FINAL
Preliminary Assessment Report
Camp Ethan Allen Training Site
Jericho, Vermont

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

April 2019

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
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
CFR	Code of Federal Regulations
CSM	conceptual site model
FTA	fire training area
HA	Health Advisories
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
ppt	parts per trillion
SI	Site Inspection
TFT	Task Force Tips®
TS	Training Site
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VSI	visual site inspection
VTARNG	Vermont Army National Guard

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Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform Preliminary Assessments (PAs) and Site Inspections 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) (a suite of related chemicals), primarily in the form of aqueous film forming foam (AFFF) released during firefighting activities or training, although other PFAS sources are possible.

AECOM completed a PA for PFAS at the Vermont Army National Guard (VTARNG) Camp Ethan Allen Training Site (Ethan Allen TS) in Jericho, Vermont, to assess potential PFAS release areas and exposure pathways to receptors. The Ethan Allen TS is an 11,000 acre facility operated by the VTARNG since 1976 that hosts a variety of training activities and facilities. The Army Mountain Warfare School and Armory is located within the facility and training activities include helicopter training. General Dynamics Armament Systems, Inc. occupies 766 acres within the 11,000 acre Ethan Allen TS for weapons systems development and testing. In addition, the facility hosts a 5-kilometer biathlon course, and associated facilities, and is considered one of the premier cross-country ski and biathlon facilities in North America.

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day PA site visit on 17 May 2018
- Interviewed current Ethan Allen TS and VTARNG personnel during the PA site visit including biathlon staff and environmental manager
- Interviewed current Jericho Fire Department Duty Captain and staff
- Completed visual site inspections at known or suspected PFAS release locations and documented with photographs
- Identified areas of interest (AOIs) and developed a conceptual site model (CSM) to summarize potential PFAS Source-Pathway-Receptor linkages for each AOI

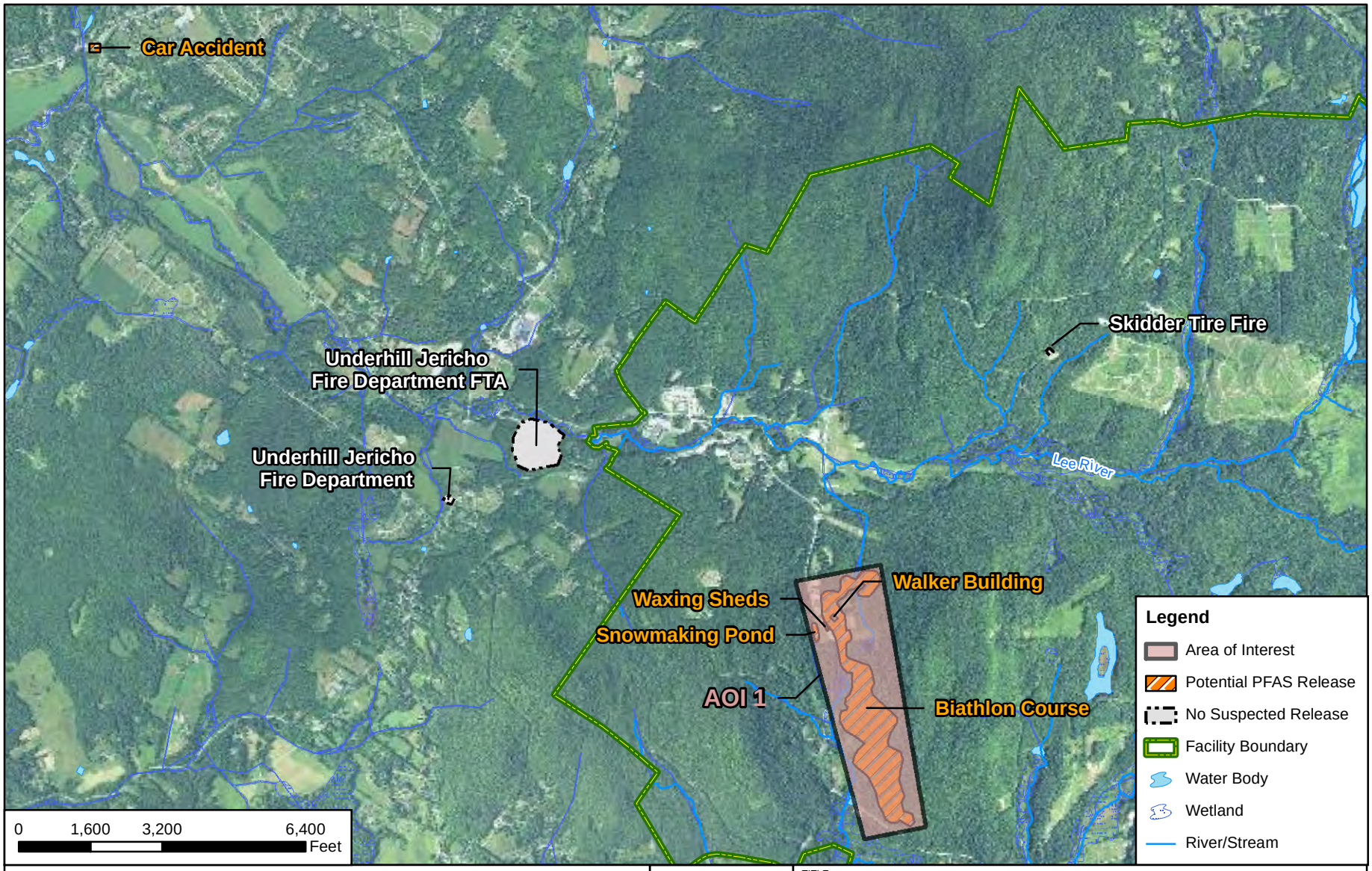
One AOI related to potential PFAS releases was identified at Ethan Allen TS during the PA. High grade commercial ski and snowboard waxes have been found to contain high concentrations of PFAS (Kotthoff et al., 2015). Surface water and snowmelt have been shown to have measureable PFAS impacts downgradient of ski areas (Kwok et. al., 2013). Interviewees noted that high grade waxes are almost exclusively used for competition and that lower grade waxes (reportedly not PFAS containing) are used the majority of the time at Ethan Allen TS. The AOI identified during the PA is associated with the biathlon course at Ethan Allen TS. The AOI is shown on **Figure ES-1** and described in the table below. The CSM for the entirety of the Ethan Allen TS is presented in **Figure ES-2**.

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Biathlon Facility	VTARNG and public	Approximately 1972 to present

The Underhill Jericho Fire Department occasionally uses AFFF to respond to fires within the area. Interviewees recalled approximately 1-gallon of AFFF being used on a car fire located off-

facility at the intersection of Lee River Road and State Route 15, hydraulically downgradient of the Ethan Allen TS.

Based on the PA findings, there is potential for exposure to PFAS contamination in surface soil, to site workers, construction workers, recreational users, and trespassers via ingestion and inhalation; groundwater, surface water and sediment to site workers, construction workers, recreational users, trespassers, and off-facility residents via ingestion; and subsurface soil to site and construction workers via ingestion.



