeners, consistent with USEPA (2014) default for residential adults.

Sources:
USEPA, 2004. Risk Assessment Guidance for Superfund. Part E, Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.
USEPA, 2011. Exposure Factors Handbook. September 2011.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.

Table 6
Calculation of Body Surface Area Exposed and Sediment Adherence Factor for Future Outdoor Worker and Recreational Adult
Risk Assessment Workplan
Albany AASF #3, NY

Adult (21 years and older)				
	Mean Body Surface Area for Adult			Average of Males and Females
Body Part	Male m^2	Female m^2		cm^2
Head	0.136	0.114		1,250
Face	0.045	0.038	(a)	417
Upper extremities				
Arms	0.314	0.237		2,755
Upper arms	0.172	0.13035	(b)	1,512
Forearms	0.148	0.11139	(b)	1,297
Hands	0.107	0.089		980
Lower extremities				
Legs	0.682	0.598		6,400
Lower legs	0.268	0.233		2,505
Feet	0.137	0.122		1,295
Outdoor worker: face, hands, and forearms =				**2,694**
Recreational Swimmer: hands, lower legs, and feet =				**4,780**
Recreational Wader: hands and feet =				**2,275**

Adult Outdoor Worker (Sediment)				
Body Part	Body Surface Area Exposed to Sediment (cm^2)	Soil Loading Rate (c) (mg/cm^2)		Total Sediment Mass (mg)
Hands	980	0.66		647
Forearms	1,297	0.036	(d)	47
Face	417	0.029	(e)	12
Total	2,694	–		706
RME Area-Weighted Adherence Factor (mg/cm^2) = Sediment mass/Surface area =				**0.3**

Adult Recreational Swimmer (Sediment)				
Body Part	Body Surface Area Exposed to Sediment (cm^2)	Soil Loading Rate (c) (mg/cm^2)		Total Sediment Mass (mg)
Hands	980	0.66		647
Lower Legs	2,505	0.16	(d)	401
Feet	1,295	0.63		816
Total	4,780	–		1,863
Area-Weighted Adherence Factor (mg/cm^2) = Sediment mass/Surface area =				**0.4**

Adult Recreational Wader (Sediment)			
Body Part	Body Surface Area Exposed to Sediment (cm^2)	Soil Loading Rate (c) (mg/cm^2)	Total Sediment Mass (mg)
Hands	980	0.66	647
Feet	1,295	0.63	816
Total	2,275	–	1,463
Area-Weighted Adherence Factor (mg/cm^2) = Sediment mass/Surface area =			**0.6**

Notes:

EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).

(a) Per USEPA (2011) Section 7.2.2, the face is assumed to be 1/3 the surface area of the head.

(b) In accordance with USEPA 2014 OSWER Directive on Recommended Default Exposure Factors (USEPA, 2014), the female forearms and upper arms surface areas were calculated as follows:

Female arms [0.237] x (Male forearm/Male arms) [0.47]

Female arms [0.237] x (Male upper arms/Male arms) [0.55]

(c) Data from USEPA (2011) Table 7-20. Geometric mean of values for reed gatherers.

(d) Data for forearms and lower legs are not available. Therefore, arm and leg data are used as a proxy.

(e) Data for head/face not available. Therefore, construction worker value used as a proxy.

Sources:

USEPA, 2011. Exposure Factors Handbook. September 2011.

USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.

Table 7

Calculation of Body Surface Area Exposed and Sediment Adherence Factor for Future Recreational Child

Risk Assessment Workplan
Albany AASF #3, NY

Young Child (1 to <7 years, from 1st birthday to the day before 7th birthday) (l)						
Mean Surface Area by Body Part, m^2 (EFH, Table 7-2)						
Age	hands	arms	forearms (a)	legs	lower legs (a)	feet
1<2	0.030	0.069	0.028 (b)	0.122	0.051 (e)	0.033
2<3	0.028	0.088	0.035 (b)	0.154	0.065 (e)	0.038
3<4 (data 3<6)	0.037	0.106	0.042 (c)	0.195	0.078 (f)	0.049
4<5 (data 3<6)	0.037	0.106	0.042 (c)	0.195	0.078 (f)	0.049
5<6 (data 3<6)	0.037	0.106	0.042 (c)	0.195	0.078 (g)	0.049
6<7 (data 6<11)	0.051	0.151	0.059 (d)	0.311	0.124 (g)	0.073
Average (cm^2)	**367**	**1,043**	**415**	**1,953**	**791**	**485**
Recreational Swimmer: hands, forearms, lower legs, and feet =						**2,057**
Recreational Wader: hands and feet =						**852**

Child Recreational Swimmer (Sediment)			
Body Part	**Body Surface Area Exposed to Sediment (cm^2)**	**Soil Loading Rate (h) (mg/cm^2)**	**Total Sediment Mass (mg)**
Hands	367	0.656	241
Forearms	415	0.015 (k)	6
Lower Legs	791	0.026 (j)	21
Feet	485	0.656 (i)	318
Total	2,057	–	585
Area-Weighted Adherence Factor (mg/cm^2) = Sediment mass/Surface area =			**0.3**

Child Recreational Wader (Sediment)			
Body Part	**Body Surface Area Exposed to Sediment (cm^2)**	**Soil Loading Rate (h) (mg/cm^2)**	**Total Sediment Mass (mg)**
Hands	367	0.656	241
Feet	485	0.656 (i)	318
Total	852	–	559
Area-Weighted Adherence Factor (mg/cm^2) = Sediment mass/Surface area =			**0.7**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
(a) Lower leg surface area = leg surface area x average of the ratios of the lower leg to the leg
Forearm surface area = arm surface area x ratio of the forearm to the arm
(EFH Table 7-8), average of male and female, consistent with methods used in USEPA, 2014.
(b) Ratio of the forearm to the arm for the 2-year old, average of male and female (0.4) (EFH Table 7-8).
(c) Ratio of the forearm to the arm for the 4-year old, average of male and female (0.4) (EFH Table 7-8).
(d) Ratio of the forearm to the arm for 6, 8 and 10 year-olds (0.39) (EFH Table 7-8).
(e) Ratio of the lower leg to the leg for the 2-year old, average of male and female (0.42) (EFH Table 7-8).
(f) Ratio of the lower leg to the leg for the 4-year old, average of male and female (0.4) (EFH Table 7-8).
(g) Ratio of the lower leg to the leg for the 6, 8 and 10 year-olds (0.4) (EFH Table 7-8).
(h) Data from USEPA (2004, Exhibit C-2). Geometric mean value, children playing in wet soil.
(i) Data for feet are not available. Therefore, hand data are used as a proxy.
(j) Data for lower legs are not available. Therefore, legs data are used as a proxy.
(k) Data for forearms are not available. Therefore, arms data are used as a proxy.
(l) The skin surface area for a 1 to <7 year old child is used to represent potential exposure by a recreational child, since a <1 year old child is likely to have limited exposure to sediment.

Sources:
USEPA, 2004. Risk Assessment Guidance for Superfund. Part E, Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.
USEPA, 2011. Exposure Factors Handbook. September 2011.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014. Revised September 2015.

Table 8
PFAS Soil Screening Levels For Terrestrial Plants And Invertebrates
Risk Assessment Workplan
Albany AASF #3, NY

		Terrestrial Plant Screening Level				Terrestrial Invertebrate Screening Level			
		Argonne Values	SERDP Values			Argonne Values	SERDP Values		
Constituent	Abbreviation	NOEC-based ESVs (mg/kg soil) [1]	NOEC Soil Screening Level (mg/kg soil) [2]	LOEC Soil Screening Level (mg/kg soil) [2]	Toxicity Benchmark (NOEC-based) (mg/kg soil) [3]	NOEC-based ESVs (mg/kg soil) [1]	NOEC Soil Screening Level (mg/kg soil) [2]	LOEC Soil Screening Level (mg/kg soil) [2]	Toxicity Benchmark (NOEC-based) (mg/kg soil) [3]
Perfluorooctane sulfonic acid	PFOS	17.3	11	33	3.9	57.6	7.7	141	80
Perfluorooctanoic acid	PFOA	101	0.084	0.84	84	77.8	50	NA	10
Perfluorononanoic acid	PFNA	NA	46	NA	NA	10	1	100	NA
Perfluorohexanesulfonic acid	PFHxS	NA	NA	NA	NA	10	1	100	NA
Perfluoroheptanoic acid	PFHpA	NA	NA	NA	NA	NA	1	100	NA
Perfluorobutanesulfonic acid	PFBS	NA	NA	NA	NA	100	10	NA	NA
Perfluorodecanoic acid	PFDA	NA	51	NA	NA	NA	NA	NA	NA
Perfluorobutanoic acid	PFBA	NA	642	NA	NA	NA	NA	NA	NA

Notes:

Shading shows preliminary values to be considered in the Screening Level Ecological Risk Assessment (lowest value).
Other values may be used in Step 3a, as needed.
Argonne - Argonne National Laboratory
ESV - Ecological Screening Value
LOEC - Lowest Observed Effect Concentration.
mg/kg - milligram per kilogram.
NA - Not Available.
NOEC - No Observed Effect Concentration.
SERDP - Strategic Environmental Research and Development Program

Sources:

1 - Grippo, M., J. Hayse, I. Hlohowskyj, and K. Picel, 2024. Derivation of PFAS Ecological Screening Values. Argonne National Laboratory, Environmental Science Division. Completed under Interagency Agreement between the U.S. Department of Energy, Argonne National Laboratory, and the Air Force Civil Engineer Center. Update. October.
2 - Divine, C., Frenchmeyer, M., Dally, K., Osborn, E., Anderson, P., Zodrow, J., 2020. Approach for Assessing PFAS Risk to Threatened and Endangered Species. Final Report. SERDP Project ER18-1653. March.
3 - Conder, J., Arblaster, J., Larson, E., Brown, J., Higgins, C., 2020. Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites. Guidance Document. SERDP Project ER18-1614. January.

