FINAL
Preliminary Assessment Report
New Hampshire National Guard Training Site
Center Strafford, New Hampshire

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

December 2019

Prepared for:

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AGQS	ambient groundwater quality standards
amsl	above mean sea level
AOI	area of interest
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	conceptual site model
EA	EA Engineering, Science, and Technology, Inc.
EDR	Environmental Data Resources, Inc.
ERT	Earth Resources Technology, Inc.
FTA	fire training area
ITRC	Interstate Technology Regulatory Council
HA	Health Advisory
MCL	maximum contaminant level
NGWA	National Ground Water Association
NH	New Hampshire
NHARNG	New Hampshire Army National Guard
NHDES	New Hampshire Department of Environmental Services
NHNGTS	New Hampshire National Guard Training Site
NHNHB	New Hampshire Natural Heritage Bureau
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
ppt	parts per trillion
RSP	Recruit Sustainment Program
SDS	Safety Data Sheet
SI	Site Inspection
T&E	threatened and endangered

UCMR 3	Third Unregulated Contaminant Monitoring Rule
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VSI	visual site inspection

Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District, on behalf of the Army National Guard (ARNG)-Installations and Environment Division, Cleanup Branch, contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. The ARNG is assessing potential effects on human health-related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible.

AECOM completed a PA for PFAS at the New Hampshire National Guard Training Site (NHNGTS) in Center Strafford, New Hampshire, to assess potential PFAS release areas and exposure pathways to receptors. The performance of this PA included the following tasks:

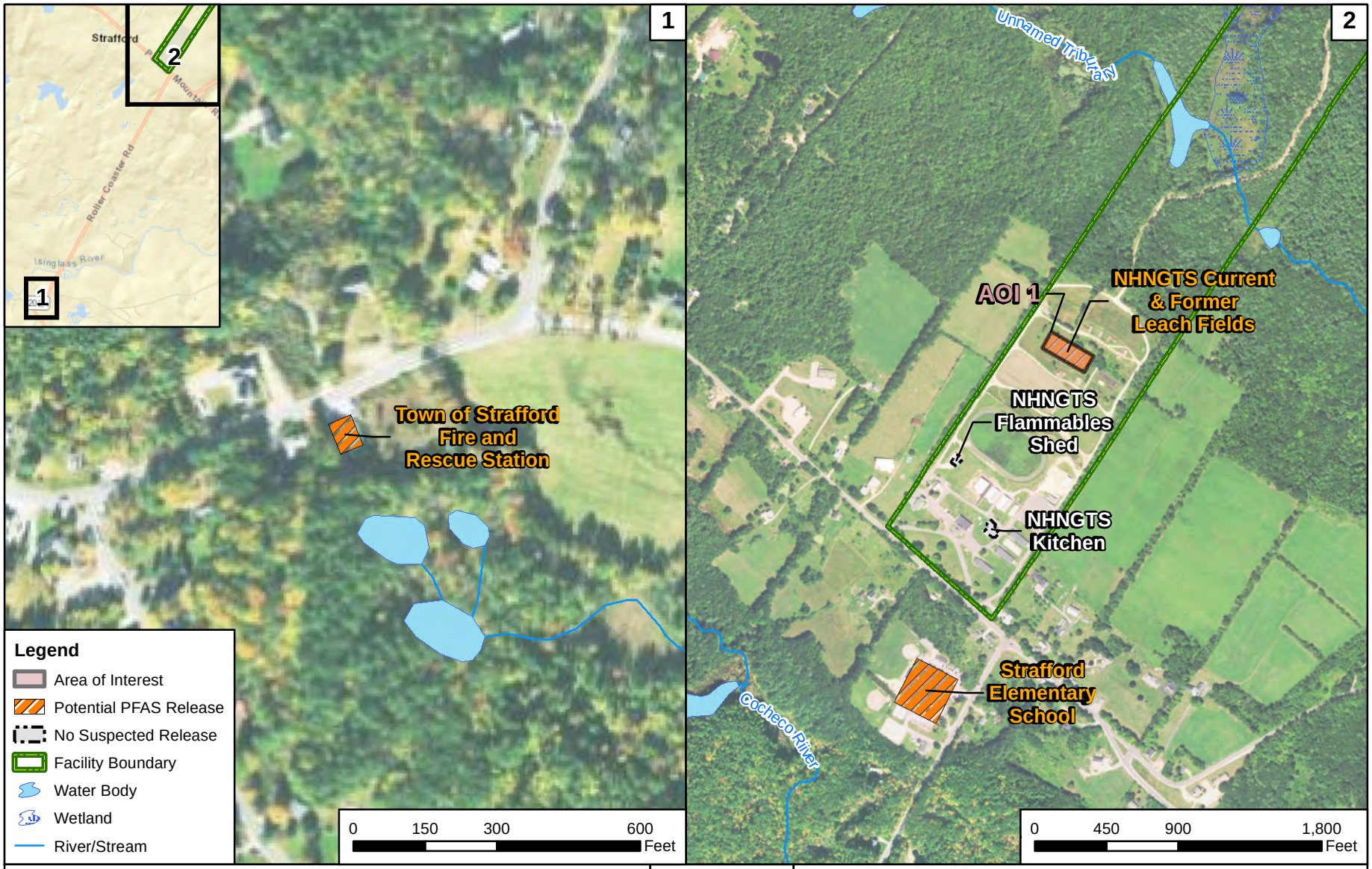
- Reviewed data resources to obtain information relevant to suspected PFAS releases;
- Conducted a site visit on 23 April 2019;
- Interviewed current New Hampshire ARNG (NHARNG) personnel at the NHNGTS during the site visit, including operations staff and personnel;
- Completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs; and
- Developed a preliminary conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility (**Figure ES-1**)

One AOI related to potential PFAS release were identified at the NHNGTS during the PA. The AOI is shown on **Figure ES-1** and described in **Table ES-1** below:

Table ES-1: AOI at the New Hampshire National Guard Training Site

Area of Interest	Name	Used by	Release Dates
AOI 1	Current and Former Leach Field	NHARNG	~1985-Current

Based on potential release of PFAS-containing liquids at this AOI, there is a potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for the NHNGTS, which presents the potential receptors and media impacted, is shown on **Figure ES-2**.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH			
REVISED	7/5/2019	GIS BY	MS	7/5/2019
SCALE	1:10,800	CHK BY	AM	7/5/2019
Base Map: National Agricultural Imagery Program, 2018 Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan,		PM	RG	7/5/2019

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TITLE

Summary of Findings

AECOM

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Figure ES-1

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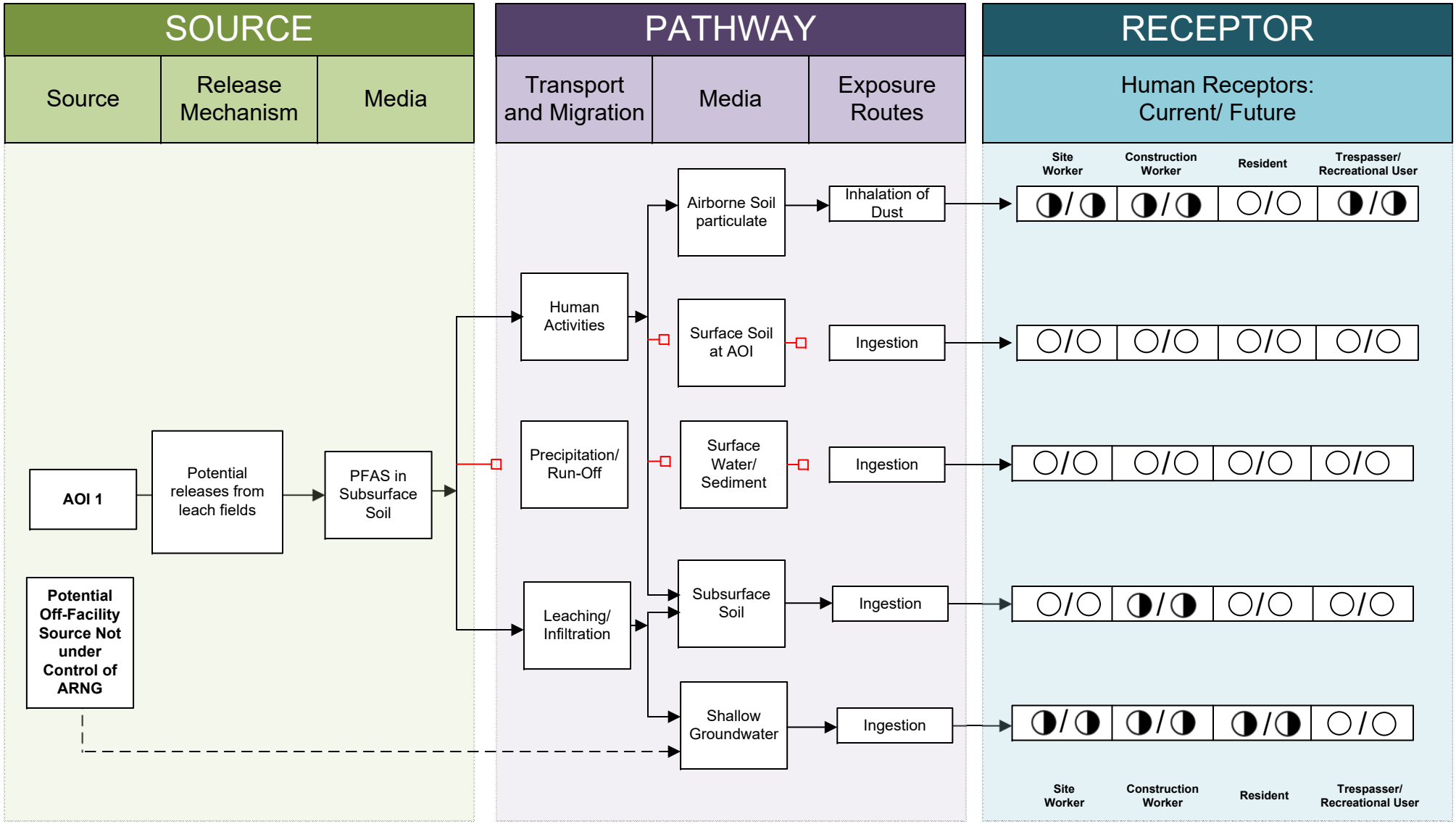


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

NOTES

1. The resident receptor refers to an off-site resident.
2. Human consumption of agricultural products potentially affected by PFAS is possible.