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SCALE	1:38,401	CHK BY	AZ	11/26/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/26/2018

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TITLE

Summary of Findings

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Figure ES-1

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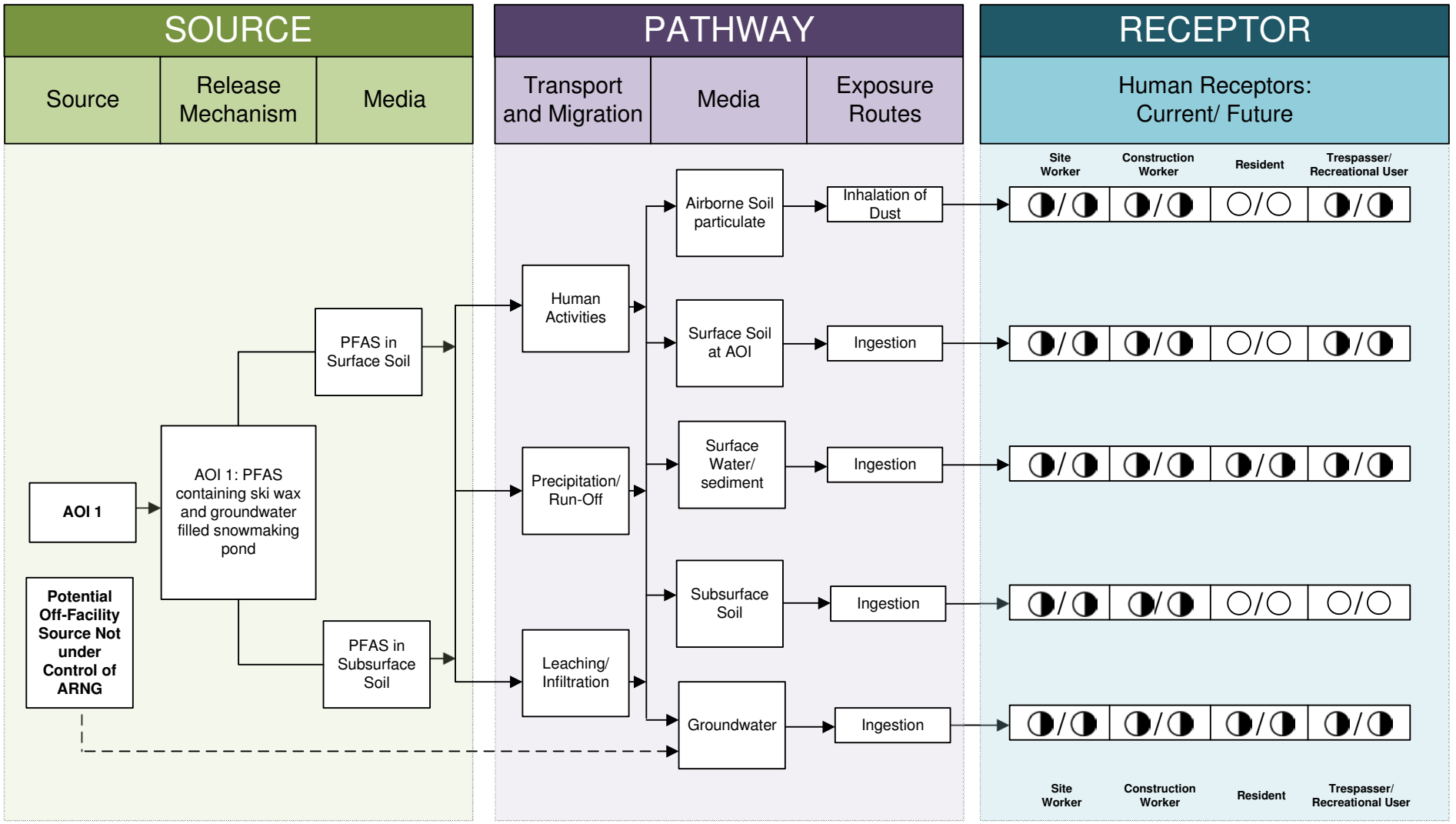


LEGEND

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

Figure ES-2
Conceptual Site Model
Ethan Allen Training Site, VT

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 & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SI) 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. The ARNG is assessing potential effects on human health related to processes at their facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), primarily releases of aqueous film forming foam (AFFF) although other sources of PFAS 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 these 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 Health Advisories (HAs) for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. In the absence of federal maximum contaminant levels, some states, such as Vermont, have adopted their own drinking water advisory levels for PFAS. On 10 July 2018 the Vermont Department of Health issued a Drinking Water HA level of 20 parts per trillion (ppt) combined for five PFAS chemicals (**Appendix A**).

This report presents findings of a PA for PFAS at Vermont Army National Guard (VTARNG) Camp Ethan Allen Training Site (Ethan Allen TS) in Jericho, Vermont in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300), and USACE requirements and guidance.

This PA documents locations where PFAS may have been released to the environment at Ethan Allen TS. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

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 1-day PA site visit on 17 May 2018
- Interviewed current Ethan Allen TS and VTARNG personnel during the PA site visit including biathlon staff and environmental manager
- Interviewed current Jericho Fire Department Duty Captain and staff
- Completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs

- Identified areas of interest (AOIs) and developed a conceptual site model (CSM) to summarize potential PFAS Source-Pathway-Receptor linkages for each AOI

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
- **Section 3** – **Non-Fire Training Areas:** describes other locations of potential PFAS releases at the facility identified during the site visit
- **Section 4** – **Emergency Response Areas:** describes areas of potential PFAS release at the facility, specifically in response to emergency situations
- **Section 5** – **Adjacent Sources:** describes sources of potential PFAS release adjacent to the facility that are not under the control of ARNG
- **Section 6** – **Conceptual Site Model:** describes the pathways of potential PFAS transport and receptors at the facility
- **Section 7** –**Conclusions:** summarizes the data findings and presents the conclusions and uncertainties 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 Ethan Allen TS occupies approximately 11,000 acres in eastern Chittenden County, Vermont, on the western side of the Green Mountains. The Town of Jericho, Vermont is approximately 1.5 miles to the northeast. The southern boundary of the facility runs adjacent to Mill Brook, a tributary of the Winooski River. The eastern boundary abuts the drainage divide formed by the main ridgeline of the Green Mountains. Mt. Mansfield State Forest is located directly east of the facility on the eastern side of the Green Mountains. Land to the north, south, and west of the facility consists of privately owned farmland, residences, and undeveloped forests (**Figure 1-1**).

The majority of the facility's footprint is undeveloped and forested. Indoor facilities are located along the western portion of the Ethan Allen TS, by the main entrance. Approximately 600 acres of fields with trails, firing ranges, and other indoor and outdoor facilities occupy central, south-central, and eastern portions of the Ethan Allen TS. A network of trails and paved and unpaved roads is distributed throughout the Ethan Allen TS. Current and former use of the Ethan Allen TS (including separately operated portions within the facility boundary) is discussed below.

The Ethan Allen TS is operated by the VTARNG and hosts the Army Mountain Warfare School and Infantry Armory, as well as the 86th Infantry Brigade Combat Team. The facility contains the Jericho Readiness Center, along with a few offices, barracks, and equipment maintenance

buildings, primarily located along Ethan Allen Road in the Lee River valley. The barracks are occasionally used to house a few thousand individuals during training exercises throughout the year.