Table 9
PFAS Screening Levels for Wildlife Receptors
Risk Assessment Workplan
Albany AASF #3, NY

		Terrestrial Wildlife Screening Level for Soil								
		Argonne Wildlife Values [1]		SERDP Wildlife RBSL [2]						
Feeding Guild				Herbivore	Invertivore	Insectivore	Carnivore	Herbivore	Insectivore	Carnivore
Receptor		ESV for Terrestrial Mammals	ESV for Terrestrial Birds	Meadow Vole	Short-Tailed Shrew	Little Brown Bat	Long-Tailed Weasel	American Goldfinch	House Wren	Red-Tailed Hawk
NOAEL-based RBSLs (mg/kg soil)										
Perfluorooctane sulfonic acid	PFOS	0.0040	0.0386	0.31	0.048	0.03	0.17	0.38	0.013	0.087
Perfluorooctanoic acid	PFOA	3.84	NA	5.8	1.3	0.84	0.57	NA	NA	NA
Perfluorononanoic acid	PFNA	0.0242	NA	2.3	1.5	1	1.5	NA	NA	NA
Perfluorohexanesulfonic acid	PFHxS	0.145	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	0.817	15.8	38	14	9.1	78	89	9.3	100
Perfluorodecanoic acid	PFDA	0.0677	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic acid	PFHxA	6.20	NA	120	340	250	160	NA	NA	NA
Perfluorobutanoic acid	PFBA	2.98	NA	29	78	58	130	NA	NA	NA
LOAEL-based RBSLs (mg/kg soil)										
Perfluorooctane sulfonic acid	PFOS	NA	NA	0.51	0.079	0.05	0.28	3.8	0.13	0.87
Perfluorooctanoic acid	PFOA	NA	NA	12	2.6	1.7	1.1	NA	NA	NA
Perfluorononanoic acid	PFNA	NA	NA	3	2	1.3	2	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	NA	NA	150	57	36	310	150	15	170
Perfluorohexanoic acid	PFHxA	NA	NA	260	700	530	330	NA	NA	NA
Perfluorobutanoic acid	PFBA	NA	NA	70	190	140	320	NA	NA	NA

		Aquatic-dependent Wildlife Screening Level for Sediment									
		Argonne Wildlife Values [1]		SERDP Wildlife RBSL [2]							
Feeding Guild				Herbivore	Insectivore	Carnivore	Carnivore	Carnivore	Omnivore	Invertivore	Piscivore
Receptor		ESV Aquatic Mammals	ESV Aquatic Birds	Muskrat	Little Brown Bat	River Otter	Harbor Seal	Mink	Red-Winged Blackbird	Tree Swallow	Brown Pelican
NOAEL-based RBSLs (mg/kg sediment)											
Perfluorooctane sulfonic acid	PFOS	NA	NA	0.023	0.0053	0.047	0.046	0.038	0.007	0.0014	0.014
Perfluorooctanoic acid	PFOA	NA	NA	1.2	0.006	0.28	0.19	0.4	NA	NA	NA
Perfluorononanoic acid	PFNA	NA	NA	3.6	0.01	0.24	0.2	0.25	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	NA	NA	370	1.1	18	16	15	24	0.73	13
Perfluorohexanoic acid	PFHxA	NA	NA	240	1.8	29	26	25	NA	NA	NA
Perfluorobutanoic acid	PFBA	NA	NA	160	1.6	26	23	22	NA	NA	NA
LOAEL-based RBSLs (mg/kg sediment)											
Perfluorooctane sulfonic acid	PFOS	NA	NA	0.038	0.0088	0.077	0.077	0.063	0.07	0.014	0.14
Perfluorooctanoic acid	PFOA	NA	NA	2.3	0.012	0.57	0.39	0.8	NA	NA	NA
Perfluorononanoic acid	PFNA	NA	NA	4.7	0.013	0.32	0.27	0.33	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	NA	NA	1500	4.3	70	63	60	40	1.2	22
Perfluorohexanoic acid	PFHxA	NA	NA	510	3.8	61	55	53	NA	NA	NA
Perfluorobutanoic acid	PFBA	NA	NA	380	3.8	61	55	53	NA	NA	NA

Table 9
PFAS Screening Levels for Wildlife Receptors
Risk Assessment Workplan
Albany AASF #3, NY

		Aquatic-dependent Wildlife Screening Level for Surface Water									
		Argonne Wildlife Values [1]		SERDP Wildlife RBSL [2]							
Feeding Guild				Herbivore	Insectivore	Carnivore	Carnivore	Carnivore	Omnivore	Invertivore	Piscivore
Receptor		ESV Aquatic Mammals	ESV Aquatic Birds	Muskrat	Little Brown Bat	River Otter	Harbor Seal	Mink	Red-Winged Blackbird	Tree Swallow	Brown Pelican
NOAEL-based RBSLs (mg/L water)											
Perfluorooctane sulfonic acid	PFOS	0.0000167	0.000487	0.0011	0.00036	0.00028	0.00031	0.00021	0.00034	0.000091	0.000075
Perfluorooctanoic acid	PFOA	0.0476	NA	0.018	0.0044	0.012	0.013	0.0094	NA	NA	NA
Perfluorononanoic acid	PFNA	0.000116	NA	0.0022	0.0047	0.0092	0.0097	0.0068	NA	NA	NA
Perfluorohexanesulfonic acid	PFHxS	0.0141	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	0.209	2.783	76	0.94	2	2.1	1.5	17	0.64	1.3
Perfluorodecanoic acid	PFDA	0.0000937	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic acid	PFHxA	0.544	NA	6.1	0.21	6.4	5	6.9	NA	NA	NA
Perfluorobutanoic acid	PFBA	0.119	NA	49	1.4	0.86	0.93	0.66	NA	NA	NA
LOAEL-based RBSLs (mg/L water)											
Perfluorooctane sulfonic acid	PFOS	NA	NA	0.0018	0.0006	0.00047	0.00051	0.00036	0.0034	0.00091	0.00075
Perfluorooctanoic acid	PFOA	NA	NA	0.036	0.0089	0.024	0.026	0.019	NA	NA	NA
Perfluorononanoic acid	PFNA	NA	NA	0.0029	0.0063	0.012	0.013	0.009	NA	NA	NA
Perfluorobutanesulfonic acid	PFBS	NA	NA	300	3.8	8	8.5	6	29	1.1	2.1
Perfluorohexanoic acid	PFHxA	NA	NA	13	0.44	13	10	14	NA	NA	NA
Perfluorobutanoic acid	PFBA	NA	NA	120	3.3	2.1	2.2	1.6	NA	NA	NA

Notes:

Shading shows values to be considered in the Screening Level Ecological Risk Assessment (lowest value).

These wildlife-based values do not reflect Site-specific receptors or conditions. If an exceedance of these values is noted in the Screening Level Ecological Risk Assessment, additional screening conducted in Step 3a will consider receptors and assumptions appropriate to the exposure areas.
Argonne - Argonne National Laboratory
ESV - Ecological Screening Value
LOAEL - Lowest Observed Adverse Effects Level.
mg/kg - milligram per kilogram.
mg/L - milligrams per liter.
NA - Not Available.
NOAEL - No Observed Adverse Effects Level.
RBSL - Risk-Based Screening Level.
SERDP - Strategic Environmental Research and Development Program

Sources:

1 - Grippo, M., J. Hayse, I. Hlohowskyj, and K. Picel, 2024. Derivation of PFAS Ecological Screening Values. Argonne National Laboratory, Environmental Science Division. Completed under Interagency Agreement between the U.S. Department of Energy, Argonne National Laboratory, and the Air Force Civil Engineer Center. Update. October.
2 - Divine, C., Frenchmeyer, M., Dally, K., Osborn, E., Anderson, P., Zodrow, J., 2020. Approach for Assessing PFAS Risk to Threatened and Endangered Species. Final Report. SERDP Project ER18-1653. March.

Table 10
PFAS Surface Water Screening Levels for Aquatic Life
Risk Assessment Workplan
Albany AASF #3, NY

Constituent	Abbreviation	Aquatic Life for Surface Water			
		Argonne Values	SERDP Values		USEPA Values
		Aquatic Life ESV [1]	Water Quality RBSL [2]	Aquatic Life Protection Values [3]	Aquatic Life Criteria [4]
		Freshwater Chronic (ug/L)	Freshwater Chronic (ug/L)	Freshwater - HC5 (ug/L)	Freshwater Chronic (ug/L)
Perfluorooctane sulfonic acid	PFOS	4.85	51	5.85	0.25
Perfluorooctanoic acid	PFOA	109	3900	1112	100
Perfluorononanoic acid	PFNA	16.9	120	NA	NA
Perfluorohexanesulfonic acid	PFHxS	94.2	NA	NA	NA
Perfluoroheptanoic acid	PFHpA	NA	870	NA	NA
Perfluorobutanesulfonic acid	PFBS	446	3400	NA	NA
Perfluorodecanoic acid	PFDA	3.44	140	NA	NA
Perfluorododecanoic acid	PFDoA	NA	72	NA	NA
Perfluorohexanoic acid	PFHxA	33.8	2300	NA	NA
Perfluoroundecanoic acid	PFUnA	NA	49	NA	NA
Perfluorobutanoic acid	PFBA	75.7	470	NA	NA
Perfluoropentanoic acid	PFPA	NA	140	NA	NA
3-Perfluoroheptyl propanoic acid	7:3FTCA	NA	4.1	NA	NA
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9C1-PF3ON	NA	69	NA	NA

Notes:

Shading shows values to be considered in the Screening Level Ecological Risk Assessment (lowest value).

Argonne - Argonne National Laboratory
ESV - Ecological Screening Value
HC5 - 5% Hazardous Concentration.
NA - Not Available.
ug/L - microgram per liter
RBSL - Risk-Based Screening Level.
SERDP - Strategic Environmental Research and Development Program
USEPA - United States Environmental Protection Agency.