Figure ES-2
Preliminary Conceptual Site Model
New Hampshire National Guard Training Site

1. Introduction

1.1 Authority and Purpose

The United States (US) Army Corps of Engineers (USACE) Baltimore District, on behalf of the Army National Guard (ARNG)-Installations and Environment Division, Cleanup Branch, contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide* under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017, and Modification 01 issued 30 September 2017. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued Drinking Water lifetime Health Advisories (HAs) of 70 parts per trillion (ppt), individually or combined, for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water (USEPA, 2016a; USEPA, 2016b). In the absence of federal maximum contaminant levels (MCLs), some states have adopted their own drinking water standards for PFAS. In June 2019, the New Hampshire Department of Environmental Services (NHDES) issued Final Proposed MCLs and Ambient Groundwater Quality Standards (AGQS) for four PFAS compounds. The drinking water rule amendments were subsequently adopted by the New Hampshire Joint Legislative Committee on Administrative Rules to be effective on 30 September 2019 (New Hampshire Code of Administrative Rules, 2019). The MCLs/AGQS are as follows:

- PFOA: 12 ppt
- PFOS: 15 ppt
- PFHxS: 18 ppt
- PFNA: 11 ppt

This report presents findings of a PA for PFAS at the New Hampshire National Guard Training Site (NHNGTS; also referred to as the "facility") in Center Strafford, New Hampshire, 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 (40 Code of Federal Regulations Part 300; USEPA, 1994), and USACE requirements and guidance.

This PA documents the locations where PFAS may have been released into the environment. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases;
- Conducted a site visit on 23 April 2019;
- Interviewed current New Hampshire ARNG (NHARNG) personnel at the NHNGTS during the site visit, including operations staff and personnel;
- Completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs; and
- Developed a preliminary conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility.

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA.
- **Section 2** – **Fire Training Areas:** describes the fire training areas (FTAs) at the facility identified during the site visit, if present.
- **Section 3** – **Non-Fire Training Areas:** describes other locations of PFAS releases at the facility identified during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of AFFF release at the facility, specifically in response to emergency situations, if present.
- **Section 5** – **Adjacent Sources:** describes sources of PFAS release adjacent to the facility that are not under the control of ARNG.
- **Section 6** – **Preliminary Conceptual Site Model:** describes the pathways of PFAS transport and receptors for the AOI and the facility.
- **Section 7** –**Conclusions:** summarizes the data findings and presents the conclusions of the PA.
- **Section 8** – **References:** provides the references used to develop this document.
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

The NHNGTS occupies approximately 104.7 acres of land in Center Strafford in the Lakes Region of New Hampshire (**Figure 1-1**). Center Strafford is located approximately 7.5 miles southwest of Rochester, New Hampshire, and 24 miles northwest of Portsmouth, New Hampshire, and access to Interstate 95. Parker Mountain of the Blue Hill Range is located north of the site and Bow Lake is located several miles to the southwest. The Isinglass River is located several miles southeast (Diversified Technology Consultants, 2005). Center Strafford is a rural residential community with

a total population of approximately 4,114. Strafford County is primarily agricultural and forested land with a total population of approximately 130,090 (US Census Bureau, 2018). The approximate center of the Property is located at 43°16'42.6" North latitude and 71°07'16.1" West longitude at 500 feet above mean sea level (amsl).

The facility was originally developed in 1833 as a boarding school under the name Strafford Union Academy. In the early 1900s, the school changed its name to the Austin Cate Academy and underwent several improvements over the course of the century. In 1985, the property was sold to the State of New Hampshire and was subsequently leased to the NHARNG. The majority of the existing buildings onsite were constructed by the Austin Cate Academy but have since been renovated by the NHARNG. Five additional buildings have been constructed since the site was purchased by the state: three Electronic Skills Trainer buildings, the maintenance shed, and the Vehicle Storage Building for the Engineer Detachment.

Currently, the NHNGTS is primarily used for classroom training and small tactical field training by the Recruit Sustainment Program (RSP) and NHARNG. The majority of military field training occurs during inactive duty training weekends by the NHARNG, typically three weekends per month. Facilities at the NHNGTS include a kitchen and dining hall, a drill hall, a running track, barracks buildings, and multiple-use operational range areas. The ranges are used for field training, land navigation, small arms, and tactical maneuver training. Agricultural lands border the installation to the southeast and northwest. The northeast edge of the site and beyond is forested. The entire installation, including all ranges, is also open for public recreational use and hunting. No barriers or fences mark the installation or range boundaries (ERA, 2008).

1.5 Facility Environmental Setting

The following sections describe the environmental setting of the subject property and include information on geology, hydrogeology, hydrology, ecological setting, climate, and current and future land use.

1.5.1 Geology

Strafford County is situated within the New England Physiographic Province of the Appalachian Highlands (Billings, 1980). The site is underlain by Late Devonian Binary Granite. This medium-grained, gray granite is part of the Hampshire Plutonic series. The surrounding metamorphic bedrock is part of the Jenness Pond Schist of the Littleton Formation. Pleistocene deposits overlying igneous and metamorphic bedrock consist of glacial till, sand, gravel, and clay. Depth to bedrock is approximately 20 feet on the ridge just northeast of the cantonment area. Data on depth to bedrock in the lower elevations on site (near the wetlands) are not available (NHARNG, 2014). Geologic features in the vicinity of the facility are shown on **Figure 1-2**.

1.5.2 Soils

The cantonment area is primarily underlain by Paxton series soil, a well-drained fine sandy loam with a hardpan layer at 16 to 36 inches below ground surface (bgs). This hardpan layer restricts movement of water from the surface, creating a high potential for erosion through surface water runoff. The range areas are underlain by Gloucester, Paxton, Whitman, and Woodbridge series soils, as well as by mucky peat in wetland areas. The soils of the southernmost forested portion are of the Paxton series. These soils are well drained and have a much lower potential for erosion due to the natural forested vegetation. The soils of the northern forested portion of the site are primarily Gloucester series, with Whitman series and muck and peat in the wetlands. Gloucester series are excessively drained soils with a potential for erosion. This portion of the site still retains its natural vegetation (NHARNG, 2014).

1.5.3 Hydrogeology

In general, glacial stratified-drift aquifers made up of layers of sand, gravel, clay, and silt overlying bedrock are the primary source of groundwater in this region of New Hampshire. Less productive bedrock aquifers also provide a valuable source of groundwater to some rural water users, including the NHNGTS (EA, 2018). Temporary monitoring wells installed at the Site in 2006 show groundwater in the unconsolidated tills of the cantonment area at a depth of approximately 3 feet bgs near the topographic high point on site (Nobis Engineering, Inc., 2006). In 2013, water levels measured in test borings within the forested portion of the site showed groundwater ranging from approximately 10 to 21 feet bgs (Jacobs Engineering Group, 2013). Groundwater features in the vicinity of the facility are shown on **Figure 1-2**.

A hardpan soil layer is found just below the surface in the unforested parts of the installation, which impacts vertical mobility of surface water. Therefore, the infiltration of precipitation to recharge the shallow aquifer is limited. There are no confining layers between the shallow aquifer and the bedrock aquifer below. Regional groundwater flow is to the east (ERT, 2008); however, localized groundwater flow in the vicinity of the cantonment area is not fully understood. Water level data for the existing wells in the area were not available for this PA.

Groundwater is the primary source of drinking water in the Center Strafford area. Most, if not all, drinking water wells penetrate and derive water from the bedrock (ERA, 2008). NHNGTS is currently served by two private, ARNG-owned drinking water supply wells. Bedrock Well #1 is approximately 450 feet deep, has a capacity of 20 gallons per minute, and is located 150 feet north of the Administration Building. Bedrock Well #4 is approximately 605 feet deep, has a capacity of 25 gallons per minute, and is located 100 feet west of the Administration Building (NHARNG, 2014). There are institutional wells in Center Strafford less than one mile southeast of the facility boundary and numerous private domestic drinking water wells surrounding the installation (Environmental Data Resource, Inc. [EDR], 2019). Locations are of the wells are shown on **Figure 1-2**.

The NHARNG sampled the private water supply wells at the NHNGTS (Well #1 and Well #4) for PFAS in March 2017. Two pre-treatment (pre-filtration) samples were collected, one from each well, and one post-treatment sample was collected, which consisted of water from both Well #1 and Well #4. Nine of the 18 PFAS compounds analyzed were detected in Well #4 pre-treatment, with PFOS and PFOA detected at 5.12 and 9.38 ppt, respectively. Only one PFAS compound, 6:2FTS, was detected in Well #1 pre-treatment. All detected compounds were below the New Hampshire AGQS/MCLs and the USEPA HAs. The PFAS analytical results from March 2017 are shown on **Table 1-1**. Additionally, Third Unregulated Contaminant Monitoring Rule (UCMR 3) data were reviewed as part of the PA; however, no PFAS were detected in a public water system above the USEPA HA within 20 miles of the facility (USEPA, 2017).

Table 1-1: PFAS Analytical Results from Well #1 and Well #3, March 2017

PFAS Compound	Well #1 Pre-Treatment[1]	Well #4 Pre-Treatment[1]	Well #1/#4 Post-Treatment[2]
6:2FTS	9.55	-	-
8:2FTS	-	-	-
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	-	-	-
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	-	-	-
Perfluorooctanoic acid (PFOA)	-	9.38	6.74
Perfluorobutanesulfonic acid (PFBS)	-	1.67	1.26
Perfluorobutanoic acid (PFBA)	-	3.16	1.97
Perfluorodecanoic acid (PFDA)	-	-	-
Perfluorododecanoic acid (PFDoA)	-	-	-
Perfluoroheptanoic acid (PFHpA)	-	2.67	1.75
Perfluorohexanesulfonic acid (PFHxS)	-	1.62	1.2
Perfluorohexanoic acid (PFHxA)	-	12.5	8.76
Perfluorononanoic acid (PFNA)	-	1.17	0.823
Perfluorooctanesulfonic acid (PFOS)	-	5.12	3.52
Perfluoropentanoic acid (PFPeA)	-	10.3	7.11
Perfluorotetradecanoic acid (PFTeA)	-	-	-
Perfluorotridecanoic Acid (PFTriA)	-	-	-
Perfluoroundecanoic acid (PFUnA)	-	-	-

Notes:
Results are in ppt
[1] Source water was sampled from each well from a pre-treatment spigot with a five-minute purge
[2] Post-treatment water was a combination of water from Well #1 and #4 and was sampled from an attached garden hose after a five-minute purge

1.5.4 Hydrology

The installation lies within the Nippo Brook - Isinglass River sub watershed of the Cocheco River watershed. Surface water from most of the site flows southeast via a small tributary to the Mohawk River, which eventually joins the Isinglass River (NHARNG, 2014). The elevation of the Mohawk River is below the elevation of the surface of the groundwater near the installation. Therefore, groundwater flow from the installation is likely to flow into the Mohawk River, which acts as boundary preventing groundwater from the installation interacting with drinking water wells east of the Mohawk River (ERA, 2008). Surface water features in the vicinity of the facility are shown on **Figure 1-3**.