Prior to being established, the area was used for farming and pasture. In 1926, the War department established Ethan Allen TS as an artillery range; the area has since been used during the 1930s for Reserve Officer Training corps and two Civilian Conservation Corp camps. The Ethan Allen TS was expanded in 1941 and used as a bombing range by the Army Air Corps. Beginning in 1952, developmental and proof testing of newly manufactured weapons systems has been conducted by the General Dynamics Armament Systems, Inc. (formerly the Armament Systems Department of General Electric) on 766 acres within the Ethan Allen TS. Between 1969 and 1982, depleted uranium ammunition was tested in this area. Affected soils and materials were subsequently removed and shipped off-site to licensed disposal facilities (Clark, Chalmers, Mack, & Denner, 2005). The Department of the Army granted license to the State of Vermont for ARNG use beginning 17 December 1976. Since that time several supplemental agreements have been issued to add additional acreage and extend the license until 16 December 2027. Leasing agreements are included in **Appendix A**. Activities at Ethan Allen TS include helicopter training.

In addition, the Ethan Allen TS hosts one of the premier cross-country ski and biathlon courses and support structures in North America and features one of three internationally licensed biathlon courses in the US (globalsecurity.org, 2011). Vermont became the pinnacle of the US Military Biathlon Program in 1972; the National Guard Bureau's first biathlon championships were held at Ethan Allen TS in 1975. Since then, the Ethan Allen TS has been used for both military and civilian biathlon training and held national and international competitions. Civilian use includes the Ethan Allen Biathlon Club, Mansfield Nordic Club, and local high schools. The 5 kilometer course is operated year round; during winter months the course is supplemented with artificially made snow.

1.5 Facility Environmental Setting

Ethan Allen TS is in the Green Mountains of Vermont within the New England Physiographic Province. Surface topography of the TS is rugged, hilly, and mountainous, with a maximum elevation of approximately 3,573 feet above mean sea level (amsl) and a minimum elevation of approximately 604 feet amsl. The easternmost edge of the property trends north-south along the main ridge of the Green Mountains. The westward-flowing Lee River originates at the eastern boundary, flows westward through the center of the facility, and exits at the western boundary. This main drainage and drainages to the north and south are fed by several tributaries located within the facility boundary, some of which form small ponds at low-lying interior locations. The area surrounding the facility is rural and supports a variety of wildlife.

1.5.1 Geology

The Ethan Allen TS is on the western side of the Green Mountains, within a region characterized by generally north-south-trending hills, ranges, and intervening valleys, all of which are cut by east-west-trending drainages. The eastern boundary of the facility corresponds to the drainage divide formed by the linear, north-south-trending main ridge of the Green Mountains.

The Ethan Allen TS is underlain by the western limb of the north-south-trending Green Mountain Anticlinorium, an antiformal duplex that is approximately 10 miles wide and consists of Ordovician, Cambrian, and Neoproterozoic rock units separated by depositional contacts and thrust faults. The area is underlain by lithologically diverse, predominantly metasedimentary rocks of the West Bridgewater Formation, Fairfield Pond Formation, Underhill Formation,

Hazens Notch Formation, Fayston Formation, and Pinnacle Formation. These rocks include schist, phyllite, marble, amphibolite, gneiss, quartzite, and greenstone. Depositional contacts, bedding, and thrust faults generally dip to the west and strike to the south (Ratcliffe et al., 2011). The bedrock geology beneath the area is presented in **Figure 1-2**.

Surface materials at the Ethan Allen TS consist predominantly of glacial till mantling bedrock and reflect the topography of the underlying bedrock surface, bedrock, and pluvial deposits consisting of swamp, peat, and/or muck. Modern, unconsolidated fluvial and glacial outwash deposits are also present in areas adjacent to the Lee River in the western half of the facility (Stewart and MacClintock, 1970).

Northwestern Vermont is an area of greater earthquake hazard potential relative to elsewhere in Vermont and the northeast US based on probabilistic seismic hazard analysis performed by the United States Geological Survey. The probable intensity of ground shaking in northwestern Vermont is less than that in more recognized seismic hazard risk areas of the US but it has the fifth highest probable intensity in the continental US. The earthquake shaking hazard in northwestern Vermont derives from its proximity to areas of significant seismic activity in the northern portion of New York State and the St. Lawrence River valley in Canada (Lens et al., 2013).

1.5.2 Hydrogeology

As a result of glacial retreat, stratified drift sediments form a confined aquifer in places overlain by an unconfined aquifer that make up the stratified-drift aquifers in the Mill Brook and Lee River Valleys at the facility. The Pinnacle and Underhill Formations are the major bedrock formations at the Ethan Allen TS. These formations contain varied textural and compositional differences; the differences are enough to define mapable rock units shown on **Figure 1-2**, but are not great enough to create regional variations in groundwater flow in the bedrock aquifer.

The overall direction of groundwater flow in the Lee River and Mill Brook Valleys is from east to west, while localized flow is from the valley walls to the Lee River or Mill Brook. The regional bedrock hydraulic conductivity at the facility is approximated to be 1 feet per day or less. Groundwater flow velocity in the center of the Lee River Valley is estimated to be 0.7 to 2 feet per day due to the steep gradient of the Valley and relatively coarse stratified drift. The Mill Brook Valley has a relatively shallow gradient and fine-grained streambed sediments resulting in an estimated velocity of 0.7 feet per day or less (Clark et al., 2005)

Static depth to groundwater in the bedrock aquifer is commonly 10 to 20 feet below ground surface (bgs). Depths to groundwater greater than 20 feet bgs usually occur at higher altitudes and ridges, whereas shallow groundwater is typically found in topographic low points or near surface water bodies. The water table generally follows the land surface. Streams in the center of valleys containing stratified-drift deposits typically drain the aquifer whereas streams that cross from upland till into stratified-drift deposits generally lose water to the aquifer.

The primary drinking water source for the facility has been the Champlain Water District system since 1999 (Clark et al., 2005). Prior to this, Ethan Allen TS was served by three onsite bedrock wells. Two bedrock wells, approximately 300 feet bgs, formerly supplied water to the Mountain Warfare School and a bedrock well, 140 feet bgs, formerly provided water to the Cantonment. The Cantonment occasionally uses its well to fill portable drinking water supply tanks (Clark et al., 2005). Additional drinking water sources at the facility include a potable well (#40293, located south of the Walker Building) used to supply the biathlon facilities located within the Ethan Allen TS. Within the Walker Building, drinking water is treated using a clean water filtration, Point-of-Entry Treatment system manufactured by Kinetico Water Systems. In addition to potable well #40293, the March 2017 sampling and analysis report indicated that there are eight other wells at the Ethan Allen TS which supply potable water sources (Tetra Tech 2017).

These potable water sources are located within classroom and bathroom sinks located within training buildings used intermittently by the Mountain Warfare School. **Table 1-1** summarizes the potable well locations sampled in the March 2017 sampling and analysis report. Well locations are shown on **Figure 1-2**.