Sources:

1 - Grippo, M., J. Hayse, I. Hlohowskyj, and K. Picel, 2024. Derivation of PFAS Ecological Screening Values. Argonne National Laboratory, Environmental Science Division. Completed under Interagency Agreement between the U.S. Department of Energy, Argonne National Laboratory, and the Air Force Civil Engineer Center. Update. October.
2 - Divine, C., Frenchmeyer, M., Dally, K., Osborn, E., Anderson, P., Zodrow, J., 2020. Approach for Assessing PFAS Risk to Threatened and Endangered Species. Final Report. SERDP Project ER18-1653. March. Marine screening levels were not derived.
3 - Conder, J., Arblaster, J., Larson, E., Brown, J., Higgins, C., 2020. Guidance for Assessing the Ecological Risks of PFAS to Threatened and Endangered Species at Aqueous Film Forming Foam-Impacted Sites. Guidance Document. SERDP Project ER18-1614. January.
4 - USEPA. 2024. National Recommended Water Quality Criteria - Aquatic Life Criteria Table. September. https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table

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Attachment A Threatened, Endangered, or Other Special Concern Species

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Attachment A-1: USFWS IPaC Report

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IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Albany County, New York



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Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699
fw5es_nyfo@fws.gov

3817 Luker Road
Cortland, NY 13045-9385

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Insects

NAME	STATUS
Karner Blue Butterfly Lycaeides melissa samuelis Wherever found There is **proposed** critical habitat for this species. https://ecos.fws.gov/ecp/species/6656	Endangered

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Monarch Butterfly Danaus plexippus — Candidate

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

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- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have

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higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

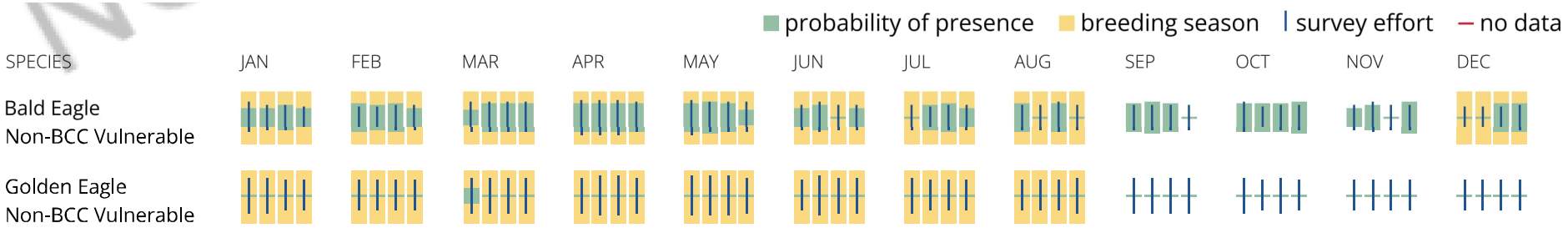
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

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Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NOT FOR CONSULTATION

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Belted Kingfisher *Megaceryle alcyon* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 25
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler *Setophaga cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 20 to Jul 20

NOT FOR CONSULTATION

Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Meadowlark Sturnella magna This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 25 to Aug 31
Eastern Whip-poor-will Antrostomus vociferus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Evening Grosbeak Coccothraustes vespertinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper Calidris melanotos This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

NOT FOR CONSULTATION

Prairie Warbler Setophaga discolor — Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rose-breasted Grosbeak Pheucticus ludovicianus — Breeds May 15 to Jul 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Upland Sandpiper Bartramia longicauda — Breeds May 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9294

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

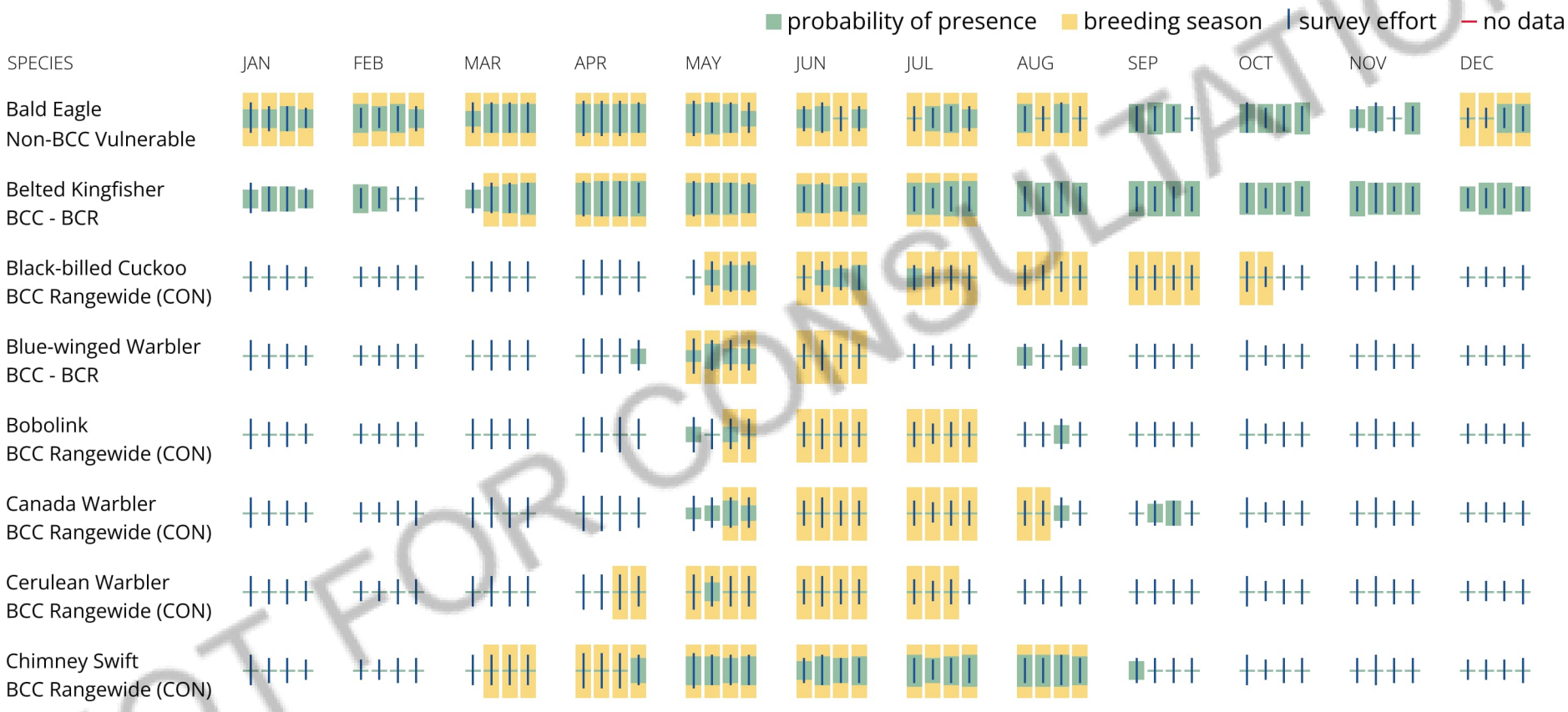
NOT FOR CONSULTATION

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

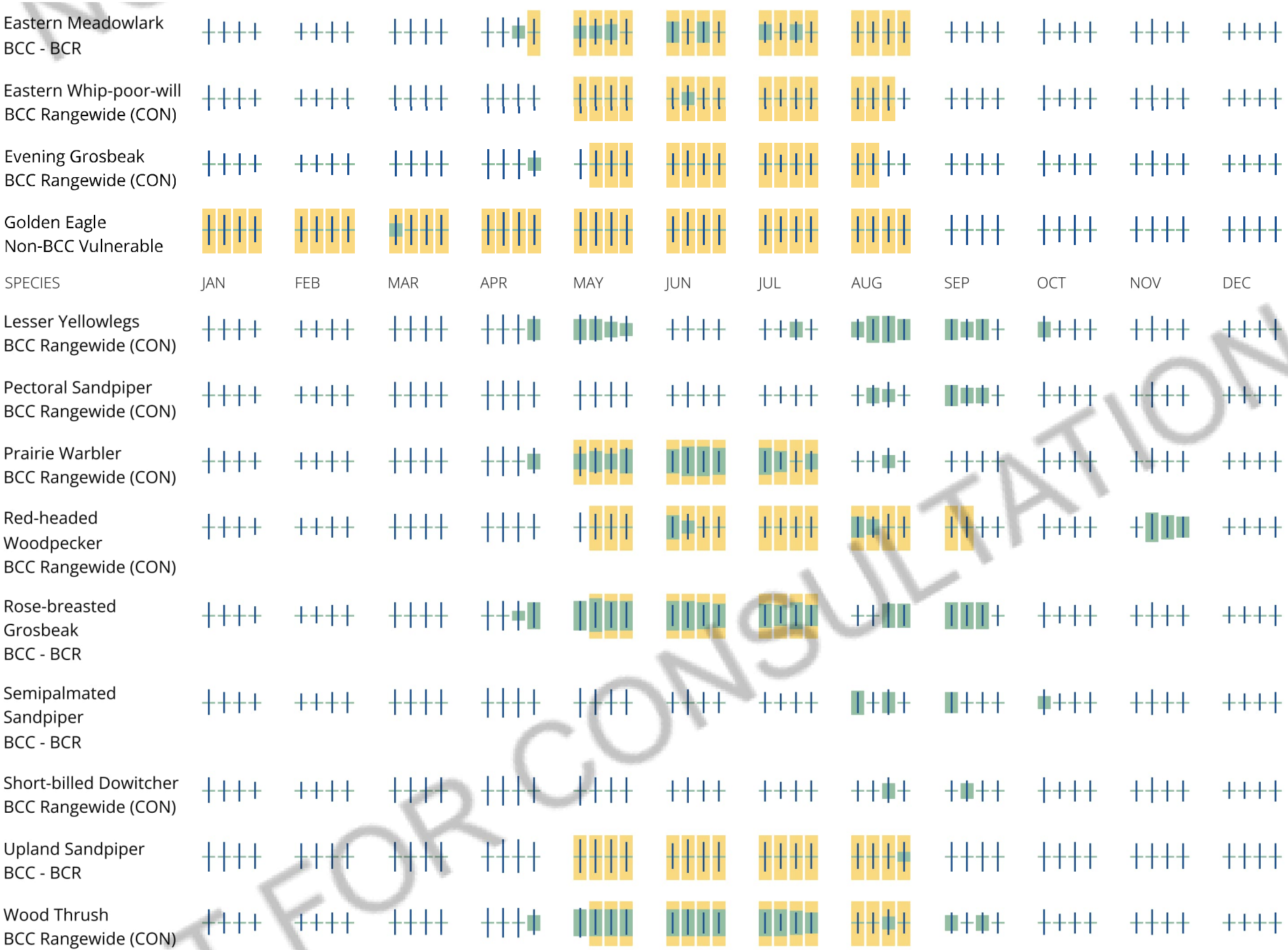
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

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What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is

NOT FOR CONSULTATION

the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

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For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