Topography at the NHNGTS is dominated by a ridge that separates the site into two drainage patterns. The crest of this ridge lies northeast of the cantonment area at the edge of the parade field and runs northwest to southeast. Based on topography, the cantonment area likely drains to the southeast, and the operational ranges drain to the northeast (ERA, 2008). A hardpan layer is

found below the surface of the unforested parts of the site. This low permeability layer restricts vertical movement of surface water, creating an erosion potential for the site during rain events (ERA, 2008). There is a small retention basin along the northern boundary of the field which drains much of the surface water runoff. The swale and retention basin were constructed within the maneuver training area to channel runoff from the site and prevent erosion, but evidence of localized erosion can be seen after large rainfall events (EA, 2018).

A number of wetlands have been identified on and off installation as part of the National Wetlands Inventory [US Fish and Wildlife Service (USFWS), 2007]. Field delineation by the NHARNG further identified on-installation freshwater wetlands (NHARNG, 2014). These wetlands include vernal ponds and both intermittent and permanent water bodies. Additionally, a small pond is located on the northern end of the NHNGTS property (NHARNG, 2018).

Stormwater flow within the cantonment area generally flows in a southerly direction toward New Hampshire Route 126. There are several storm drain structures, including small diameter cross culverts, under driveways and drainage pipes exiting isolated catch basins. Stormwater flowing off the site to the south disperses into drainage channels parallel to New Hampshire Route 126. The remainder of the property consists of primarily pervious land cover, allowing for infiltration of precipitation. Stormwater runoff follows the training site's topography overland and generally flows in a northerly direction, draining to the wetland complex or the tributary to the Mohawk River (EA, 2018).

1.5.5 Ecological Setting

A 2003 Vegetation Mapping and Floristic Inventory of the facility by the New Hampshire Natural Heritage Bureau (NHNHB) identified three general vegetation classes at the NHNGTS: developed area, cultural (human modified and actively managed) vegetation, and natural vegetation. The 14 acres of developed cantonment area consist of native and non-native turf grass which is mowed regularly. The 26 acres of culturally-modified vegetation consists primarily of the turf species with a mixture of such plants as clover and common timothy. This part of the installation is cut for hay once a year by a local farmer (NHARNG, 2014).

The remaining 65 acres of natural vegetation (undisturbed habitat) consist of general forested upland and five wetland classifications. The forested upland is a mixture of hardwood and conifer trees with such species as Eastern Hemlock, White Pine, American Beech, Red Oak, and Red Maple (NHARNG, 2014). There are approximately 20 acres of mapped wetlands in the northern, forested portion of the property. The wetlands types, as classified by USFWS, include palustrine emergent, palustrine forested/shrub, and palustrine unconsolidated bottom (pond) (NHARNG, 2014).

The forested portion of the site serves as protected habitat for federally listed threatened and endangered (T&E) species and other special status species (EA, 2018). New Hampshire state-listed faunal species include 27 endangered and 12 threatened species (USFWS, 2008; NHNHB, 2004; NHNHB, 2011). Table 1-1 presents a list of federal and state-listed species known to occur within the Town of Strafford, as well as those species observed at the NHNGTS. The small whorled pogonia, grassleaf goldenrod, hairy-fruited sedge, eastern meadowlark, American kestrel, and spotted turtle are the only listed species known to occur at the NHNGTS (EA, 2018).

One spotted turtle was reportedly observed on NHNGTS during an amphibian and reptile survey; however, no other sightings of this species have been recorded and the reported sighting was not verified. Suitable habitat exists on NHNGTS to support this species. Although no insect surveys have been conducted at NHNGTS, the presence of the wetland complex at NGNGTS and the documented presence of ringed boghaunter in the immediate vicinity of NHNGTS make the presence of this species a potential likelihood (EA, 2018).

Table 1-2. Federal and State-Listed Species

Common Name	Scientific Name	State Status	Federal Status
	BIRDS		
American kestrel*	*Falco sparverius*	SC	-
Bald eagle	*Haliaeetus leucocephalus*	T	M
Common loon	*Gavia immer*	T	-
Eastern meadowlark*	*Sturnella magna*	SC	-
	FISH		
Branded sunfish	*Enneacanthus obesus*	SC	-
Bridled shiner	*Notropis bifrenatus*	T	-
	PLANTS		
Awlwort*	*Subularia aquatic* spp. *americana*	E	-
Goodenough's sedge*	*Carex nigra*	E	-
Grassleaf goldenrod*	*Euthamia caroliniana*	T	-
Hairy-fruited sedge*	*Carex trichocarpa*	E	-
Inflated sedge*	*Carex bullata*	E	-
Poplar hawthorn*	*Crataegus populnea*	-	-
Reversed bladderwort*	*Utricularia resupinata*	E	-
River bank quillwort*	*Isoetes riparia* var. *canadensis*	E	-
Small whorled pogonia*	*Isotria medeoloides*	T	T
	REPTILES		
Blanding's turtle	*Emydoidea blandingii*	E	-
Smooth green snake	*Opheodrys vernalis*	SC	-
Spotted turtle**	*Clemmys guttata*	T	-
Wood turtle	*Glyptemys insculpta*	SC	-
	INVERTEBRATES		
Ringed boghaunter	*Williamsonia lintnen*	E	-

Notes
E = Endangered; Danger of extinction throughout range
T = Threatened; Likely to become endangered in foreseeable future throughout range
SC = Special concern; Species could become threatened in the foreseeable future if conservation actions are not taken or that were recently recovered from the endangered or and threatened category
M = Monitored under the USFWS Post-Delisting Monitoring Plan for Bald Eagle; Maintains protection under MBTA
Bold * Species observed at the NHNGTS
Bold ** Species reportedly observed at NHNGTS, but sighting not verified
* Historical listing (not recorded in the last 20 years)
Sources: NHNHB, 2004; EA, 2018

1.5.6 Climate

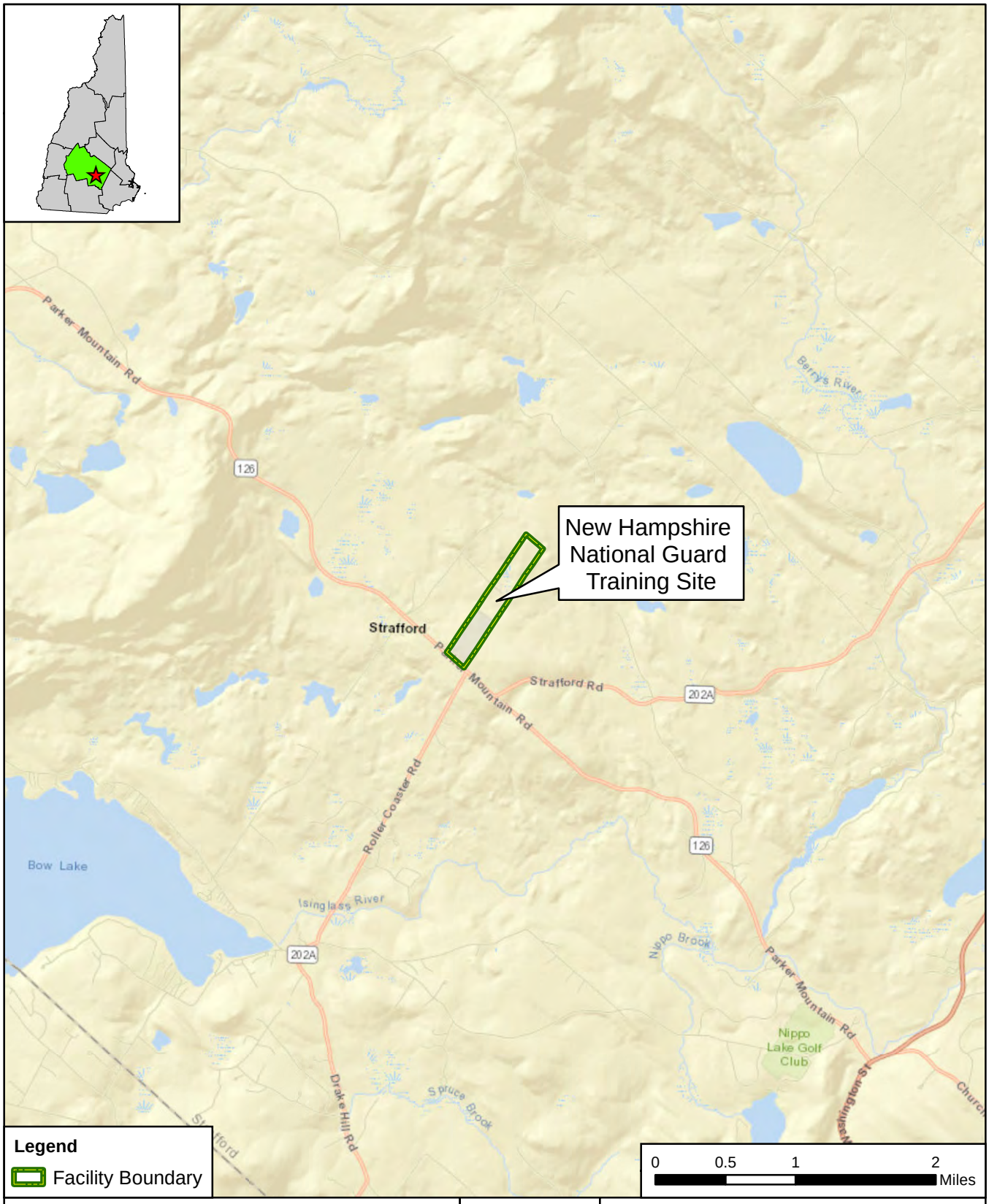
The facility lies within the humid continental climate zone, which is characterized by long, cold, snowy winters, very warm (and at times humid) summers, and relatively brief autumns and springs. The average maximum temperature ranges from 83°Fahrenheit (°F) in July to 31°F in January. The average minimum temperature ranges from 58°F in July to 14°F in January. In winter, successive storms deliver light to moderate snowfall amounts, contributing to the relatively

reliable snow cover. Summer can bring stretches of humid conditions, as well as thunderstorms. Average annual rainfall is 46 inches (US Climate Data, 2019).