Table 1-1 Potable Wells Sampled in March 2017

Well Number	Location	PFAS Detected (ppt)
40293	Walker Building	Yes (PFOA: 19.5; PFHpA: 12.2)
40030	Range	Yes (PFBA:1.4J; PFTeA: 0.645J)
WAT21	Firing Point Classroom	No
40163	Range	Yes (PFTeA: 0.456J)
WAT19	Range	No
40167	Range Classroom	Yes (PFOA: 0.724J; PFTriA: 0.572J)
40107	Range	No
40081	Range	Yes (PFOA: 1.24J; PFBA: 1.59J; PFHxA: 0.96J; PFPeA: 1.13J)
40054	Pump House #2	Yes (PFOA: 8.19, PFOS: 1.54J)

Notes: ppt = parts per trillion; J = estimated concentration

Of the nine potable wells sampled in the March 2017 sampling event, PFAS were detected at six wells. Of those detections, well #40293 (Walker Building well) was the only well to exceed the Vermont HA of a combined 20 ppt for five PFAS chemicals. Low level detections of some PFAS chemicals were detected at five other wells; however, no concentrations exceeded either the Vermont or USEPA HA levels. VTARNG has sampled well #40293 on a quarterly basis since the initial sampling event. **Table 1-2** summarizes the results for the PFAS analytes included in the Vermont HA for each quarter. The full report and results can be found in **Appendix A**.

Table 1-2 Well # 40293 (Walker Building Well) Quarterly Sampling Results

Vermont HA Analytes (ppt)	March 2017	August 2017	November 2017	February 2018
Perfluorooctanoic acid (PFOA)	19.5	29	31	34
Perfluorooctanesulfonic acid (PFOS)	--	1.48J	0.721J	--
Perfluorohexanesulfonic acid (PFHxS)	--	--	--	--
Perfluoroheptanoic acid (PFHpA)	12.2	19.5	18	21.5
Perfluorononanoic acid (PFNA)	--	1.96J	1.93J	1.76J

Notes: ppt = parts per trillion; -- = not detected; J = estimated concentration

General Dynamics Armament Systems, Inc. is still supplied by onsite water from a bedrock well. One of the firing ranges is also supplied by a bedrock well, 226 feet bgs, which is infrequently used. An artificial pond, used by Ethan Allen TS to supply snowmaking machines, is fed by 2 wells; one deep well, drilled to a depth of 625 feet bgs, and one shallow well, approximately 4 feet bgs, that is fed by a spring. The West Bolton Public Water Source Protection area includes land areas within the facility boundaries; however, the water system is upgradient of the Ethan Allen TS watershed and not likely to be affected by activities within the facility boundary.

Domestic wells are commonly drilled into bedrock in the communities surrounding the Ethan Allen TS. Numerous domestic wells are located immediately outside of the northern, western, and southern boundaries of the facility. Median well depths are approximately 300 feet bgs; hydraulic properties and aquifer characteristics vary widely across relatively short distances (Clark et al., 2005).

1.5.3 Hydrology

The Ethan Allen TS is located within three separate sub-watersheds. The majority of the facility lies within the Browns River Watershed, which runs through the center of the facility from east to west and encompasses approximately 6,548 acres of the Ethan Allen TS. The second largest drainage area, covering around 3,830 acres, is the Snipe Island Brook-Winooski River Watershed. This watershed drains the southern area of the facility to Mill Brook. Lastly, approximately 840 acres of the far northeastern portion of the facility lies within Headwaters Browns River Watershed. Watersheds within the facility boundary lie within hilly, mountainous terrain and include drainage areas that are mostly forested and undeveloped. Watersheds, surface water features, and their associated drainages at Ethan Allen TS are presented in **Figure 1-3**.

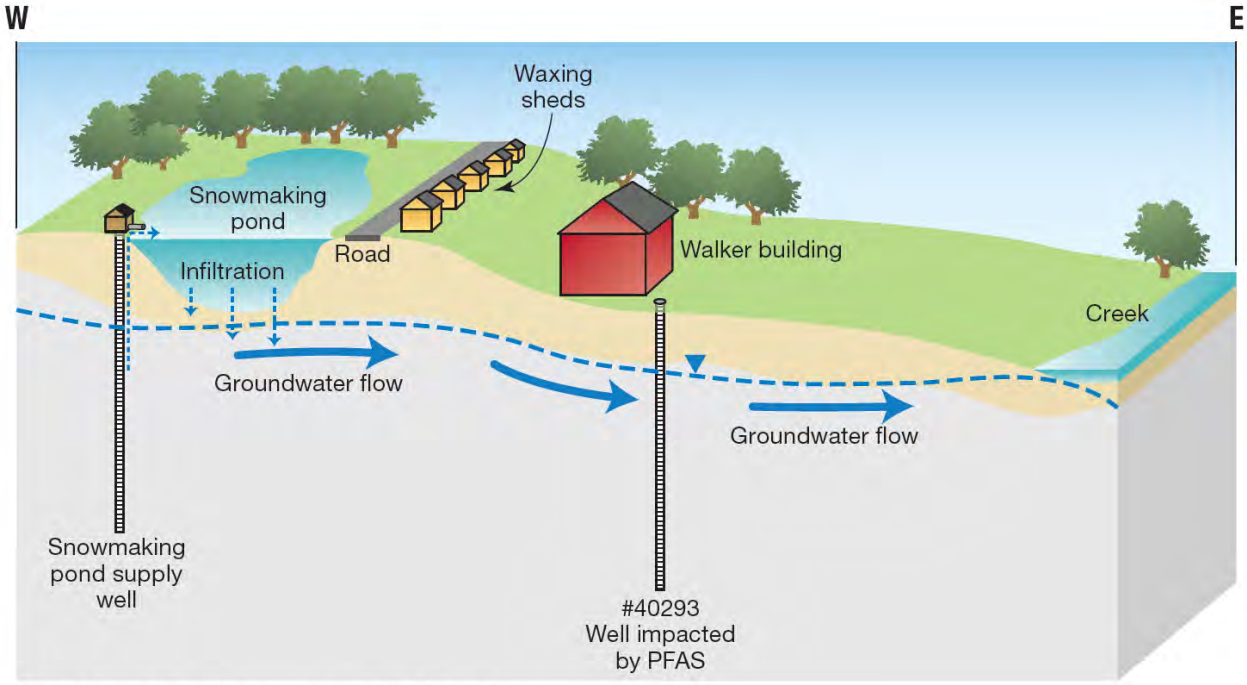
Numerous unnamed tributaries, natural and artificial ponds, springs, and wetlands are located within the Ethan Allen TS. These freshwater features predominantly drain into two major waterbodies: the Lee River, which subsequently discharges to the Browns River to the northwest, and Mill Brook, which drains to the Winooski River to the southwest. The drainage divide between the watersheds runs east-west across the southcentral half of the facility. Both systems drain into Lake Champlain, a large freshwater lake that forms the western border between New York and Vermont and comprises the main freshwater supply for adjacent regions.

The major hydrologic feature of the Ethan Allen TS is the Lee River which runs through the central portion of the facility, flowing generally east to west. Several small, unnamed tributaries flow into the Lee River along its length. Data from 2003 showed that the average streamflow that year was 25.4 cubic feet per second (Clark et al., 2005). A comparative analysis of the Lee River to other similar rivers in Vermont indicated that groundwater likely contributes largely to streamflow during periods of low rainfall. The watershed contains a large area of relatively permeable stratified-drift deposits that may act as a storage reservoir for groundwater (Clark et al., 2005).