PFO1E

FRESHWATER POND

PUBHx

RIVERINE

R4SBC

R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

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Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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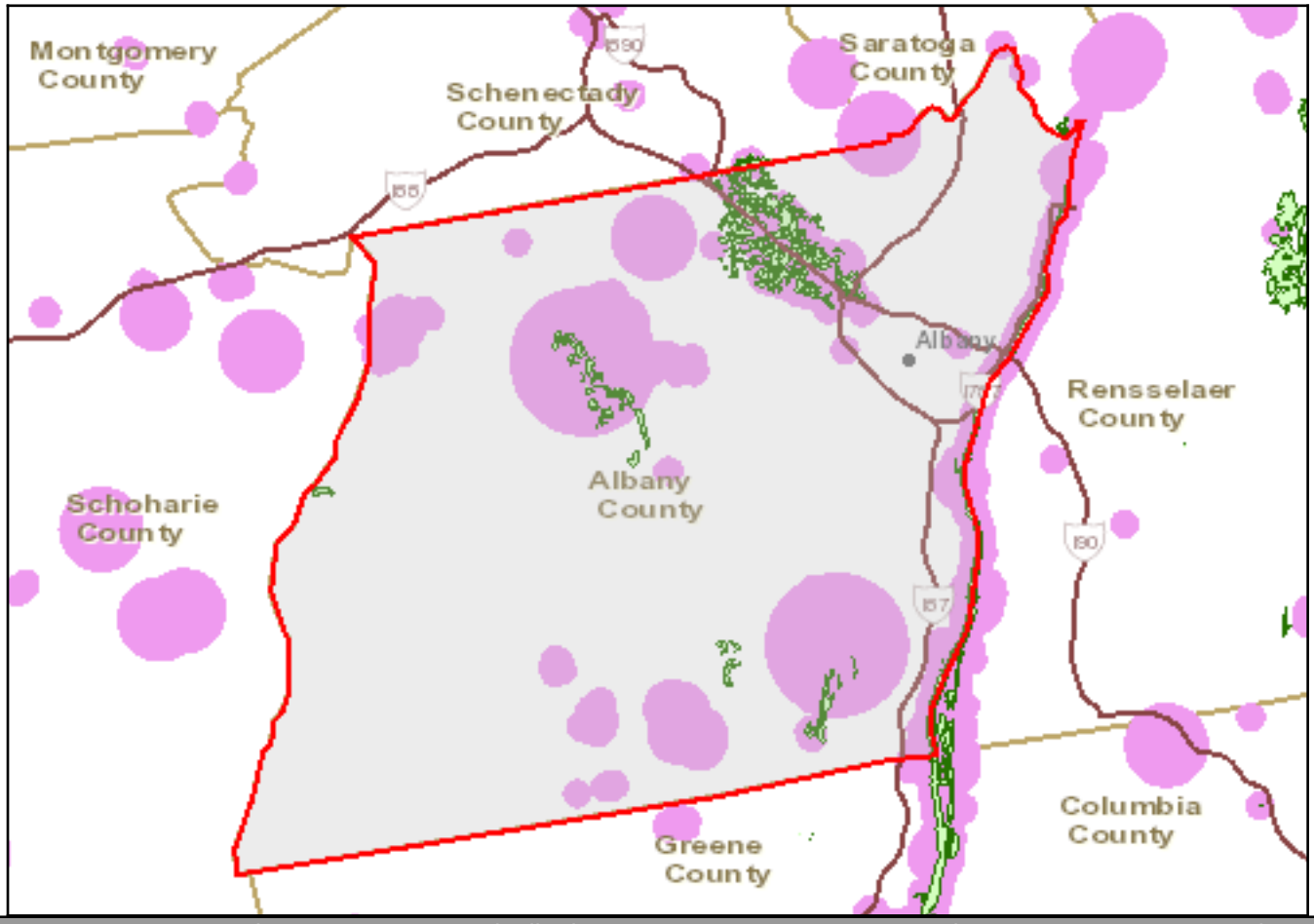
Attachment A-2: State Listed Species

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New York Nature Explorer

Albany County

Criteria: County: Albany



Common Name	Subgroup	Distribution Status	Year Last Documente	Protection Status State	Protection Status Federal	Conservation Rank State	Conservation Rank Global
County: Albany							
Animal: Mammals							
Allegheny Woodrat *Neotoma magister*	Rodents	Extirpated		Endangered		S1	G3G4
Eastern Small-footed Myotis *Myotis leibii*	Bats	Recently Confirmed	2019	Special Concern		S1S3	G4
Indiana Bat *Myotis sodalis*	Bats	Recently Confirmed	2010	Endangered		S1	G2

New York Nature Explorer

Common Name	Subgroup	Distribution Status	Year Last Documente	Protection Status		Conservation Rank	
				State	Federal	State	Global
Northern Long-eared Bat *Myotis septentrionalis*	Bats	Recently Confirmed	2014	Threatened		S1	G2G3

Animal: Birds

Bald Eagle *Haliaeetus leucocephalus*	Hawks, Falcons, Eagles, Vultures	Recently Confirmed	2021	Threatened		S2S3B,S2N	G5
Henslow's Sparrow *Ammodramus henslowii*	Sparrows and Towhees	Recently Confirmed	1992	Threatened		S3B	G4
King Rail *Rallus elegans*	Rails, Coots and Cranes	Recently Confirmed	1984	Threatened		S1B	G4
Least Bittern *Ixobrychus exilis*	Herons, Bitterns, Egrets, Pelicans	Recently Confirmed	2016	Threatened		S3B,S1N	G4G5
Northern Harrier *Circus hudsonius*	Hawks, Falcons, Eagles, Vultures	Recently Confirmed	2002	Threatened		S3B,S3N	G5
Peregrine Falcon *Falco peregrinus*	Hawks, Falcons, Eagles, Vultures	Recently Confirmed	2009	Endangered		S3B	G4
Pied-billed Grebe *Podilymbus podiceps*	Grebes	Recently Confirmed	2012	Threatened		S3B,S1N	G5
Sedge Wren *Cistothorus platensis*	Wrens	Historically Confirmed	1991	Threatened		S3B	G5
Upland Sandpiper *Bartramia longicauda*	Gulls, Terns, Plovers, Shorebirds	Recently Confirmed	1983	Threatened		S3B	G5

Animal: Reptiles

Timber Rattlesnake *Crotalus horridus*	Snakes	Extirpated		Threatened		S3	G4

Animal: Amphibians

Tiger Salamander *Ambystoma tigrinum*	Salamanders	Possible but not Confirmed		Endangered		S1S2	G5

Animal: Fish

Shortnose Sturgeon *Acipenser brevirostrum*	Sturgeons and Paddlefish	Recently Confirmed	2013	Endangered		S1	G3

New York Nature Explorer

Common Name	Subgroup	Distribution Status	Year Last Documente	Protection Status		Conservation Rank	
				State	Federal	State	Global
Animal: Butterflies and Moths							
Frosted Elfin *Callophrys irus*	Butterflies and Skippers	Recently Confirmed	2017	Threatened		S1S2	G2G3
Karner Blue *Plebejus melissa samuelis*	Butterflies and Skippers	Recently Confirmed	2017	Endangered		S1	G1G2
Persius Duskywing *Erynnis persius persius*	Butterflies and Skippers	Historically Confirmed	1963	Endangered		S1	G5T1T3
Animal: Animal Assemblages							
Bat Colony *Bat Colony*	Animal Assemblages	Recently Confirmed	2018			SNRN	GNR
Animal: Other Animals							
Bog Turtle *Glyptemys muhlenbergii*	Other Animals	Historically Confirmed	1960	Endangered		S2	G2G3
Spiny Softshell *Apalone spinifera*	Other Animals	Historically Confirmed		Special Concern		S2S3	G5
Plant: Flowering Plants							
Bayard's Adder's Mouth Orchid *Malaxis bayardii*	Orchids	Recently Confirmed	1997	Endangered		S1	G1G2
Goldenseal *Hydrastis canadensis*	Other Flowering Plants	Recently Confirmed	2021	Threatened		S2	G3G4
Hooker's Orchid *Platanthera hookeri*	Orchids	Historically Confirmed	1937	Endangered		S1	G4
Lily-leaved Twayblade *Liparis liliifolia*	Orchids	Recently Confirmed	1932	Endangered		S1	G5
Orange Fringed Orchid *Platanthera ciliaris*	Orchids	Historically Confirmed		Endangered		S1	G5
Pine Drops *Pterospora andromedea*	Other Flowering Plants	Historically Confirmed	1835	Endangered		S1	G5
Puttyroot *Aplectrum hyemale*	Orchids	Historically Confirmed	1959	Endangered		S1	G5

New York Nature Explorer

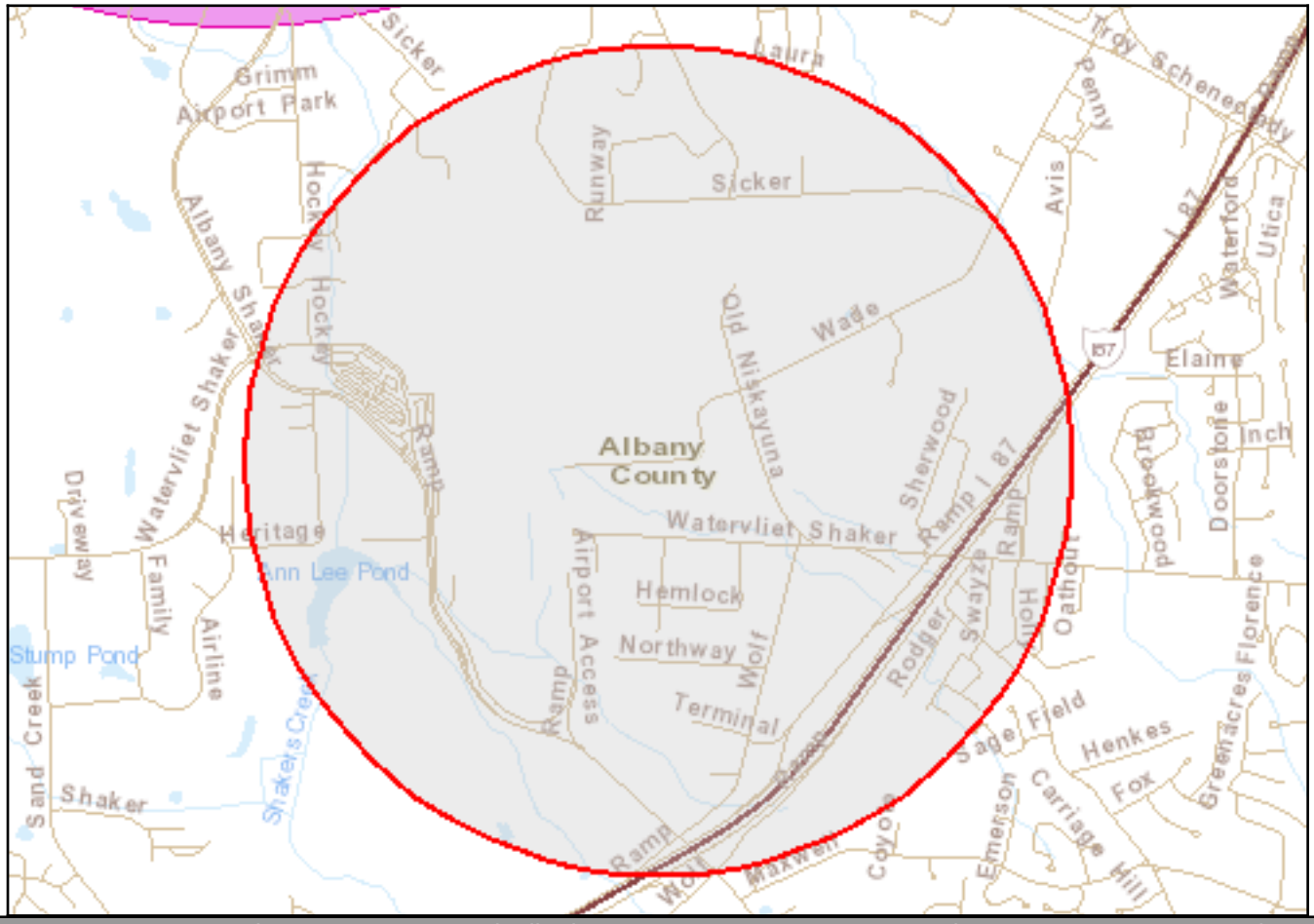
Common Name	Subgroup	Distribution Status	Year Last Documente	Protection Status		Conservation Rank	
				State	Federal	State	Global
Ram's Head Lady's Slipper	Orchids	Recently Confirmed	1980	Threatened		S2	G3
Cypripedium arietinum							

This list only includes records from the databases of the NY Natural Heritage Program, the second NYS Breeding Bird Atlas Project, and the NY Amphibian and Reptile Atlas Project. This list is not a definitive statement about the presence or absence of all plants and animals, including rare or state-listed species, or of all significant natural communities.