1.5.7 Current and Future Land Use

The current use of the NHNGTS is for classroom training and small tactical field training by two primary tenants, the NHARNG. Most training by these organizations occurs in classrooms within the cantonment area. It is estimated that about 12,000 soldiers are trained on site per year for a day or more. Additional users include the state and county police, who do limited canine training, run the county Drug Abuse Resistance Education program, and host the New Hampshire Teen Institute. The facility is also open for public recreational use and hunting. The NHARNG does not regulate hunting on the facility but estimates that there are less than 20 hunters per year (ERA, 2008). Future land use on the facility is anticipated to remain the same.

The area surrounding the facility largely remains agricultural and rural in nature. The area is zoned entirely as Residential-Agricultural and includes a mixture of old farmland/open fields, forested wetlands, single-family homes, and minor municipal development. Municipal town buildings, the Strafford School, and the Hill Library are located within 0.25 miles of the site (NHARNG, 2014). Future land use in the immediate area is not expected to change and will remain rural in character.



CLIENT	ARNG			
Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH				
REVISED	5/23/2019	GIS BY	MS	5/23/2019
SCALE	1:63,360	CHK BY	AM	5/23/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	5/23/2019

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Facility Location

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Figure 1-1

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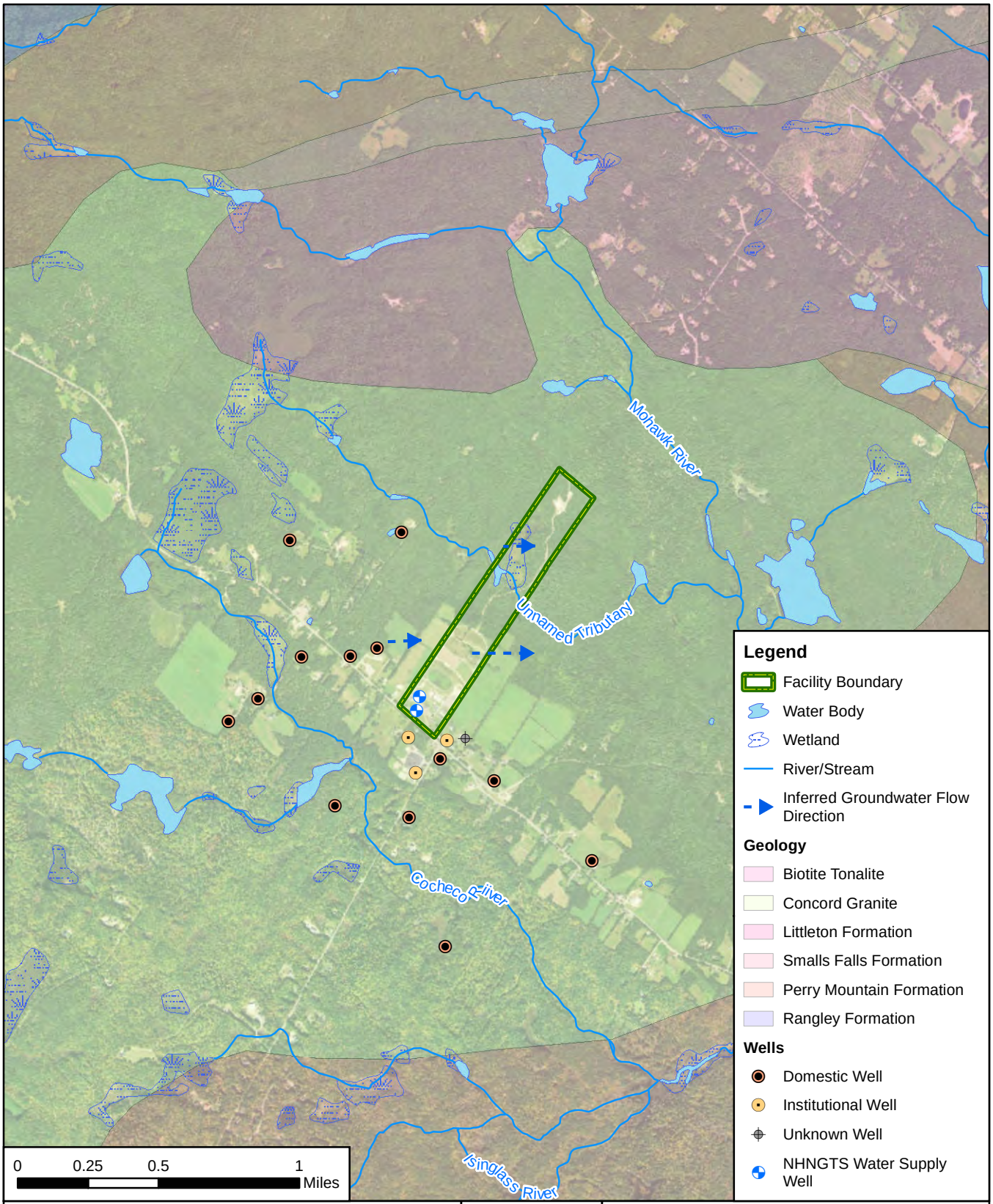

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Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH				
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Well Data Provided by EDR Report. Base Map: National Agricultural Imagery Program,		PM	RG	7/24/2019

Groundwater Features

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Figure 1-2

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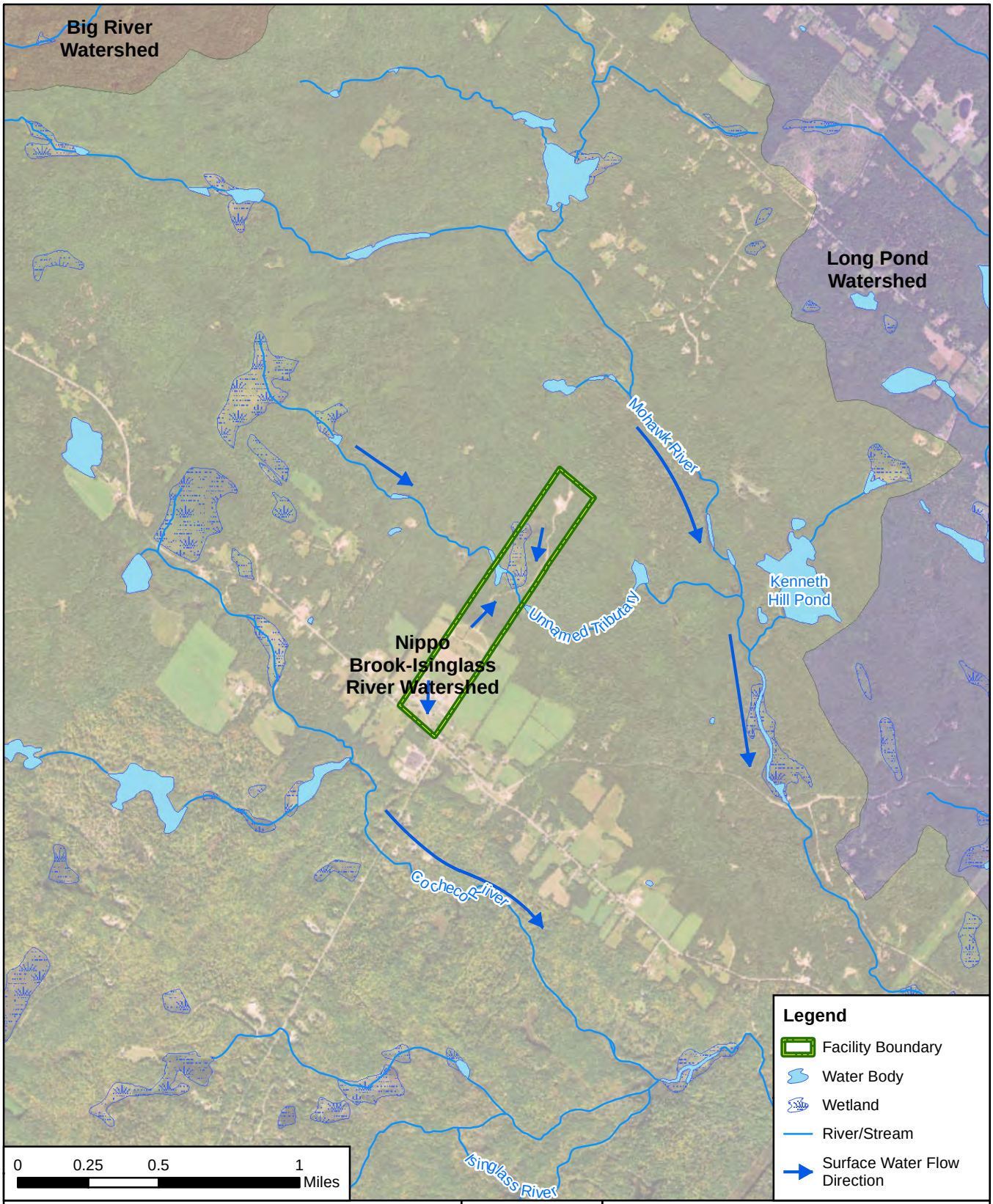

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Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH				
REVISED	5/24/2019	GIS BY	MS	5/24/2019
SCALE	1:31,680	CHK BY	AM	5/24/2019
Base Map:		PM	RG	5/24/2019

N

Surface Water Features

AECOM
12420 Milestone Center Drive
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Figure 1-3

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\NH\Strafford_NHGTS_Figures\Strafford_NHGTS_PA_Figures\Fig_1-3_Strafford_NHGTS_Surface_Water.mxd

2. Fire Training Areas

No FTAs were identified at the NHNGTS during the PA. Interviewees confirmed that the facility is supported by the Town of Strafford Fire and Rescue and that firefighting training has never occurred on the property (**Appendix B**).

3. Non-Fire Training Areas

Three non-FTAs were included in the VSI during the PA. A description of each is presented below and their locations are shown on **Figure 3-1**. Photographs of each non-FTA appear in **Appendix C**.