The southern third of the facility is drained by several southward- and/or southwestward-flowing tributaries that feed into Mill Brook. Mill Brook runs along the southern boundary of the facility and flows westward towards its confluence with the Winooski River, approximately 4 miles west of the Ethan Allen TS.

At low-lying locations within the north-central, central, and south-central portions of the Ethan Allen TS, surface water flows into several freshwater surface ponds, forested/shrub wetlands, and emergent wetlands (**Figure 1-3**). In total, ponds cover approximately 60 acres, forested/shrub wetland cover approximately 330 acres, and emergent wetlands cover approximately 15 acres (USFWS, 2018).

One of the larger ponds on the property is a man-made pond, located adjacent to the Wax Sheds, which is used by the biathlon facility to supply snow making machines and snowmaking huts with water. Shallow and deep groundwater wells are used to supply the pond with water for snowmaking. The pond is upgradient to the Wax Sheds and Walker Building. Surface water in the pond may infiltrate to shallow groundwater. Localized groundwater flow direction is assumed to be travel to the northeast from the pond, towards the Wax Sheds and past the deep well impacted by PFAS at the Walker Building. From there, groundwater would continue to travel northeast to a creek that connects to the Lee River. The snowmaking pond may be a secondary source of PFAS, because the pond is partly fed by a deep well and PFAS have been detected in groundwater at the nearby deep well. The following diagram depicts a generalized cross-section for the area.



Note: Generalized cross-section. Not to scale

1.5.4 Climate

The Ethan Allen TS is in the western half of the Green Mountains physiographic region of Vermont. Local rainfall and temperature ranges in this region are strongly affected by factors such as slope, elevation, aspect, and urbanization, and can vary considerably over short distances. Temperatures are moderated year round by the proximity of Lake Champlain to the west. Cool breezes blow inland off the lake in the summer and in the winter the Lake acts as a heat reservoir that moderates local land temperature. Air temperature highs in July and lows in January average 80 degrees Fahrenheit (°F) and 18°F, respectively (NOAA, 2018). Rainfall data indicates that the Ethan Allen TS is located in an area that averages approximately 38 inches of precipitation per year. Precipitation is well distributed throughout the year but typically heavier in the summer than in the winter. Strong thunderstorms in the summer produce the heaviest local rainfall intensities (NOAA, 2018). Precipitation remains largely locked in snowpack during winter months prior to melt.

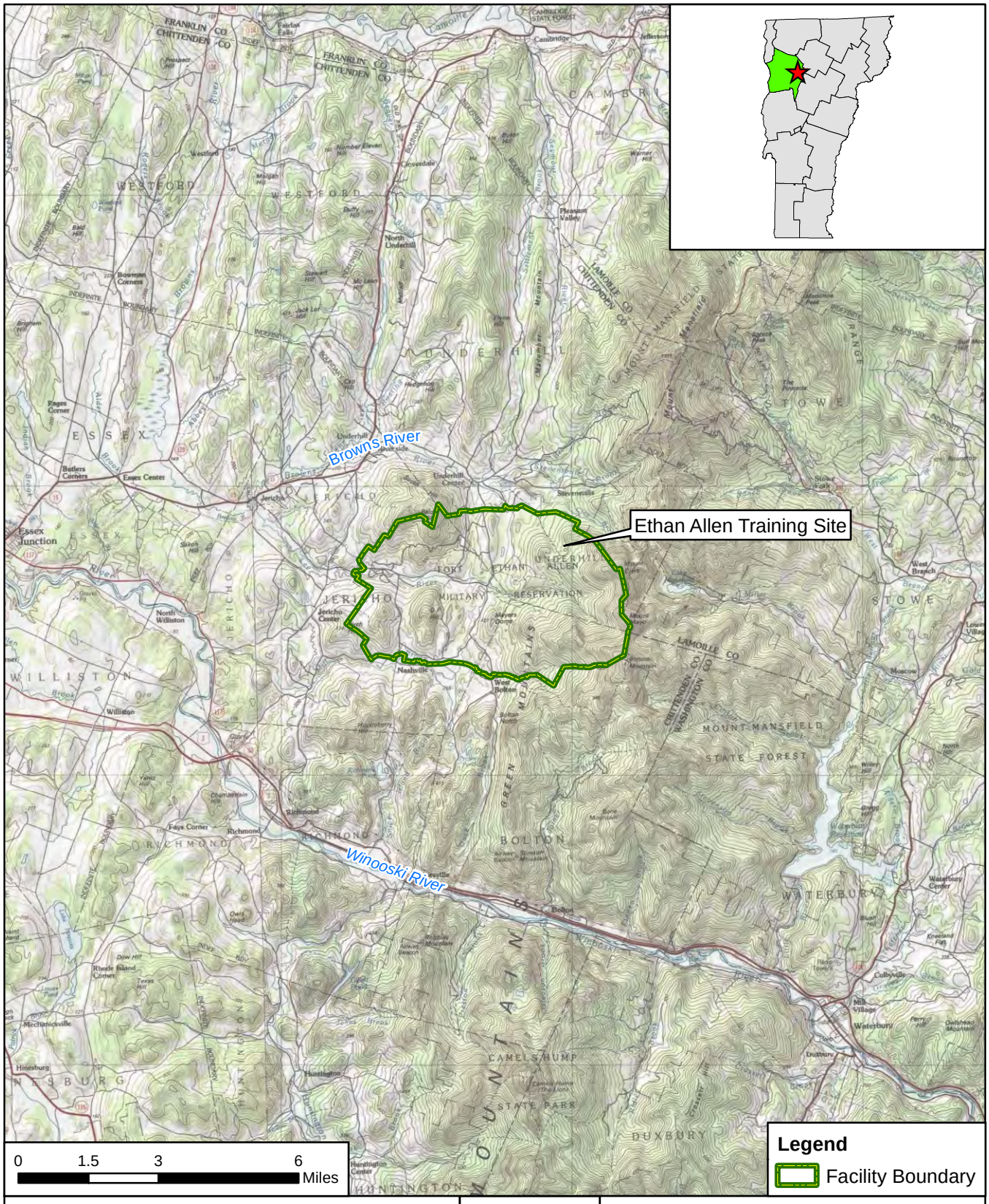
1.5.5 Current and Future Land Use

Ethan Allen TS is used by the VTARNG for weapons-testing and training. The camp is home to the US Army Mountain Warfare School and Infantry Armory, along with the 86th Infantry Brigade Combat Team. The majority of the facility's footprint is undeveloped and forested. The few offices, barracks, and equipment maintenance buildings are primarily located along Ethan Allen Road in the Lee River Valley. The facility is sparsely populated; however, the barracks occasionally host a few thousand individuals during Army Mountain Warfare School training exercises throughout the year.

The facility is used for both military and civilian biathlon training and holds national and international competitions. Civilian use includes the Ethan Allen Biathlon Club, Mansfield Nordic Club, and local high schools. Biathlon training and competitions occur throughout the year; traditional snow skis are used for training and competitions during winter months while roller skis are used during the warmer months of the year. During the VSI, facility staff mentioned that people have used the Snowmaking Pond for recreational swimming.