New York Nature Explorer

Albany AASF

Criteria: Selected Map Area



Common Name	Subgroup	Distribution Status	Year Last Documente	Protection Status		Conservation Rank	
				State	Federal	State	Global

Note: Restricted plants and animals may also have also been documented in one or more of the Towns or Cities in which your user-defined area is located, but are not listed in these results. This application does not provide information at the level of Town or City on state-listed animals and on other sensitive animals and plants. A list of the restricted animals and plants documented at the corresponding county level can be obtained via the County link(s) on the original User Defined Search Results page. Any individual plant or animal on this county's restricted list may or may not occur in this particular user-defined area.

This list only includes records of rare species and significant natural communities from the databases of the NY Natural Heritage Program. This list is not a definitive statement about the presence or absence of all plants and animals, including rare or state-listed species, or of all significant natural communities. For most areas, comprehensive field surveys have not been conducted, and this list should not be considered a substitute for on-site surveys.

U.S. Fish and Wildlife Service
National Wetlands Inventory

Albany AASF



June 4, 2024

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Appendix F
Soil Stockpile IDW Results

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Thursday, July 11, 2024

Attn: Jeff Kaleta
Precision Industrial Maint.
1710 Erie Blvd
Schenectady, NY 12308

Project ID: NATIONAL GUARD LATHAM
SDG ID: GCR01412
Sample ID#s: CR01412

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Sample Id Cross Reference

July 11, 2024

SDG I.D.: GCR01412

Project ID: NATIONAL GUARD LATHAM

Client Id	Lab Id	Matrix
SP-1	CR01412	SOLID

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

July 11, 2024

FOR: Attn: Jeff Kaleta
Precision Industrial Maint.
1710 Erie Blvd
Schenectady, NY 12308

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		06/20/24	16:40
Location Code:	PREINDST	Received by:	B	06/21/24	17:10
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCR01412
Phoenix ID: CR01412

Project ID: NATIONAL GUARD LATHAM
Client ID: SP-1

Parameter	Result	RL/ PQL	LOD/ MDL	Units	Dilution	Date/Time	By	Reference	
TCLP Silver	< 0.10	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Arsenic	< 0.10	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Barium	0.20	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Cadmium	< 0.050	0.050		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Chromium	< 0.10	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Mercury	< 0.0002	0.0002		mg/L	1	06/24/24	ZT	SW846 1311/7470	
TCLP Lead	< 0.10	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010	
TCLP Selenium	< 0.10	0.10		mg/L	1	06/24/24	TH	SW846 1311/6010D	
TCLP Metals Digestion	Completed					06/24/24	AL/AL	SW3010A	
Percent Solid	95			%		06/21/24	CV	SW846-%Solid	
Soil Extraction for PCB	Completed					06/25/24	H/A	SW3546	
Paint Filter Test	Passed			PASS/FAIL		06/21/24	O	SW9095B	
TCLP Digestion Mercury	Completed					06/24/24	AL/AL	SW7470A	
TCLP Extraction for Metals	Completed					06/21/24	AL	SW1311	
TCLP Extraction for Organics	Completed					06/21/24	AL	SW1311	
TCLP Semi-Volatile Extraction	Completed					06/25/24	LB1/LB1	SW3510C	
TCLP Extraction Volatiles	Completed					06/21/24	CV	SW1311	
PFAS (21)	Completed					07/05/24	***	EPA 537m	C

PFAS (21)

1H,1H,2H,2H-Perfluorodecanesulfonic acid	ND	0.263	0.0270	ng/g	1	07/09/24	***	EPA 537m	C
1H,1H,2H,2H-Perfluorooctanesulfonic acid	ND	0.263	0.0695	ng/g	1	07/09/24	***	EPA 537m	C
NEtFOSAA	ND	0.263	0.110	ng/g	1	07/09/24	***	EPA 537m	C
NMeFOSAA	ND	0.263	0.110	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.263	0.0539	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.263	0.0519	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.263	0.0492	ng/g	1	07/09/24	***	EPA 537m	C

Ver 1

Project ID: NATIONAL GUARD LATHAM
Client ID: SP-1

Phoenix I.D.: CR01412

Parameter	Result	RL/ PQL	LOD/ MDL	Units	Dilution	Date/Time	By	Reference	
Perfluorobutanesulfonic acid (PFBS)	ND	0.263	0.211	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorodecanoic acid (PFDA)	ND	0.263	0.0539	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorododecanoic acid (PFDoA)	ND	0.263	0.0790	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoroheptanoic acid (PFHpA)	ND	0.263	0.0479	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorohexanesulfonic Acid (PFHxS)	ND	0.263	0.0326	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorohexanoic acid (PFHxA)	ND	0.263	0.0694	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoro-n-butanoic acid (PFBA)	ND	0.263	0.192	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorononanoic acid (PFNA)	ND	0.263	0.0630	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorooctanesulfonic Acid (PFOS)	1.64	0.263	0.0461	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorooctanoic acid (PFOA)	ND	0.263	0.0813	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoropentanoic acid (PFPeA)	ND	0.263	0.0968	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorotetradecanoic acid (PFTA)	ND	0.263	0.0787	ng/g	1	07/09/24	***	EPA 537m	C
Perfluorotridecanoic acid (PFTrDA)	ND	0.263	0.0458	ng/g	1	07/09/24	***	EPA 537m	C
Perfluoroundecanoic acid (PFUnA)	ND	0.263	0.122	ng/g	1	07/09/24	***	EPA 537m	C
QA/QC Surrogates									
% d3-N-MeFOSAA	117			%	1	07/09/24	***	25 - 150 %	C
% d5-N-EtFOSAA	106			%	1	07/09/24	***	25 - 150 %	C
% M2-6:2 FTS	356			%	1	07/09/24	***	25 - 200 %	C,3
% M2-8:2 FTS	250			%	1	07/09/24	***	25 - 200 %	C,3
% M2PFTEDA	104			%	1	07/09/24	***	10 - 150 %	C
% M3PFBS	122			%	1	07/09/24	***	25 - 150 %	C
% M3PFHxS	164			%	1	07/09/24	***	25 - 150 %	C,3
% M4PFHpA	115			%	1	07/09/24	***	25 - 150 %	C
% M5PFHxA	106			%	1	07/09/24	***	25 - 150 %	C
% M5PFPEA	113			%	1	07/09/24	***	25 - 150 %	C
% M6PFDA	106			%	1	07/09/24	***	25 - 150 %	C
% M7PFUDA	72.0			%	1	07/09/24	***	25 - 150 %	C
% M8FOSA	99.2			%	1	07/09/24	***	10 - 150 %	C
% M8PFOA	142			%	1	07/09/24	***	25 - 150 %	C
% M8PFOS	121			%	1	07/09/24	***	25 - 150 %	C
% M9PFNA	104			%	1	07/09/24	***	25 - 150 %	C
% MPFBA	133			%	1	07/09/24	***	25 - 150 %	C
% MPFDOA	81.5			%	1	07/09/24	***	25 - 150 %	C
Polychlorinated Biphenyls									
PCB-1016	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1221	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1232	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1242	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1248	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1254	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1260	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1262	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
PCB-1268	ND	350		ug/Kg	10	06/26/24	SC	SW8082A	
QA/QC Surrogates									
% DCBP	98			%	10	06/26/24	SC	30 - 150 %	
% DCBP (Confirmation)	92			%	10	06/26/24	SC	30 - 150 %	
% TCMX	90			%	10	06/26/24	SC	30 - 150 %	
% TCMX (Confirmation)	96			%	10	06/26/24	SC	30 - 150 %	

Project ID: NATIONAL GUARD LATHAM
Client ID: SP-1

Phoenix I.D.: CR01412

Parameter	Result	RL/ PQL	LOD/ MDL	Units	Dilution	Date/Time	By	Reference
TCLP Volatiles								
1,1-Dichloroethene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
1,2-Dichloroethane	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
1,4-Dichlorobenzene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Benzene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Carbon tetrachloride	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Chlorobenzene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Chloroform	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Methyl ethyl ketone	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Tetrachloroethene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Trichloroethene	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
Vinyl chloride	ND	50		ug/L	10	06/25/24	HM	SW846 1311/8260
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4 (10x)	99			%	10	06/25/24	HM	70 - 130 %
% Bromofluorobenzene (10x)	99			%	10	06/25/24	HM	70 - 130 %
% Dibromofluoromethane (10x)	91			%	10	06/25/24	HM	70 - 130 %
% Toluene-d8 (10x)	101			%	10	06/25/24	HM	70 - 130 %
TCLP Acid/Base-Neutral								
1,4-Dichlorobenzene	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
2,4,5-Trichlorophenol	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
2,4,6-Trichlorophenol	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
2,4-Dinitrotoluene	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
2-Methylphenol (o-cresol)	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
3&4-Methylphenol (m&p-Cresol)	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Hexachlorobenzene	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Hexachlorobutadiene	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Hexachloroethane	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Nitrobenzene	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Pentachlorophenol	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
Pyridine	ND	83		ug/L	1	06/26/24	MR	SW-846 1311/8270
QA/QC Surrogates								
% 2,4,6-Tribromophenol	89			%	1	06/26/24	MR	15 - 110 %
% 2-Fluorobiphenyl	81			%	1	06/26/24	MR	30 - 130 %
% 2-Fluorophenol	67			%	1	06/26/24	MR	15 - 110 %
% Nitrobenzene-d5	89			%	1	06/26/24	MR	30 - 130 %
% Phenol-d5	62			%	1	06/26/24	MR	15 - 110 %
% Terphenyl-d14	87			%	1	06/26/24	MR	30 - 130 %

Parameter	Result	RL/ PQL	LOD/ MDL	Units	Dilution	Date/Time	By	Reference

3 = This parameter exceeds laboratory specified limits.
C = This parameter is subcontracted.