3.1 Current and Former Leach Field

The existing NHNGTS utilizes a single common leach field for wastewater disposal for the entire facility, which was originally built in 1993. Septic tanks are located outside each building, and then individual building sewage is collected by gravity sewers and conveyed to the leach field via a single pump station and twin force mains (Diversified Technology Consultants, 2005). The leach field piping is located below ground surface.

According to interviews with NHNGTS personnel and the NHARNG, the Austin Cate Academy leach field was utilized for waste water at the NHNGTS prior to 1993. Engineering drawings indicate the current leach field was built in the same location as the former leach field. The approximate geographic coordinates for the current and former leach field are 43°16'31.9"N; 71°07'28.8"W.

According to NHNGTS personnel, the floors in the kitchen and drill hall are polished with Centi Finish floor polish. The floor polish is mixed with water in a bucket, and after polishing is complete, the unused mixture is dumped down the drain in each respective building. The mixture would subsequently be transported through the site's septic system to the leach field and released to the subsurface. The Centi Finish bottle and Safety Data Sheet (SDS) maintained by the NHNGTS indicate the formula is proprietary; however, some floor polishes are known to contain PFAS (Interstate Technology Regulatory Council [ITRC], 2017). The SDS was dated 2012, but interviewees were unaware of when use of the Centi Finish began. It is likely that floor polish has been used in buildings since the NHARNG occupied the buildings (Centi Finish or possibly other brands).

Because liquids potentially containing PFAS were dumped into the waste system that lead to the leach field, the current and former leach field is considered potential release area.

3.2 Flammables Shed

The Flammables Shed at the NHNGTS was inspected as part of the VSI. Because there were no AFFF or PFAS-containing liquids stored there, and the fire extinguisher was a chemical class, the Flammables Shed is not considered a potential release area.

3.3 Kitchen

The kitchen at the NHNGTS was inspected as part of the VSI. Two hood fire suppression systems and two fire extinguishers were noted. However, because the hood fire suppression systems and the fire extinguishers in the kitchen were wet chemical or Class K, the kitchen is not considered a potential release area.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH				
REVISED	6/13/2019	GIS BY	MS	6/13/2019
SCALE	1:4,200	CHK BY	AM	6/13/2019
Base Map: National Agricultural Imagery Program, 2018		PM	RG	6/13/2019

Non-Fire Training Areas

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Figure 3-1

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4. Emergency Response Areas

No emergency response areas were identified within the facility during the PA through interviews or the EDR Report (EDR, 2019). The Town of Strafford Fire and Rescue would handle any potential fire or emergency response incident at the NHNGTS.

5. Adjacent Off-Facility Sources

Two potential off-facility sources of PFAS within 4 miles of the NHNGTS were identified during the PA. Descriptions of the off-facility sources are presented below and are shown on **Figure 5-1**. Interview records are included in **Appendix B**.

5.1 Strafford Fire and Rescue

The Town of Strafford Fire and Rescue Station is located approximately 2 miles south of the NHNGTS at 360 Province Road, Strafford, New Hampshire. The approximate geographic coordinates for the Fire and Rescue Station are 43°14'29.3"N; 71°08'50.9"W. Strafford Fire and Rescue is responsible for responding to emergencies at the NHNGTS.

Fire and Rescue personnel were not interviewed during the PA because the focus of the assessment was to evaluate potential PFAS related activities and sources at NHARNG properties, not formally assess adjacent sources. Therefore, it is not known if AFFF is used or stored at the Fire and Rescue Station currently or historically. Because the presence of AFFF at the Station cannot be confirmed, it has been identified as a potential offsite PFAS source area. **Figure 5-1** shows the location of the Strafford Fire and Rescue in relation to the NHNGTS.

5.2 New Hampshire Detections

The NHDES is engaged in an ongoing investigation PFAS in New Hampshire drinking water and maintains an online, interactive PFAS Sampling Results map (NHDES, 2019). The PFAS Sampling Results map shows two groundwater sample locations within 4 mile radius of the NHNGTS, both of which had no detections of PFAS. The data presented in the database are under constant revision, as new sites or facilities are added, and the data may not contain all potential PFAS detections.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH				
REVISED	7/15/2019	GIS BY	MS	7/15/2019
SCALE	1:4,200	CHK BY	AM	7/15/2019
Base Map: National Agricultural Imagery Program, 2018 Sources: Esri, HERE, Garmin, USGS, Intermap,		PM	RG	7/15/2019

N

Adjacent Source

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Figure 5-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\NH\Strafford_NHGTS_Figures\Strafford_NHGTS_PA_Figures\Fig_5-1_Strafford_NHGTS_Adjacent_Source.mxd

6. Preliminary Conceptual Site Model

Based on the PA findings, one AOI was identified at the NHNGTS: AOI 1 Current and Former Leach Field. The AOI location is shown on **Figure 6-1**. The following section describes the preliminary CSM components and the specific preliminary CSM developed for the AOI. The preliminary CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete. Potential receptors at the NHNGTS include site workers, construction workers, recreational users, and trespassers. Potential off-post receptors include nearby residents.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of PFAS toxicological study.

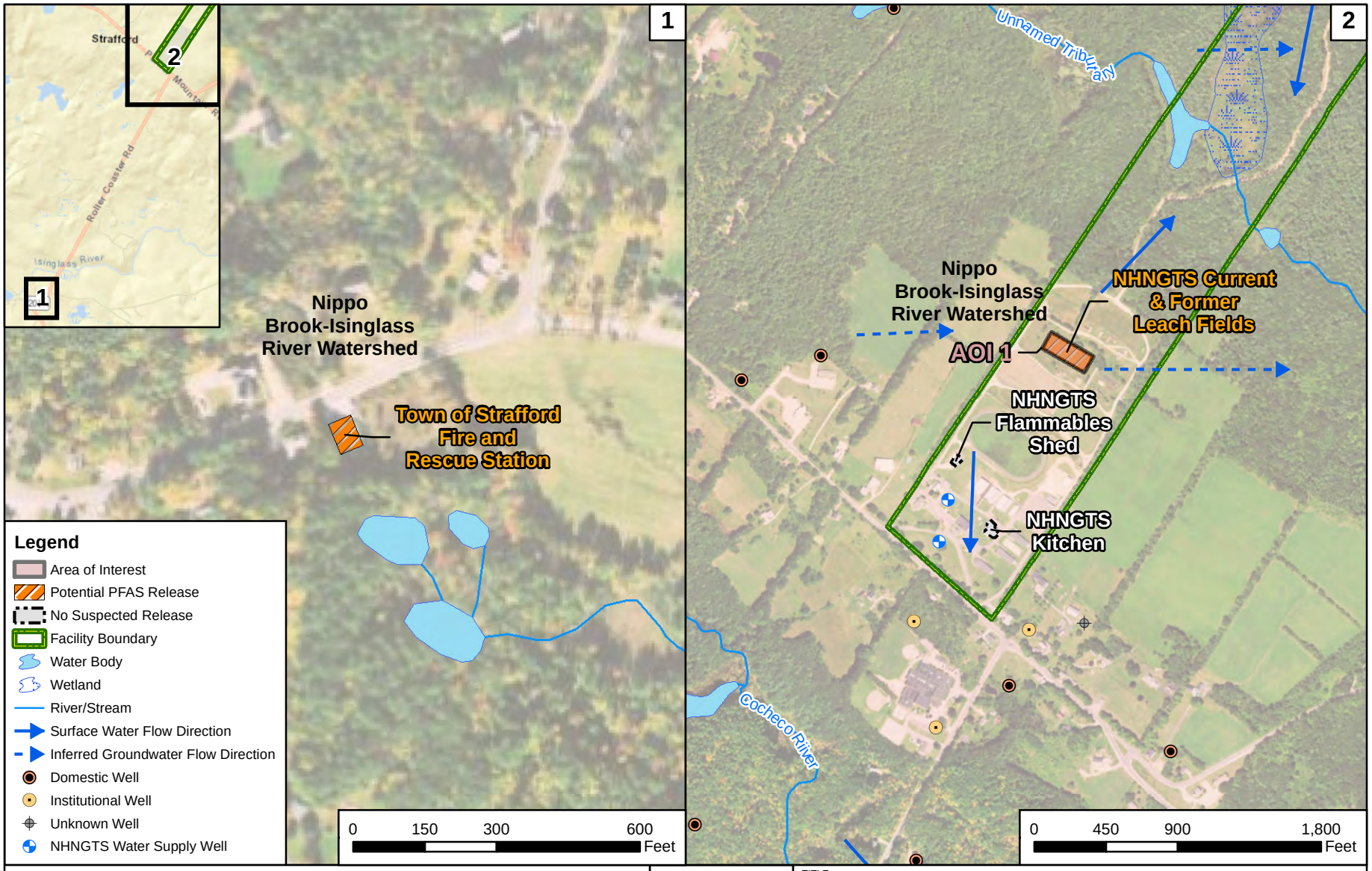
6.1 AOI 1 Current and Former Leach Field

AOI 1 is the Former and Current Leach Field. According to interviews with NHNGTS personnel, floor polish is used in the kitchen and drill hall, and after polishing is complete, the unused polish mixture is dumped down the drain in each respective building. Although the brand used by the NHNGTS has a proprietary formula, and therefore PFAS content cannot be confirmed, some floor polishes are known to contain PFAS (ITRC, 2017). Drains in the buildings lead to septic tanks located outside each building, and then individual building sewage is conveyed to the leach field (Diversified Technology Consultants, 2005). The current leach field was constructed in 1993, prior to which the former Austin Cate Academy leach field was utilized by the NHNGTS. Engineering drawings indicate the current leach field was built in the same location as the former leach field.

Because liquids potentially containing PFAS were dumped into the waste system culminating at the leach field, and the piping for the leach field was below the ground surface, there is the potential for PFAS to have been released directly to the subsurface soil. Therefore, ground-disturbing activities to subsurface soil could result exposure via inhalation of airborne soil particulates for onsite workers, construction workers, recreational users, and trespassers. Additionally, it could result in onsite construction worker exposure via ingestion of subsurface soil. Therefore, the inhalation and ingestion pathways for these receptors are considered potentially complete for AOI 1.