Land to the north, south, and west of the facility is primarily rural, consisting of privately owned farmland, residences, and undeveloped forests. The eastern border of the facility abuts the western slope of the Green Mountains and Mount Mansfield State Forest.

Reasonably anticipated future land use is not expected to change from the current land use described above.



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Base Map: Copyright:© 2013 National Geographic Society, i-cubed		PM	RG	11/28/2018

Facility Location

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Figure 1-1

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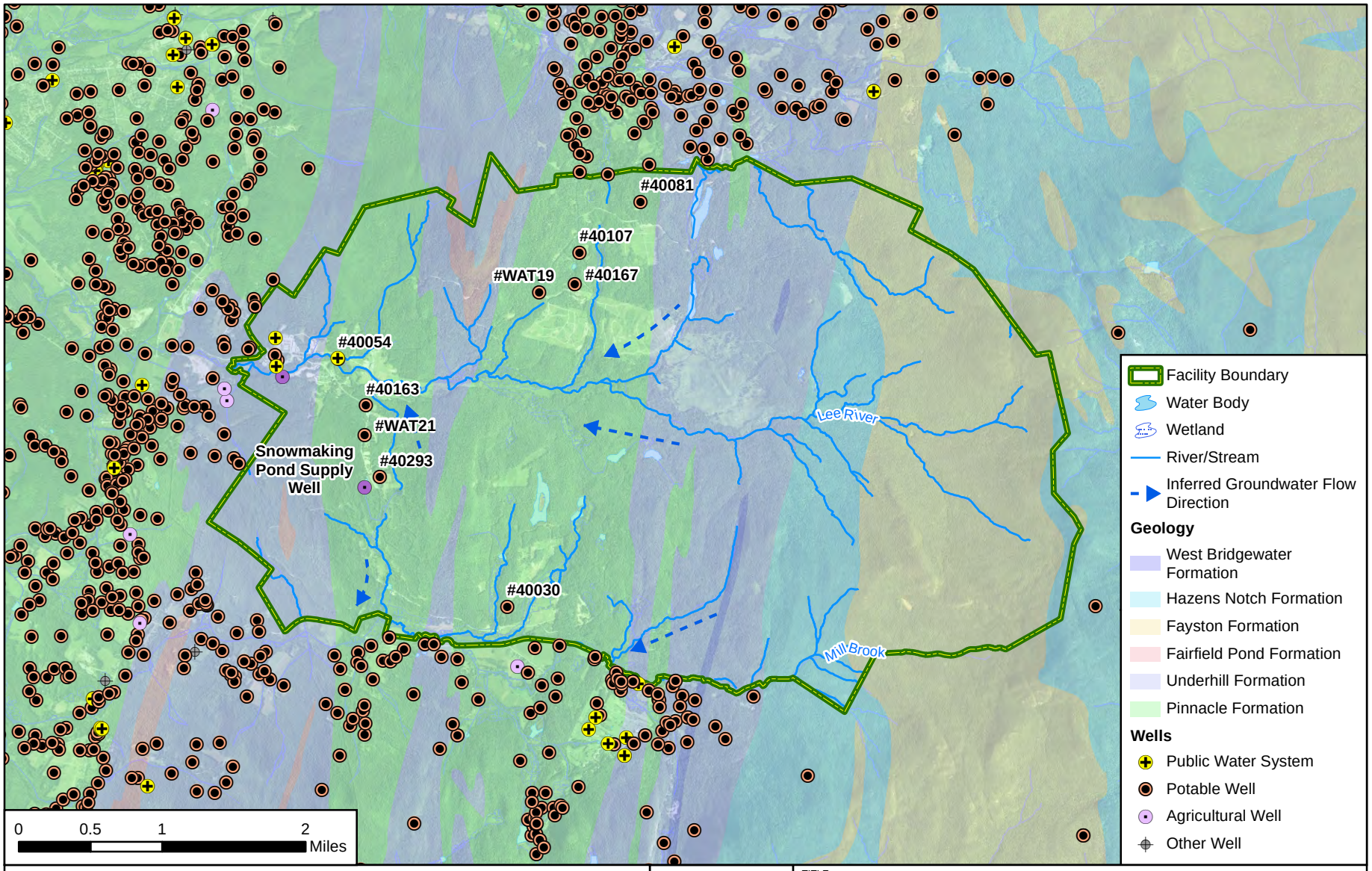

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Groundwater Features

AECOM

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Figure 1-2

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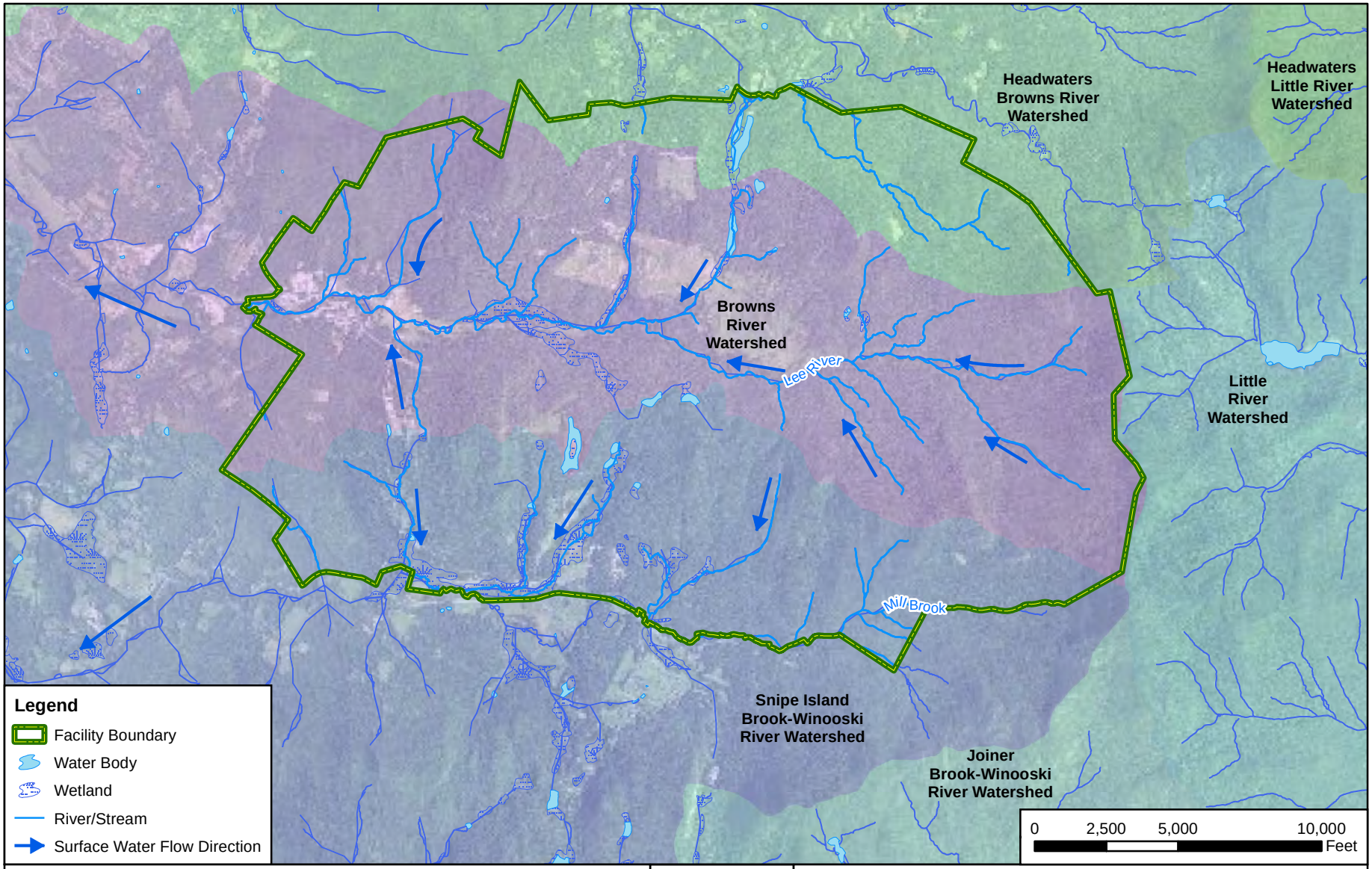