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low LOD=Limit of Detection MDL=Method Detection Limit1
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Paint Filter Test:
Pass = no free liquids were detected. Fail = free liquids were detected.

*See attached

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

PFAS (21) (EPA 537m), PFOA/PFOS - Soil Extraction (EPA 537m) were analyzed by NY certified lab #12058.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

July 11, 2024

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102

NY # 11301

QA/QC Report

July 11, 2024

QA/QC Data

SDG I.D.: GCR01412

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 737163 (mg/L), QC Sample No: CR01489 (CR01412)													
Mercury - Water	BRL	0.0002	<0.0002	<0.0002	NC	99.5			106			80 - 120	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 737164 (mg/L), QC Sample No: CR01053 (CR01412)													
ICP Metals - TCLP Extraction													
Arsenic	BRL	0.05	<0.05	<0.05	NC	108	111	2.7	109			80 - 120	20
Barium	BRL	0.01	0.38	0.38	0	93.5	95.6	2.2	92.8			80 - 120	20
Cadmium	BRL	0.005	<0.004	<0.005	NC	93.2	97.0	4.0	92.7			80 - 120	20
Chromium	BRL	0.010	<0.010	<0.010	NC	92.4	95.8	3.6	93.7			80 - 120	20
Lead	BRL	0.010	0.089	0.090	1.10	98.2	101	2.8	98.4			80 - 120	20
Selenium	BRL	0.05	<0.04	<0.05	NC	107	108	0.9	107			80 - 120	20
Silver	BRL	0.010	<0.005	<0.010	NC	102	103	1.0	106			80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

PHOENIX

Environmental Laboratories, Inc.
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Tel. (860) 645-1102

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

QA/QC Report

July 11, 2024

QA/QC Data

SDG I.D.: GCR01412

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 739560 (ng/g), QC Sample No: CR01412 (CR01412)											
PFOA & PFOS											
6:2FTS	ND	0.250	120						50 - 200		
8:2FTS	ND	0.250	109						50 - 200		
FOSA	ND	0.250	90.9						50 - 130		
NEtFOSAA	ND	0.250	106						50 - 130		
NMeFOSAA	ND	0.250	114						50 - 130		
PFBA	ND	0.250	103						50 - 130		
PFBS	ND	0.250	111						50 - 130		
PFDA	ND	0.250	86.5						50 - 130		
PFDoA	ND	0.250	102						50 - 130		
PFDS	ND	0.250	108						50 - 130		
PFHpA	ND	0.250	93.6						50 - 130		
PFHpS	ND	0.250	141						50 - 130		I
PFHxA	ND	0.250	97.6						50 - 130		
PFHxS	ND	0.250	110						50 - 130		
PFNA	ND	0.250	94.1						50 - 130		
PFOA	ND	0.250	81.7						50 - 130		
PFOS	ND	0.250	132						50 - 130		I
PFPeA	ND	0.250	100						50 - 130		
PFTA	ND	0.250	107						50 - 130		
PFTrDA	ND	0.250	18.8						50 - 130		I
PFUnA	ND	0.250	113						50 - 130		
% d3-N-MeFOSAA	124	0.0500	107						25 - 150		
% M2-6:2 FTS	263	0.0500	221						25 - 200		I,S
% M2-8:2 FTS	168	0.0500	205						25 - 200		I
% M2PFTEDA	130	0.0500	58.3						10 - 150		
% M3PFBS	162	0.0500	124						25 - 150		S
% M3PFHxS	229	0.0500	158						25 - 150		I,S
% M4PFHpA	146	0.0500	140						25 - 150		
% M5PFHxA	145	0.0500	116						25 - 150		
% M5PFPEA	148	0.0500	102						25 - 150		
% M6PFDA	134	0.0500	118						25 - 150		
% M7PFUDA	100	0.0500	93.6						25 - 150		
% M8FOSA	112	0.0500	93.3						10 - 150		
% M8PFOA	175	0.0500	151						25 - 150		I,S
% M8PFOS	155	0.0500	116						25 - 150		S
% M9PFNA	135	0.0500	115						25 - 150		
% MPFBA	120	0.0500	107						25 - 150		
% MPFDOA	122	0.0500	98.0						25 - 150		
QA/QC Batch 737446 (ug/Kg), QC Sample No: CR01380 2X (CR01412)											
Polychlorinated Biphenyls - Solid											
PCB-1016	ND	33	94	95	1.1	84	94	11.2	40 - 140	30	

QA/QC Data

SDG I.D.: GCR01412

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	99	98	1.0	84	95	12.3	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	91	%	106	106	0.0	88	104	16.7	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	105	%	122	123	0.8	100	117	15.7	30 - 150	30
% TCMX (Surrogate Rec)	61	%	82	78	5.0	75	84	11.3	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	61	%	87	84	3.5	79	87	9.6	30 - 150	30
QA/QC Batch 737468 (ug/L), QC Sample No: CR02282 (CR01412)										
Semivolatiles - TCLP										
1,4-Dichlorobenzene	ND	17	70	72	2.8	71			40 - 140	20
2,4,5-Trichlorophenol	ND	17	94	104	10.1	100			40 - 140	20
2,4,6-Trichlorophenol	ND	17	95	102	7.1	99			30 - 130	20
2,4-Dinitrotoluene	ND	58	100	111	10.4	105			30 - 130	20
2-Methylphenol (o-cresol)	ND	17	87	95	8.8	91			40 - 140	20
3&4-Methylphenol (m&p-cresol)	ND	17	77	88	13.3	78			30 - 130	20
Hexachlorobenzene	ND	58	78	91	15.4	86			40 - 140	20
Hexachlorobutadiene	ND	58	84	89	5.8	86			40 - 140	20
Hexachloroethane	ND	58	70	70	0.0	71			40 - 140	20
Nitrobenzene	ND	58	86	94	8.9	90			40 - 140	20
Pentachlorophenol	ND	58	90	97	7.5	92			30 - 130	20
Pyridine	ND	83	65	53	20.3	48			40 - 140	20
% 2,4,6-Tribromophenol	85	%	85	91	6.8	86			15 - 110	20
% 2-Fluorobiphenyl	83	%	86	88	2.3	82			30 - 130	20
% 2-Fluorophenol	62	%	64	64	0.0	60			15 - 110	20
% Nitrobenzene-d5	83	%	85	88	3.5	80			30 - 130	20
% Phenol-d5	57	%	58	61	5.0	56			15 - 110	20
% Terphenyl-d14	87	%	93	99	6.3	90			30 - 130	20
Comment:										
Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)										
QA/QC Batch 737655 (ug/L), QC Sample No: CR01412 (CR01412 (10X))										
Volatiles - TCLP										
1,1-Dichloroethene	ND	5.0	97	95	2.1	112	114	1.8	70 - 130	20
1,2-Dichloroethane	ND	0.60	104	100	3.9	110	112	1.8	70 - 130	20
Benzene	ND	0.70	105	101	3.9	115	116	0.9	70 - 130	20
Carbon tetrachloride	ND	5.0	116	96	18.9	110	114	3.6	70 - 130	20
Chlorobenzene	ND	1.0	105	101	3.9	112	113	0.9	70 - 130	20
Chloroform	ND	5.0	101	97	4.0	111	114	2.7	70 - 130	20
Methyl ethyl ketone	ND	5.0	95	93	2.1	105	105	0.0	70 - 130	20
Tetrachloroethene	ND	1.0	97	94	3.1	109	108	0.9	70 - 130	20
Trichloroethene	ND	5.0	101	98	3.0	113	115	1.8	70 - 130	20
Vinyl chloride	ND	5.0	101	96	5.1	114	118	3.4	70 - 130	20
% 1,2-dichlorobenzene-d4	98	%	100	100	0.0	99	100	1.0	70 - 130	20
% Bromofluorobenzene	98	%	102	102	0.0	100	103	3.0	70 - 130	20
% Dibromofluoromethane	90	%	92	93	1.1	92	99	7.3	70 - 130	20
% Toluene-d8	99	%	102	102	0.0	102	104	1.9	70 - 130	20

QA/QC Data

SDG I.D.: GCR01412

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
s = This parameter is outside laboratory Blank Surrogate specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
July 11, 2024

Thursday, July 11, 2024

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCR01412 - PREINDST

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

July 11, 2024 SDG I.D.: GCR01412

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report:

SVOA Narration

CHEM36 06/25/24-2: CR01412

The following Continuing Calibration compounds did not meet recommended response factors: Hexachlorobenzene 0.095 (0.1)
The following Continuing Calibration compounds did not meet minimum response factors: None.

Up to eight compounds can be outside of ICAL %RSD criteria and up to sixteen compounds can be outside of CCAL %Dev criteria if less than 40%.

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

July 11, 2024

SDG I.D.: GCR01412

The samples in this delivery group were received at 1.7°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

Cooler: Yes [X] No [ ]
Coolant: IPK [X] ICE [ ] No [ ]
Temp 5.1°C 9.7°C

NY/NJ/PA CHAIN OF CUSTODY RECORD

Page 1 of 1

PHOENIX *Environmental Laboratories, Inc.*

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: Makrina Nolan, makrina@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-1102

Contact Options:
[ ] Phone: 518-369-5600
[ ] Fax:
[ ] Email: JTcaleta@PSM-INC.com

Customer: Precision Industrial Maintenance
Address: 1710 Erie Blvd
Schenectady, N.Y. 12308

Project: National Guard - Latham
Report to: Jeff Caleta
Invoice to: Jeff Caleta
QUOTE # :

Project P.O:

This section MUST be completed with Bottle Quantities.