Groundwater is the primary source of drinking water in the Center Strafford area. Most, if not all, drinking water wells penetrate and derive water from the bedrock (ERA, 2008). NHNGTS is currently served by two public water supply wells, there are two municipal wells in Center Strafford less than one mile southeast of the facility boundary, and there are numerous domestic drinking water wells surrounding the installation (**Figure 1-2**). Additionally, there are agricultural areas in the vicinity that may produce products for human consumption. Although regional groundwater flow is to the east, localized groundwater flow in the vicinity of the cantonment area is not fully understood; therefore, it is not clear if the existing water supply wells with PFAS detections are downgradient of the leach field.

PFAS are water soluble and can migrate readily from soil to groundwater, which is estimated to be 10 to 20 feet bgs. Because potential PFAS releases to subsurface soil at AOI 1 may have occurred, PFAS may migrate from the subsurface soil to the groundwater via leaching. Therefore, the ingestion exposure pathway for groundwater is considered potentially complete for site workers, onsite and offsite construction workers, and nearby offsite residents. The preliminary CSM for AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH			
REVISED	7/24/2019	GIS BY	MS	7/24/2019
SCALE	1:10,800	CHK BY	AM	7/24/2019
Base Map: National Agricultural Imagery Program, 2018 Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan,		PM	RG	7/24/2019

N

TITLE

Area of Interest

AECOM

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Figure 6-1

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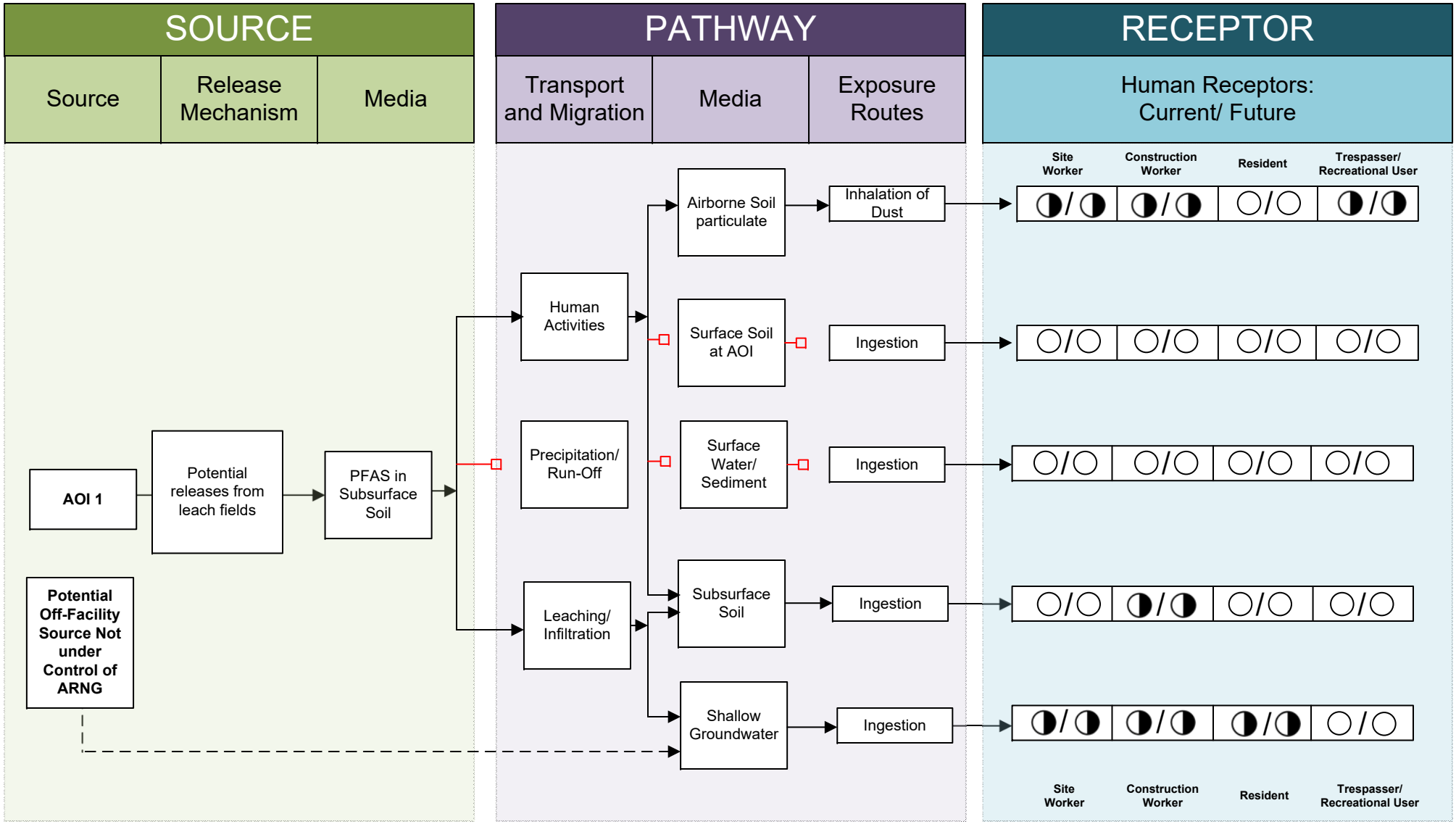


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

NOTES

1. The resident receptor refers to an off-site resident.
2. Human consumption of agricultural products potentially affected by PFAS is possible.

Figure 6-2
Preliminary Conceptual Site Model
AOI1 Former and Current Leach Fields

7. Conclusions

This report presents a summary of available information gathered during the PA on the use, storage, and potential release of PFAS at the NHNGTS. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to a PFAS releases was identified (**Table 7-1**) at the NHNGTS during the PA (**Figure 7-1**).

Table 7-1: AOI at the New Hampshire National Guard Training Site

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Former and Current Leach Field	NHARNG	~1985 - Current

Based on the potential PFAS releases at this AOI, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for AOI 1 is shown on **Figure 6-2**, which presents the potential receptors and media impacted.

The following areas discussed in **Section 2** through **Section 5** were determined to have no suspected PFAS release to the environment (**Table 7-2**).

Table 7-2: No Suspected Release Areas

No Suspected Release Area	Used by	Rationale for No Suspected Release Determination
Flammables Shed	NHARNG	No AFFF or PFAS-containing liquids stored in shed; the fire extinguisher was chemical class.
Kitchen	NHARNG	Hood fire suppression systems and the fire extinguishers in the kitchen were wet chemical or Class K.

7.2 Uncertainty

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the NHNGTS. Historically, documentation of PFAS use was not required because PFAS were considered benign. Records were not typically kept by the facility or available during the PA on the use of PFAS-containing materials.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of potential PFAS use at the facility. Sometimes the provided information was vague. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS were first used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected. **Table 7-3** summarizes the uncertainties associated with the PA.

Table 7-3: Uncertainties

Area of Interest	Source of Uncertainty
AOI 1: Former and Current Leach Field	Because the Centi Finish floor polish contents are proprietary, it is not definitively known whether the product contains PFAS. If PFAS are present in the floor polish, the type and concentration are unknown. Additionally, the exact quantities and dates of floor polish used are not documented. Although it is likely that floor polish has been used in buildings since 1985, the other brands used (and whether they contain PFAS) are not known.
	Additionally, the construction details of the former leach field from the Austin Cate Academy are unknown. The former leach field would have been utilized by the NHARNG from 1985 to 1993, when the current leach field was constructed.
	Finally, although regional groundwater flow is to the east, localized groundwater flow in the vicinity of the cantonment area is not fully understood; therefore, it is not clear if the existing water supply wells with PFAS detections are downgradient of the leach field. Water level data for the existing wells in the area were not available for this PA.

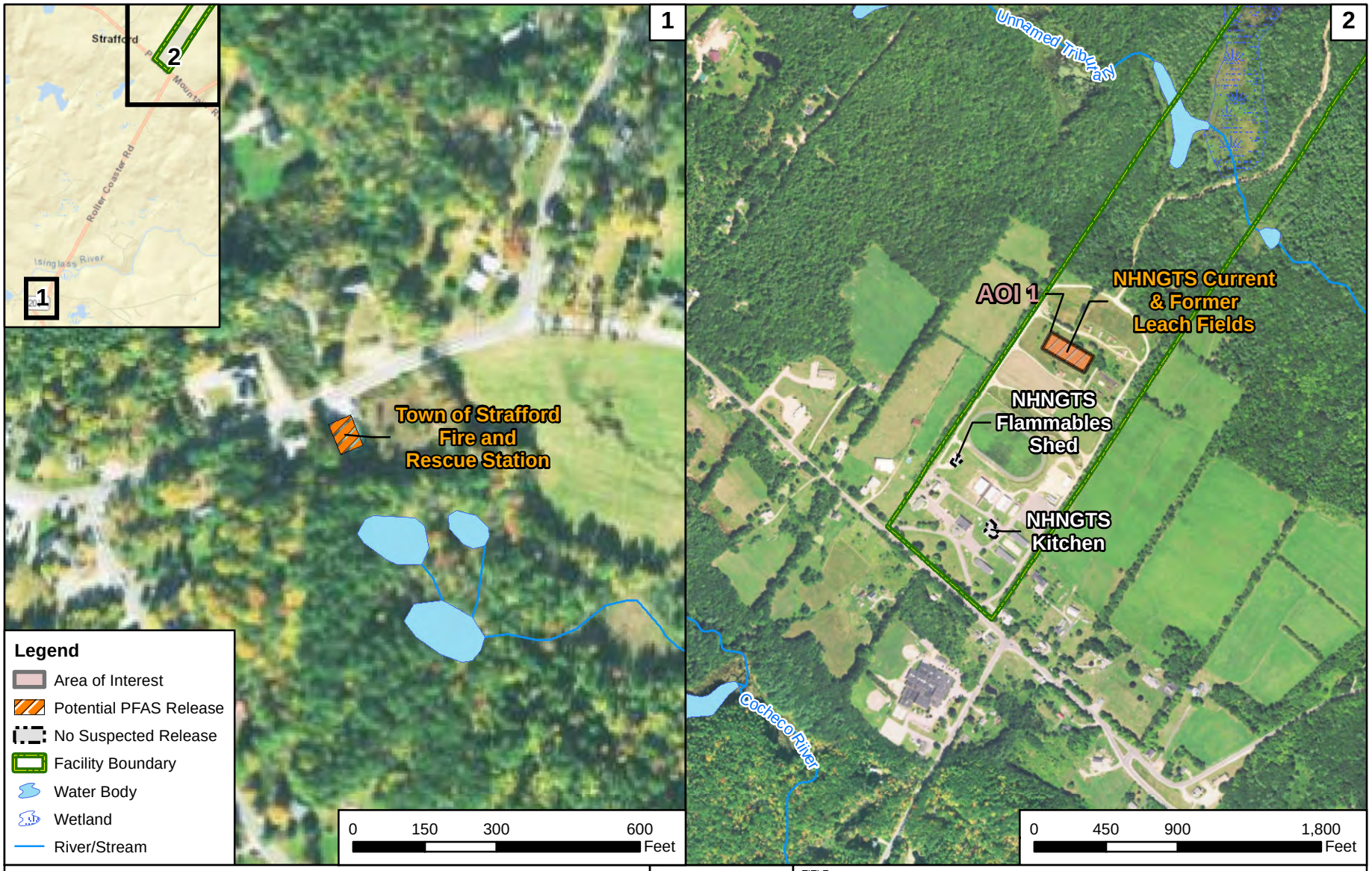
7.3 Potential Future Action

The degree of uncertainties associated with the interviews and data collected during the PA indicate that current or former ARNG activities may have resulted in potential PFAS releases at the one AOI identified during the PA. Based on the preliminary CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in subsurface soil and groundwater at this AOI. **Table 7-4** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a SI.