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SCALE	1:60,000	CHK BY	JL	11/9/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/9/2018

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TITLE

Surface Water Features

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-3

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\Fig_1-3_TS-Ethan_Allen_ Surface_Water_Features.mxd

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2. Fire Training Areas

No FTAs were identified at Ethan Allen TS during the PA. Interviewees confirmed that the facility is supported by the Underhill Jericho Fire Department and that firefighting training has never occurred on Ethan Allen TS property (**Appendix B**).

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3. Non-Fire Training Areas

Three non-FTAs were identified during the PA at Ethan Allen TS. A description of each non-FTA is presented below, and the non-FTAs are shown on **Figure 3-1**. Photographs of the non-FTAs appear in **Appendix C**.

VTARNG began quarterly sampling of drinking water at well #40293, located approximately 50 feet south of the Walker Building within the biathlon facilities at Ethan Allen TS, in March 2017. Four rounds of samples have been collected from the kitchen sink of the Walker Building, at the time of reporting. Since the initial sampling event, PFAS have consistently been detected in well #40293 above the July 2018 updated Vermont Department of Health Drinking Water HA level of 20 ppt but below the USEPA Drinking Water HA of 70 ppt (Tetra Tech 2018). Eight other wells at Ethan Allen TS were sampled during the initial sampling event in March 2017. Low level detections of some PFAS chemicals were detected; however, no concentrations exceeded either the Vermont or USEPA HA levels (Tetra Tech 2018).

High grade commercial ski and snowboard waxes have been found to contain high concentrations of PFAS (Kotthoff et al., 2015). Surface water and snowmelt have been shown to have measureable PFAS impacts downgradient of ski areas (Kwok et. al., 2013). Interviewees noted that high grade waxes are almost exclusively used for competition and that lower grade waxes (reportedly not PFAS containing) are used the majority of the time at the facility. The non-FTAs identified during the PA are associated with the biathlon course at Ethan Allen TS.

3.1 Waxing Areas

As part of the biathlon facility, 20 Wax Sheds (2 rows of 10 huts) used by biathletes during training and competitions for ski maintenance and ski waxing, are located on the western side of the Walker Building at geographic coordinates 44°28'3.07"N and 72°56'12.84"W. Each shed stands above grade, is approximately 15 feet long by 10 feet wide, and is constructed with a wooden (plywood) floor and work benches, an exhaust fan, and a window.

During the VSI, hardened wax was observed on the floor and work benches of the sheds. Discarded wax shavings were also observed in plastic waste bins within the sheds. Interviewees were not sure where the bins were emptied, but speculated they were likely emptied in facility trash bins for municipal waste disposal. An empty waste bin with wax remnants was observed during the VSI lying on its side in the strip of grass between the two rows of sheds. Interviewees also noted that wax shavings from the floors of the warming huts have typically been swept out of the sheds onto the grassy area between the 2 rows of sheds.

Additionally, inside the Walker Building are rooms for applying ski wax and a wax storage room. A French drain surrounds the Walker Building and is connected to the facility's storm water drainage network. Wax may have been swept from inside the building and entered the drainage system.

Remnants of ski wax left in and swept from the Waxing Sheds and Walker Building by patrons of the biathlon facility are potential PFAS sources.

3.2 Snowmaking Pond

Located approximately 130 feet to the west and upgradient of the Wax Sheds is an artificial pond used to supply snowmaking machines and snowmaking huts with water. The approximate geographic coordinates are 44°28'1.80"N and 72°56'15.93"W. Historical aerials provided in the Environmental Data Resources report (**Appendix A**) show that the pond was built between 1986 and 1999. Portions of the biathlon track are supplemented with artificial snow during the winter, as needed. The pond is fed by 2 wells; one deep well (**Figure 1-2**), drilled to a depth of 625 feet bgs, and one shallow well, approximately 4 feet bgs, that is spring fed. Based on

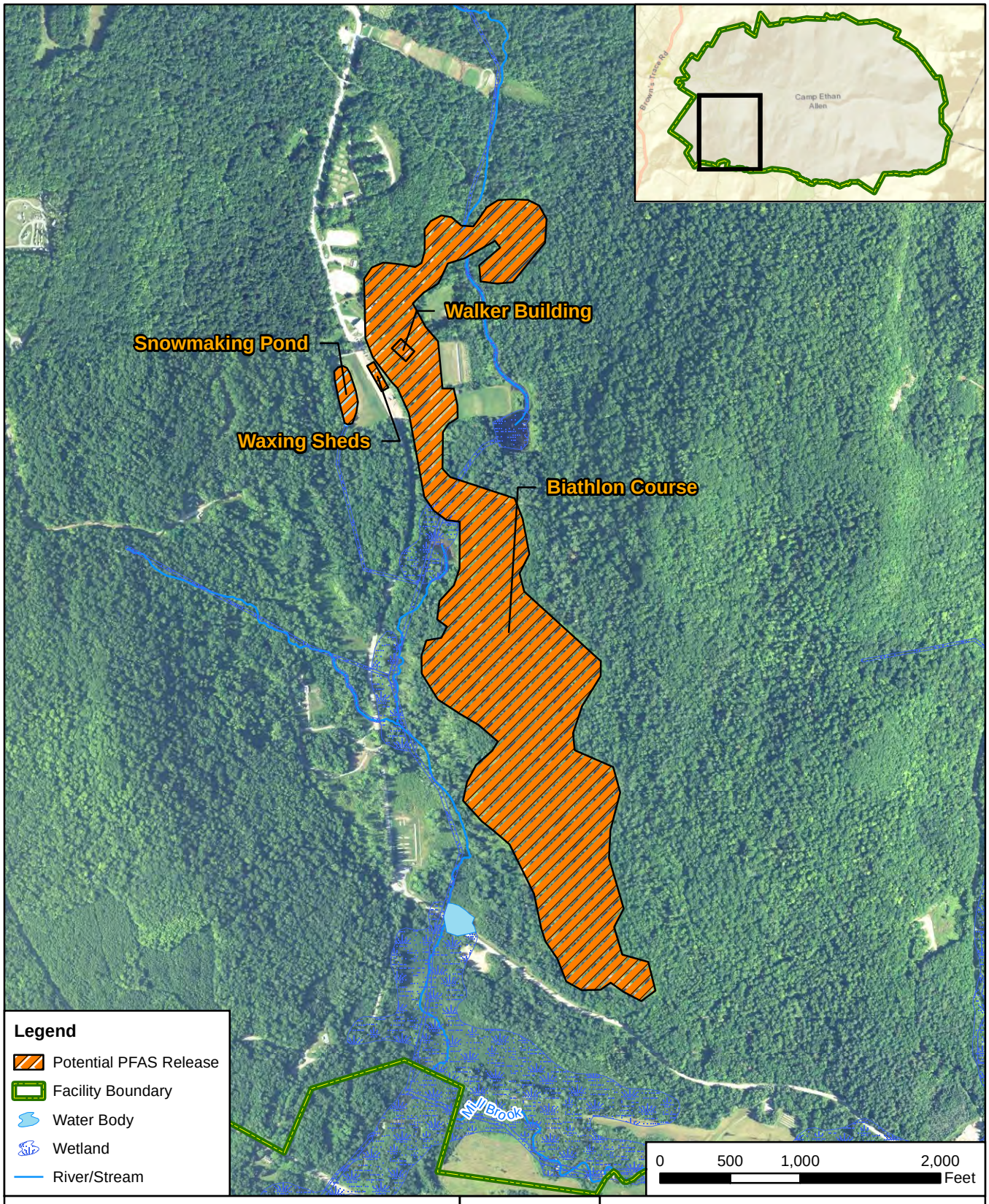
interviews with facility staff during the VSI, approximately 3.3 kilometers of the 5 kilometer track can be covered by the artificial snow. Snowmaking Pond may be a secondary source of PFAS, because the pond is partly fed by a deep well and PFAS have been detected in groundwater from a nearby deep well.