Sampler's Signature: JTCaleta Date: 6/20/24

Client Sample - Information - Identification

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe **OIL**=Oil
B=Bulk **L**=Liquid

Analysis Request

PHOENIX USE ONLY SAMPLE #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	*MS/MSD (May be billable at analysis unit rate)	8260 TCLP	8270 TCLP	PCB's	% solids	Paint Filter	8 RCRA Metals	PFAS 537M (24 list)	GL Amber 8 oz. [ ] w/H_3PO_4 [ ] $NAHSO_4$	Soil VOA Vials [ ] methanol [ ] H_2O	GL Soil container (8) oz	GL Soil container (6) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H_2SO_4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H_2SO_4 [ ] 250ml [ ] 500ml	PL NAOH 250ml	PL HNO_3 250ml	Bacteria Bottle w/thio	Bacteria Bottle as is
01412	SP-1	S	6/20/24	4:40		X	X	X	X	X	X	X			1	1		1						

Relinquished by:	Accepted by:	Date:	Time:
JTCaleta	Enrique Jr Caleta	21June2024	1000
Enrique Jr Caleta			
97			2227

Comments, Special Requirements or Regulations:
Soil pile
Ashley See 6/21/24 17:10

*MS/MSD are considered site samples and will be billed as such in accordance with the prices quoted.

Data Format:
[ ] Phoenix Std Report [ ] EQuIS
[ ] Excel [ ] NJ Hazsite EDD
[ ] PDF [ ] NY EZ EDD (ASP)
[ ] GIS/Key [ ] Other

Turnaround:
[ ] 1 Day*
[ ] 2 Days*
[ ] 3 Days*
[ ] 4 Days*
[ ] 5 Days*
[X] Standard
* SURCHARGE APPLIES

NJ
[ ] Res. Criteria
[ ] Non-Res. Criteria
[ ] Impact to GW Soil Cleanup Criteria
[ ] Impact to GW soil screen Criteria
[ ] GW Criteria

Data Package:
[ ] NJ Reduced Deliv. *
[ ] Other
[ ] NY Enhanced (ASP B) *

NY
[ ] TOGS GW
[ ] CP-51 SOIL
[ ] 375SCO Unrestricted Soil
[ ] 375SCO Residential Soil
[ ] 375SCO Residential Restricted Soil
[ ] 375SCO Commercial Soil
[ ] 375SCO Industrial Soil
[ ] Subpart 5 DW

PA
[ ] Clean Fill Limits
[ ] PA-GW
[ ] Reg Fill Limits
[ ] PA Soil Restricted
[ ] PA Soil non-restricted

State Samples Collected? NY

PEL-111 Rev 1/2023

Technical Report

prepared for:

Phoenix Environmental Laboratories, Inc.
P.O. Box 370, 587 East Middle Turnpike
Manchester CT, 06040
Attention: Helen Geoghegan

Report Date: 07/09/2024
Client Project ID: GCR01412
York Project (SDG) No.: 24F1633

Stratford, CT Laboratory IDs:
NY:10854, NJ: CT005, PA: 68-0440, CT: PH-0723

Richmond Hill, NY Laboratory IDs:
NY:12058, NJ: NY037, CT: PH-0721, NH: 2097,
EPA: NY01600

120 RESEARCH DRIVE STRATFORD, CT 06615 ■ 132-02 89th AVENUE RICHMOND HILL, NY 11418
www.YORKLAB.com (203) 325-1371 FAX (203) 357-0166 ClientServices@yorklab.com

Report Date: 07/09/2024
Client Project ID: GCR01412
York Project (SDG) No.: 24F1633

Phoenix Environmental Laboratories, Inc.
P.O. Box 370, 587 East Middle Turnpike
Manchester CT, 06040
Attention: Helen Geoghegan

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on June 25, 2024 and listed below. The project was identified as your project: **GCR01412**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
24F1633-01	CR01412	Soil	06/20/2024	06/25/2024

General Notes for York Project (SDG) No.: 24F1633

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854, NJ Cert No. CT005, PA Cert No. 68-04440, CT Cert No. PH-0723; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058, NJ Cert No. NY037, CT Cert No. PH-0721, NH Cert No. 2097, EPA Cert No. NY01600.

Approved By: Cassie L. Mosher

Cassie L. Mosher
Laboratory Manager

Date: 07/09/2024

Sample Information

Client Sample ID: CR01412 **York Sample ID:** 24F1633-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
24F1633	GCR01412	Soil	June 20, 2024 4:40 pm	06/25/2024

PFAS by EPA 537 m

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
1763-23-1	*** Perfluorooctanesulfonic acid (PFOS)**	**1.64**	PF-CCV-H, PF-LCS-H	ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND	PF-CCV-L, PF-LCS-L	ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
2991-50-6	* N-EtFOSAA	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH

Sample Information

Client Sample ID: CR01412 **York Sample ID:** 24F1633-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
24F1633	GCR01412	Soil	June 20, 2024 4:40 pm	06/25/2024

PFAS by EPA 537 m

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	0.263	1	EPA 537m Certifications:	07/05/2024 09:52	07/09/2024 16:59	KFH

Surrogate Recoveries	Result		Acceptance Range
Surrogate: M3PFBS	*122 %*		*25-150*
Surrogate: M5PFHxA	*106 %*		*25-150*
Surrogate: M4PFHpA	*115 %*		*25-150*
Surrogate: M3PFHxS	*164 %*	PFSu-H	*25-150*
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	*142 %*		*25-150*
Surrogate: M6PFDA	*106 %*		*25-150*
Surrogate: M7PFUdA	*72.0 %*		*25-150*
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	*81.5 %*		*25-150*
Surrogate: M2PFTeDA	*104 %*		*10-150*
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	*133 %*		*25-150*
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	*121 %*		*25-150*
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	*113 %*		*25-150*
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	*99.2 %*		*10-150*
Surrogate: d3-N-MeFOSAA	*117 %*		*25-150*
Surrogate: d5-N-EtFOSAA	*106 %*		*25-150*
Surrogate: M2-6:2 FTS	*356 %*	PFSu-H	*25-200*
Surrogate: M2-8:2 FTS	*250 %*	PFSu-H	*25-200*
Surrogate: M9PFNA	*104 %*		*25-150*

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst

Sample Information

Client Sample ID: CR01412 **York Sample ID:** 24F1633-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
24F1633	GCR01412	Soil	June 20, 2024 4:40 pm	06/25/2024

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	*** % Solids**	**94.9**		%	0.100	1	SM 2540G	06/27/2024 17:35	06/27/2024 17:38	AC
							Certifications: CTDOH-PH-0723			

Analytical Batch Summary

Batch ID: BF41922 **Preparation Method:** % Solids Prep **Prepared By:** AC

YORK Sample ID	Client Sample ID	Preparation Date
24F1633-01	CR01412	06/27/24
BF41922-DUP1	Duplicate	06/27/24

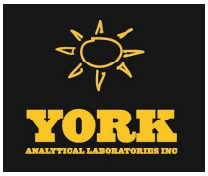
Batch ID: BG40359 **Preparation Method:** SPE Ext-PFAS-EPA 537.1M **Prepared By:** SAB

YORK Sample ID	Client Sample ID	Preparation Date
24F1633-01	CR01412	07/05/24
BG40359-BLK1	Blank	07/05/24
BG40359-BS1	LCS	07/05/24

PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BG40359 - SPE Ext-PFAS-EPA 537.1M											
Blank (BG40359-BLK1)									Prepared: 07/05/2024 Analyzed: 07/09/2024		
Perfluorobutanesulfonic acid (PFBS)	ND	0.250	ug/kg wet								
Perfluorohexanoic acid (PFHxA)	ND	0.250	"								
Perfluoroheptanoic acid (PFHpA)	ND	0.250	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	0.250	"								
Perfluorooctanoic acid (PFOA)	ND	0.250	"								
Perfluorooctanesulfonic acid (PFOS)	ND	0.250	"								
Perfluorononanoic acid (PFNA)	ND	0.250	"								
Perfluorodecanoic acid (PFDA)	ND	0.250	"								
Perfluoroundecanoic acid (PFUnA)	ND	0.250	"								
Perfluorododecanoic acid (PFDoA)	ND	0.250	"								
Perfluorotridecanoic acid (PFTrDA)	ND	0.250	"								
Perfluorotetradecanoic acid (PFTA)	ND	0.250	"								
N-MeFOSAA	ND	0.250	"								
N-EtFOSAA	ND	0.250	"								
Perfluoropentanoic acid (PFPeA)	ND	0.250	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.250	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.250	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.250	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	0.250	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	0.250	"								
Perfluoro-n-butanoic acid (PFBA)	ND	0.250	"								
Surrogate: M3PFBS	*8.10*		"	*5.00*		*162*	*25-150*				
Surrogate: M5PFHxA	*7.23*		"	*5.00*		*145*	*25-150*				
Surrogate: M4PFHpA	*7.32*		"	*5.00*		*146*	*25-150*				
Surrogate: M3PFHxS	*11.4*		"	*5.00*		*229*	*25-150*				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	*8.75*		"	*5.00*		*175*	*25-150*				
Surrogate: M6PFDA	*6.69*		"	*5.00*		*134*	*25-150*				
Surrogate: M7PFUdA	*5.02*		"	*5.00*		*100*	*25-150*				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	*6.09*		"	*5.00*		*122*	*25-150*				
Surrogate: M2PFTeDA	*6.48*		"	*5.00*		*130*	*10-150*				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	*5.99*		"	*5.00*		*120*	*25-150*				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	*7.76*		"	*5.00*		*155*	*25-150*				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	*7.39*		"	*5.00*		*148*	*25-150*				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	*5.61*		"	*5.00*		*112*	*10-150*				
Surrogate: d3-N-MeFOSAA	*6.22*		"	*5.00*		*124*	*25-150*				
Surrogate: d5-N-EtFOSAA	*7.02*		"	*5.00*		*140*	*25-150*				
Surrogate: M2-6:2 FTS	*13.1*		"	*5.00*		*263*	*25-200*				
Surrogate: M2-8:2 FTS	*8.42*		"	*5.00*		*168*	*25-200*				
Surrogate: M9PFNA	*6.76*		"	*5.00*		*135*	*25-150*				