ARNG evaluates the need for an SI at the NHNGTS based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to receptors.

Table 7-4: PA Findings Summary

Area of Interest	AOI Location	Rational	Potential Future Action
AOI 1 Current and Former Leach Field	43°16'31.9"N; 71°07'28.8"W	Potential for PFAS-containing liquids dumped in NHNGTS building drains to be released from the leach field.	Proceed to an SI, focus on subsurface soil and groundwater



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Stafford National Guard Training Site, NH			
REVISED	7/15/2019	GIS BY	MS	7/15/2019
SCALE	1:10,800	CHK BY	AM	7/15/2019
Base Map: National Agricultural Imagery Program, 2018 Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan,		PM	RG	7/15/2019

TITLE

Summary of Findings

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Germantown, MD 20876

Figure 7-1

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8. References

Billings, Marland, 1980. *The Geology of New Hampshire. New Hampshire Division of Forests and Lands, Department of Resources and Economic Development, Concord, New Hampshire*.

Comprehensive Environmental, Inc., 2005. *NH National Guard Strafford Training Site Water Supply System Vulnerability Assessment*.

Diversified Technology Consultants, 2005. *Draft Environmental Assessment Real Property Development Plan New Hampshire National Guard Training Site*. February.

EA, 2018. *Draft 2018 Operational Range Assessment Periodic Review Binder, New Hampshire Army National Guard.* October.

EDR, 2019. *The EDR Radius Map™ Report with GeoCheck®; Aerial Photo Decade Package; and Certified Sanborn® Map Report; New Hampshire National Guard Training Site, 1151 Parker Mountain Road, Strafford, NH 03884*. May.

ERT, 2008. *Final Operational Range Assessment Program, Phase I Qualitative Assessment Report, New Hampshire National Guard Training Site, Center Strafford, New Hampshire.* April.

ITRC, 2017. *History and Use of Per- and Polyfluoroalkyl Substances (PFAS)*. PFAS Fact Sheets. Accessed May 16 2019 at https://pfas-1.itrcweb.org/fact-sheets/. November.

Jacobs Engineering Group, 2013. *Geotechnical Design Report for New Hampshire Army National Guard, Central Strafford Baffled Range Designs (Pistol and Small Arms) – 31 Meter Range, Strafford, New Hampshire, Project NO. 12-004*. 27 August.

New Hampshire Code of Administrative Rules*, Chapter Env-Dw 700, Water Quality: Standards, Monitoring, Treatment, Compliance, and Reporting; Env-Dw 701.03, Env-Dw 705.06, Env-Dw 707.06, Env-Dw 712.23 through Env-Dw 712.30.* Effective 30 September 2019.

NHARNG, 2014. *Final Integrated Natural Resources Management Plan for the New Hampshire National Guard Training Site*. January.

NHDES, 2019. *NHDES PFAS Sample Map*. Accessed May 15 2019 at http://nhdes.maps.arcgis.com/apps/View/index.html?appid=66770bef141c43a98a445c54a17720e2&extent=-73.5743,42.5413,-69.6852,45.4489.

NHNHB, 2004. *Vegetation Mapping and Floristic Inventory of the New Hampshire National Guard Training Site in Center Strafford, NH*. New Hampshire Department of Resources and Economic Development.

Nobis Engineering, Inc., 2006. *Env-WM 1600 Level I Site Investigation, Strafford New HampshireArmy National Guard Training Site*.

US Census Bureau, 2018. *QuickFacts: Strafford Country, New Hampshire; United States*. Accessed May 2 2019 at https://www.census.gov/quickfacts/fact/table/straffordcountynewhampshire,US/PST045218.

US Climate Data, 2019. Climate Rochester - New Hampshire. Accessed May 2 2019 at https://www.usclimatedata.com/climate/rochester/new-hampshire/united-states/usnh0416.

USEPA, 1980. *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*.

USEPA, 1991. *Guidance for Performing Preliminary Assessments under CERCLA.* September.

USEPA, 1994. National Oil and Hazardous Substances Pollution Contingency Plan (Final Rule). 40 CFR Part 300; 59 Federal Register 47384. September.

USEPA, 2016a. *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA).* Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May.

USEPA, 2016b. *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS).* Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May.

USEPA, 2017. UCMR 3 (2013-2015) Occurrence Data by State. Occurrence Data for the Unregulated Contaminant Monitoring Rule. Accessed 9 July 2019 at https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule. January.

Appendix A
Data Resources

Data resources will be provided separately on CD. Data resources for the New Hampshire National Guard Training Site include:

Environmental Data Resources Report

- 2019 The EDR Radius Map™ Report with GeoCheck®; Aerial Photo Decade Package; and Certified Sanborn® Map Report; New Hampshire National Guard Training Site, 1151 Parker Mountain Road, Strafford, NH 03884.

Previous Investigations

- Diversified Technology Consultants, 2005. *Draft Environmental Assessment Real Property Development Plan New Hampshire National Guard Training Site.* February.
- EA Engineering, Science, and Technology, Inc., 2018. *Draft 2018 Operational Range Assessment Periodic Review Binder, New Hampshire Army National Guard.* October.
- Earth Resources Technology, Inc., 2008. *Final Operational Range Assessment Program, Phase I Qualitative Assessment Report, New Hampshire National Guard Training Site, Center Strafford, New Hampshire*. April.
- John Milner Associates, Inc., 2010. *District Survey Area Form, New Hampshire National Guard Training Site, Center Strafford, New Hampshire*.

Facility Drawing

- Jones and Beach Engineers, Inc., 2011. *Site Overview Plan, Map 11, Lot 39, Drawing Number AB1, Sheet 1 of 16, New Hampshire National Guard Training Site, NH Rte. 126, Ctr Strafford, NH*. February 1.

Regulations, Advisories, and Orders

- NHDES, 2019. *New Hampshire Code of Administrative rules, Chapter Env-Dw 700, Water Quality: Standards, Monitoring, Treatment, Compliance, and Reporting; NH Env-Dw 701.03, NH Env-Dw 705.06, NH Env-Dw 707.06, NH Env-Dw 712.23 through NH Env-Dw 712.30*. 30 September.

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: Stafford TS
Interviewer: [redacted]
Date/Time: 04-23-19

Interviewee: [redacted] **Title:** Groundskeeper **Phone Number:** [redacted] **Email:** NA	Can your name/role be used in the PA Report? Y or (N) Can you recommend anyone we can interview? Y or (N)

Roles or activities with the Facility/Years working at the Facility:

New Hampshire National Guard Training Site
Groundskeeper - 3 yrs at NH TS, 20 years working w/ the state

PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?

Possible PFAS use in floor polish used in kitchen and drill hall.
- SDS indicates proprietary contents, CertiClean (see photos)
- kitchen drains to septic system and leach filed located at 43°16'31.5"N and 71°07'28.8"W
- polishing also occurs in drill hall (only two locations)
- no cross-country skiing on site. neighbors do cross-country skiing.

Kitchen fire extinguishers are class K (chemical); see photos

Flammables shed on site extinguisher is chemical (class K); see photos

Known Uses	
Use	no
Procurement	no
Disposition	no
Storage (Mixed)	no
Storage (Solution)	no
Inventory, Off-Spec	no
Containment	no
SOP on Filling	no
Leaking Vehicles	no
Nozzle and Suppression System Testing	no
(Dining Facilities)	
Vehicle Washing	no
Ramp Washing	no
Fuel Spill Washing and Fueling Stations	no
Chrome Plating or Waterproofing	no

PA Interview Questionnaire - Other

Facility: Strafford TS
Interviewer: [redacted]
Date/Time: 04-23-19

PA Interview Questionnaire - Other

Facility: Strafford TS
Interviewer: [redacted]
Date/Time: 04-23-19

PA Interview Questionnaire - Other

Facility: Strafford TS
Interviewer: [redacted]
Date/Time: 04-23-19

Appendix B.2
Visual Site Inspection Checklists

04-23-19

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted], ARNG [redacted], USACE [redacted], NHARNG

Recorded by: [redacted] AECOM

ARNG Contact: [redacted] NHARNG

Date and Time: 04-23-19

Method of visit (walking, driving, adjacent): walking

Source/Release Information

Site Name / Area Name / Unique ID: New Hampshire Nat. Guard (Strafford) Training Site

Site / Area Acreage: 100 acres

Historic Site Use (Brief Description): Field + ~~small arms~~ training

Current Site Use (Brief Description): Field and small arms training, navigation

Physical barriers or access restrictions: none

1. Was PFAS used (or spilled) at the site/area? **Y / N**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):
possibly used in floor wax, contents proprietary

2. Has usage been documented? **Y / N**

2a. If yes, keep a record (place electronic files on a disk):

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**

3a. Indicate what businesses are located near the site DOT Shed - Storage of equipme
no plating or waterproofing
farms w/ longhorn steer

4. Is this site located at an airport/flightline? **Y / N**

4a. If yes, provide a description of the airport/flightline tenants:

well w/ detections (well #4) is 600 ft deep

Strafford TS
04-23-19

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? Y (N)

1a. If yes, indicate which type of AFFF has been used:
NA

1b. If yes, describe maintenance schedule/leaks:
NA

1c. If yes, how often is the AFFF replaced:
NA

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?
NA

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? (Y) N

1a. If so, note observation and location: Surface water from the site flows southeast via small tributary to the Mohawk River (tributary located in

2. Is there channelized flow within the site/area? Y (N) Northern portion of site)

2a. If so, please note observation and location:
Tributary in N portion of site, undeveloped
NO Channelized flow w/in developed portion

3. Are monitoring or drinking water wells located near the site? (Y) N

3a. If so, please note the location: Wells - two drinking water wells - well #1 and well #4 (see photos for locations).