PFAS Target compounds by LC/MS-MS - Quality Control Data

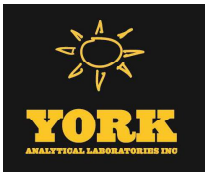
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BG40359 - SPE Ext-PFAS-EPA 537.1M											
LCS (BG40359-BS1)								Prepared: 07/05/2024 Analyzed: 07/09/2024			
Perfluorobutanesulfonic acid (PFBS)	4.71	0.240	ug/kg wet	4.25		111	50-130				
Perfluorohexanoic acid (PFHxA)	4.69	0.240	"	4.81		97.6	50-130				
Perfluoroheptanoic acid (PFHpA)	4.50	0.240	"	4.81		93.6	50-130				
Perfluorohexanesulfonic acid (PFHxS)	4.80	0.240	"	4.38		110	50-130				
Perfluorooctanoic acid (PFOA)	3.93	0.240	"	4.81		81.7	50-130				
Perfluorooctanesulfonic acid (PFOS)	5.89	0.240	"	4.45		132	50-130	High Bias			
Perfluorononanoic acid (PFNA)	4.52	0.240	"	4.81		94.1	50-130				
Perfluorodecanoic acid (PFDA)	4.16	0.240	"	4.81		86.5	50-130				
Perfluoroundecanoic acid (PFUnA)	5.41	0.240	"	4.81		113	50-130				
Perfluorododecanoic acid (PFDoA)	4.88	0.240	"	4.81		102	50-130				
Perfluorotridecanoic acid (PFTrDA)	0.905	0.240	"	4.81		18.8	50-130	Low Bias			
Perfluorotetradecanoic acid (PFTA)	5.15	0.240	"	4.81		107	50-130				
N-MeFOSAA	5.47	0.240	"	4.81		114	50-130				
N-EtFOSAA	5.11	0.240	"	4.81		106	50-130				
Perfluoropentanoic acid (PFPeA)	4.82	0.240	"	4.81		100	50-130				
Perfluoro-1-octanesulfonamide (FOSA)	4.37	0.240	"	4.81		90.9	50-130				
Perfluoro-1-heptanesulfonic acid (PFHpS)	6.48	0.240	"	4.59		141	50-130	High Bias			
Perfluoro-1-decanesulfonic acid (PFDS)	5.01	0.240	"	4.64		108	50-130				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	5.46	0.240	"	4.57		120	50-200				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	5.05	0.240	"	4.62		109	50-200				
Perfluoro-n-butanoic acid (PFBA)	4.97	0.240	"	4.81		103	50-130				
Surrogate: M3PFBS	*5.96*		*"*	*4.81*		*124*	*25-150*				
Surrogate: M5PFHxA	*5.59*		*"*	*4.81*		*116*	*25-150*				
Surrogate: M4PFHpA	*6.75*		*"*	*4.81*		*140*	*25-150*				
Surrogate: M3PFHxS	*7.61*		*"*	*4.81*		*158*	*25-150*				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	*7.26*		*"*	*4.81*		*151*	*25-150*				
Surrogate: M6PFDA	*5.69*		*"*	*4.81*		*118*	*25-150*				
Surrogate: M7PFUdA	*4.50*		*"*	*4.81*		*93.6*	*25-150*				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	*4.71*		*"*	*4.81*		*98.0*	*25-150*				
Surrogate: M2PFTeDA	*2.80*		*"*	*4.81*		*58.3*	*10-150*				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	*5.12*		*"*	*4.81*		*107*	*25-150*				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	*5.57*		*"*	*4.81*		*116*	*25-150*				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	*4.91*		*"*	*4.81*		*102*	*25-150*				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	*4.48*		*"*	*4.81*		*93.3*	*10-150*				
Surrogate: d3-N-MeFOSAA	*5.14*		*"*	*4.81*		*107*	*25-150*				
Surrogate: d5-N-EtFOSAA	*4.72*		*"*	*4.81*		*98.2*	*25-150*				
Surrogate: M2-6:2 FTS	*10.6*		*"*	*4.81*		*221*	*25-200*				
Surrogate: M2-8:2 FTS	*9.87*		*"*	*4.81*		*205*	*25-200*				
Surrogate: M9PFNA	*5.54*		*"*	*4.81*		*115*	*25-150*				

Miscellaneous Physical Parameters - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BF41922 - % Solids Prep											
Duplicate (BF41922-DUP1)	*Source sample: 24F1632-01 (Duplicate)							Prepared & Analyzed: 06/27/2024			
% Solids	87.8	0.100	%		87.3				0.564	20	


YORK
ANALYTICAL LABORATORIES INC

Sample and Data Qualifiers Relating to This Work Order

PFSu-H	The isotopically labeled surrogate recovered above lab control limits due to a matrix effect. Isotope Dilution was applied.
PF-LCS-L	The LCS recovery for this PFAS compound was below control limits.
PF-LCS-H	The LCS recovery for this PFAS compound was above control limits.
PF-CCV-L	The CCV recovery for this PFAS compound was below control limits.
PF-CCV-H	The CCV recovery for this PFAS compound was above control limits.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

24F1633

Cooler: Yes ☐ No ☐
Coolant: IPK ☐ ICE ☐ No ☐

Temp 1.1 °C Pg of

CHAIN OF CUSTODY RECORD

Page 1 of 1

PHOENIX Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Contact Options:
☐ Fax: 860-645-0823
☐ Phone: 800-827-5426
☐ Email: HelenG@PhoenixLabs.com

Customer: York Analytical Laboratories, Inc.
Address: 132-02 89th Avenue
Richmond Hill, NY

Project #: GCR01412
Report to: HelenG@PhoenixLabs.com / Helen Geoghegan
Invoice to: AccountsPayable@PhoenixLabs.com
Quote# :

Project P.O: GCR01412

This section MUST be completed with Bottle Quantities.

Client Sample - Information - Identification

Sampler's Signature _____ Date: _____

Matrix Code:
DW=Drinking Water **GW**=Ground Water **SW**=Surface Water **WW**=Waste Water
RW=Raw Water **SE**=Sediment **SL**=Sludge **S**=Soil **SD**=Solid **W**=Wipe
OIL=Oil **B**=Bulk **L**=Liquid

Analysis Request

Phoenix Sample ID	Sample Comment	Sample Matrix	Date Sampled	Time Sampled	PFAS (21) E537 modified	8oz HDPE Plastic As Is
CR01412		SOL	6/20/2024	4:40 PM	x	1

Relinquished by:	Accepted by:	Date:	Time:
		6/25/24	0715
		6/25/24	1236
		6/25/24	16:25
		6/25/24	18:30

Comments, Special Requirements or Regulations:

2 6/25/24 18:30 2.6

Please send notice as soon as possible not exceeding 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration.

Please notify Phoenix Environmental Laboratories, Inc. immediately and prior to conducting analysis if certification is not held for the analyses requested.

Turnaround:
☐ 1 Day
☐ 2 Days
☐ 3 Days
☐ 5 Days
☐ 10 Days
☒ Standard
☐ Other_____

Report Type:
☒ Standard PDF
☐ Full Data Package
☐ NJ Reduced Deliverable
☐ NJ Full Deliverable
☐ NY ASP B

What State were samples collected?
NY

EDD Format:
☐ Excel
☐ GIS/Key
☐ EQuIS
☐ NJ Hazsite EDD
☐ NY EZ EDD (ASP)
☐ Other:_____

State Criteria:

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Appendix G
State Historic Preservation Officer Response

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New York State
Parks, Recreation and
Historic Preservation

KATHY HOCHUL
Governor

RANDY SIMONS
Commissioner Pro Tempore

January 03, 2025

Gregory Austin
Cultural Resource Manager
NYSDMNA NYARNG
JFHQ
330 Old Niskayuna Rd
Latham, NY 12067

Re: NGB
Construct New Access Control Point & Install Additional Groundwater Monitoring Wells
330 Old Niskayuna Rd, Latham/Colonie, Albany County, NY 12110
24PR11403

Dear Gregory Austin:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project.

Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above. If you have any questions, please contact Chelsea Towers at the following email address:

Chelsea.Towers@parks.ny.gov

Sincerely,

R. Daniel Mackay

Deputy State Historic Preservation Officer
Division for Historic Preservation

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Appendix H
RSL Update

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Appendix H
Applicable Screening Levels at QAPP Finalization
Albany Army Aviation Support Facility #3
Latham, New York

The relevant screening levels (SLs) for Department of Defense (DoD) Remedial Investigations (RI) for per- and polyfluoroalkyl substances (PFAS) are updated regularly based on new regulations and policies. As such, the SLs presented in this appendix document the relevant SLs at the time of finalization of the subject Quality Assurance Project Plan (QAPP).

The SLs presented within the body of the QAPP are the November 2023 Office of the Secretary of Defense (OSD) SLs. As of the date of finalization, the most current SLs are based on the 17 January 2025 OSD Memorandum, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program.* The SLs are presented in Table 1 below:

Table 1- DoD SLs as of Finalization of the Subject QAPP

Analyte	Residential (Soil) (µg/kg)[a, b] 0-2 ft bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[c] 2-15 ft bgs	Tap Water (Groundwater) (ng/L)[a, b]
HFPO-DA	23	350	1.5
PFBA	7,800	120,000	1,800
PFBS	1,900	25,000	600
PFHxA	3,200	41,000	990
PFHxS	130	1,600	10
PFNA	19	250	5.9
PFOA	0.070	0.078	4.0
PFOS	0.63	8.2	4.0
TFSI[d]	2,300	35,000	590
PFPrA[d]	3,900	58,000	980
PFDA	0.06	0.16	0.52

Appendix H
Applicable Screening Levels at QAPP Finalization
Albany Army Aviation Support Facility #3
Latham, New York

Notes:

[a] The DoD SLs are derived from a combination of USEPA Regional Screening Level (RSLs) based on a cancer risk level of 1E-06 and a hazard quotient of 0.1 (November 2024), USEPA Maximum Contaminant Levels, and DoD-adjusted SLs which are based on pooled method detection limits. The DoD SLs are consistent with the memorandum from the OSD, *Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program* (17 January 2025), and the list of RSLs included in Department of Defense Investigations of PFAS (https://www.acq.osd.mil/eie/eer/ecc/pfas/pfas101/rsl.html).

[b] The OSD memo values are applicable to tap water and soil. Surface water and sediment screening criteria are multiplied by a factor of 10 from the respective residential tap water and soil RSLs to estimate changes in exposure when assuming a non-residential scenario compared to a residential scenario.

[c] USEPA RSLs Version Date November 2024. Screening levels based on an industrial soil scenario (composite worker) with a cancer risk level of 1E-06 and a hazard quotient of 0.1.

[d] PFPrA and TFSI are not currently included in the 40-compound list for USEPA Method 1633.

Acronyms and Abbreviations:

µg/kg = micrograms per kilogram
bgs = below ground surface
ft = foot or feet
HFPO-DA = hexafluoropropylene oxide dimer acid
ng/L = nanograms per liter
PFBA = perfluorobutanoic acid
PFBS = perfluorobutanesulfonic acid
PFDA = perfluorodecanoic acid
PFHxA = perfluorohexanoic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctanesulfonic acid
PFPrA = perfluoropropanoic acid
RSL = Regional Screening Level
TFSI = bis (trifluoromethyl sulfonyl) amine
USEPA = United States Environmental Protection Agency