4. Are surface water intakes located near the site? (Y) N

4a. If so, please note the location:
small tributary located in Northern portion of site

5. Can wind dispersion information be obtained? Y (N)

5a. If so, please note and observe the location.

6. Does an adjacent non-ARNG PFAS source exist? Y/N

6a. If so, please note the source and location. unknown - Fire Stations located at following addresseds within 4 mi radius (cont)

6b. Will off-site reconnaissance be conducted? Y (N)

2.4 mi
Strafford Fire and Rescue
360 Province Rd

Strafford TS
04-23-19

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? (Y)/N

1a. If so, please describe change (ex. Structures no longer exist): transitioned from boarding school in 1980s - leach field was in a different location (was approx 250 ft SW of current location)

2. Is the site/area vegetated? (Y)/N

2a. If not vegetated, briefly describe the site/area composition: grass, shrubs outside buildings in southern portion; northern portion is wooded

3. Does the site or area exhibit evidence of erosion? (Y)/N

3a. If yes, describe the location and extent of the erosion: runoff on sides of the roads - otherwise no

4. Does the site/area exhibit any areas of ponding or standing water? Y/(N)

4a. If yes, describe the location and extent of the ponding:

Receptor Information

1. Is access to the site restricted? (Y)/N

1a. If so, please note to what extent:

2. Who can access the site? **(Site Workers)/(Construction Workers)/(Trespassers)/(Residential)/(Recreational Users)/(Ecological)**

2a. Circle all that apply, note any ~~not~~ covered above: residents for building for one week max; rec user walking at track

3. Are residential areas located near the site? (Y)/N

3a. If so, please note the location/distance: Residents to all sides - house 555 ft to NW along Parker Mtn. Rd, residence 341 ft to SW across Parker Mtn. Rd, Residence 600 ft to SE also

4. Are any schools/day care centers located near the site? (Y)/N

4a. If so, please note the location/distance/type: Strafford Elementary; daycare on roller coaster Rd (approx 800 ft south of TS), Strafford kinder Campus

5. Are any wetlands located near the site? (Y)/N

5a. If so, please note the location/distance/type: several wetlands in the Northern portion of the site w/ tributaries to Mohawk River - P. Glennon to send mapped wetlands

Hill Library - 800 ft to the SE
USPS office - 1200 ft to the NW
Strafford Town Hall - 1200 ft to the NW

Stratford TS
04-23-19

Visual Survey Inspection Log

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description
NHARNGTS-01	04-23-19 Flammables Shed	outside of flammables shed (looking North)
"_02	04-23-19 Flammables Shed	Extinguisher in Flammables shed - Chemical - close up
"_03	04-23-19 Flammables Shed	Extinguisher in Flammables shed
"_04	04-23-19 Flammables Shed	Inside of flammables shed; NO AFFF Storage of add'l extinguishers
"_05	04-23-19 maintenance Bldg	CENTI finish floor polish bottle - front
"_06	04-23-19 maintenance Bldg	CENTI finish floor polish bottle - back
"_07	04-23-19 Kitchen	Fire extinguisher #1 in kitchen Chemical class K
"_08	04-23-19 Kitchen	Fire extinguisher #1 in kitchen, close-up of label
"_09	04-23-19 Kitchen	Fire supression system #1 in kitchen
"_10	04-23-19 Kitchen	Fire extinguisher #2 in kitchen Chemical class K
"_11	04-23-19 Kitchen	Fire supression system ~~AFFF~~ in kitchen, over grills, wet chemical
"_12	04-23-19 Kitchen	close up of tank for fire supression system #2
"_13	04-23-19 Kitchen	" "
"_14	04-23-19 Well #1	View of well # looking south
"_15	04-23-19 Well #3	view of well #3 looking NE w/ barracks in background
"_16	04-23-19 Drill Hall	Inside of drill hall where floor polish is used
"_17	04-23-19 Pump Room	pump room taps for wells #1 and #2 where prev. samples were collected
"_18	04-23-19 Pump Room	close-up of above

Appendix B.3
Conceptual Site Model Information

04-23-14 recorded by. amanda martin AECOM

Preliminary Assessment – Conceptual Site Model Information

Site Name: New Hampshire National Guard (Strafford) Training Center/site

Why has this location been identified as a site?

Detection of PFAS up to 10ppt in well

Are there any other activities nearby that could also impact this location?

Fire station 2.4 mi away, Strafford Fire and Rescue

Training Events

Have any training events with AFFF occurred at this site? NO

If so, how often? NA

How much material was used? Is it documented? NA

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction? Flows into brook/tributary in center of property, which then flows SE to Mohawk River

Average rainfall? Approx. 38 inches

Any flooding during rainy season? no

Direct or indirect pathway to ditches? ditch along NE edge of practice course, not near areas of foam polish use

Direct or indirect pathway to larger bodies of water? yes → brook/tributary to Mohawk River

Does surface water pond any place on site? no

Any impoundment areas or retention ponds? no

Any NPDES location points near the site? no

How does surface water drain on and around the flight line? no flight line

Structures
04-2319

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Northeast / east

Depth to groundwater? 10-21 ft bgs

Uses (agricultural, drinking water, irrigation)? drinking water

Any groundwater treatment systems? yes

Any groundwater monitoring well locations near the site? yes - MW#1 and MW#4

Is groundwater used for drinking water? yes

Are there drinking water supply wells on installation? yes

Do they serve off-post populations? NO

Are there off-post drinking water wells downgradient? Nearby drinking water wells - two municipal wells in Center Strafford (~1 mi from site), numerous domestic DW wells surrounding installation including down gradient

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? NO - septic tank

If so, do we understand the process and which water is/was treated at the plant? yes, septic tank + leach field

Do we understand the fate of sludge waste? ~~A~~ NA

Is surface water from potential contaminated sites treated? NO

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? NA

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles? NA

3. Other? Floor waxing/polishing water is dumped down drain - will go to septic tank then leach field located on site at 43°16'31.5"N 71°07'28.8"W

Stratford TS
04-23-19

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker – yes

Construction Worker – yes (none currently planned)

Recreational User – yes, locals use running/walking track

Residential – yes

Child – nearby school - yes

Ecological – yes

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?

school (Stafford Elementary), Stafford Town Hall, USPS office, Hill Library, Hayesfield family farm, multiple residences nearby

Documentation

Ask for Engineering drawings (if applicable). to be provided by P-Glennon

Has there been a reconstruction or changes to the drainage system? When did that occur?

- leach field relocated in 1993 by NHARNG
- exact location of previous leach field (now Austin Cate Academy) is unknown

Appendix C
Photograph Log

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 01

Date 4/23/2019

Time 8:19

Description:
NHNGTS Flammables Shed

Orientation:
North

Photograph No. 02

Date 4/23/2019

Time 8:18

Description:
Fire Extinguisher (chemical) in NHNGTS Flammables Shed (close-up of label).

Orientation:
NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 03

Date 4/23/2019

Time 8:18

Description:
Fire Extinguisher (chemical) in NHNGTS Flammables Shed.

Orientation:
NA

Photograph No. 04

Date 4/23/2019

Time 8:18

Description:
Inside of NHNGTS Flammables Shed. No additional fire extingushers or storage of PFAS-containing materials noted.

Orientation:
NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 05

Date 4/23/2019

Time 8:20

Description:
CENTIfinish floor polish bottle - back.

Orientation:
NA

Photograph No. 06

Date 4/23/2019

Time 8:20

Description:
CENTIfinish floor polish bottle - front.

Orientation:
NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 07

Date 4/23/2019

Time 8:24

Description:
Fire extinguisher (#1) in the NHNGTS kitchen, chemical Class K.

Orientation:
NA

Photograph No. 08

Date 4/23/2019

Time 8:25

Description:
Fire extinguisher (#1) in the NHNGTS kitchen, chemical Class K, close-up of the label.

Orientation:
NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 09

Date 4/23/2019

Time 8:34

Description:
Hood fire suppression system (#1) in the NHNGTS kitchen, wet chemical.

Orientation:
NA

Photograph No. 10

Date 4/23/2019

Time 8:35

Description:
Fire extinguisher (#2) in the NHNGTS kitchen, chemical Class K.

Orientation:
NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 11

Date 4/23/2019

Time 8:35

Description:

Hood fire suppression system (#2) in the NHNGTS kitchen, wet chemical, located over grills. CENTIFinish floor polish is used on floor in kitchen.

Orientation:

NA

Photograph No. 12

Date 4/23/2019

Time 8:35

Description:

Hood fire suppression system (#2) in the NHNGTS kitchen, wet chemical, located over grills, close-up of top tank label.

Orientation:

NA

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 13

Date 4/23/2019

Time 8:35

Description:
Hood fire suppression system (#2) in the NHNGTS kitchen, wet chemical, located over grills, close-up of bottom tank label.

Orientation:
NA

Photograph No. 14

Date 4/23/2019

Time 8:44

Description:
View of Bedrock Well #4 looking Southwest.

Orientation:
Southwest

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 15

Date 4/23/2019

Time 8:46

Description:
View of Bedrock Well #1 looking Northeast.

Orientation:
Northeast

Photograph No. 16

Date 4/23/2019

Time 8:45

Description:
NHNGTS Drill Hall looking East. CENTIFinish floor polish is used on floor.

Orientation:
East

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	New Hampshire National Guard Training Site	Strafford, New Hampshire

Photograph No. 17

Date 4/23/2019

Time 8:49

Description:

Flow meters and taps for Well #4 and Well #1 in NHNGTS pump room. March 2017 groundwater samples for PFAS were collected at these taps.

Orientation:

West

Photograph No. 18

Date 4/23/2019

Time 8:49

Description:

Flow meters and taps for Well #4 and Well #1 in NHNGTS pump room. March 2017 groundwater samples for PFAS were collected at these taps.

Orientation:

West