3.3 Biathlon Course

The biathlon course is a 5 kilometer asphalt paved track averaging about 20 feet in width that starts at a newly constructed building, located immediately to the south of the Walker Building. The course is situated to both the north/northwest and south of the Walker Building. Biathlon training and competitions occur throughout the year at the course; traditional snow skis are used for training and competitions during winter months while roller skis are used during the warmer months of the year. At select locations along the course, snow is supplemented with water from the Snowmaking Pond (a potential secondary source of PFAS). Normal use of the biathlon course during winter months results in wax from skis incidentally transferring from the ski to snow. This residual wax left on the snow surface may be a potential source of PFAS in snowmelt along the 5 kilometer track.

3.3.1 Off-Site Snow

During the 2017 ski course season, a combination of low snow and snowmaking machine failure required off-site snow to be transported to facility for use at the biathlon course. Interviews with facility staff have indicated that about 120-160 tons of snow was trucked in from the Army Aviation Support Facility at the South Burlington Airport, down-gradient Ethan Allen TS, declination station, and Hyde Park (approximately 30-40 tons from each location). The PFAS concentrations (if any) in the off-site snow is unknown and may have contributed to the detected levels of PFAS in groundwater from infiltration due to snow melt.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Ethan Allen Training Site, VT			
REVISED	11/26/2018	GIS BY	MS	11/26/2018
SCALE	1:12,000	CHK BY	JL	11/26/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/26/2018

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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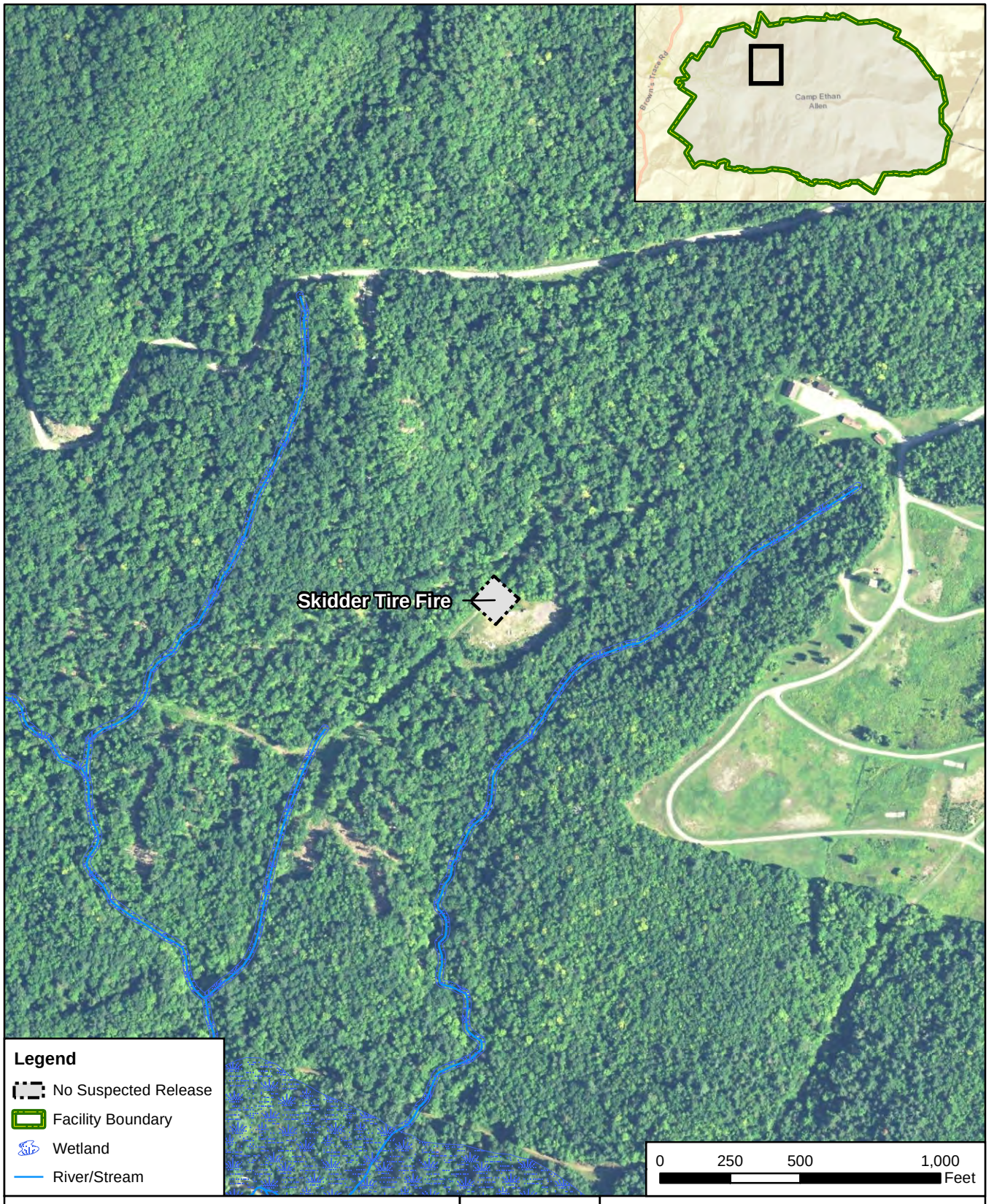
4. Emergency Response Areas

One emergency response area was identified at Ethan Allen TS during the PA. A description of the emergency response area is presented below and shown on **Figure 4-1**. Interview records are included in **Appendix B** and a copy of the incident report in **Appendix A**.

Emergency response at Ethan Allen TS is supported by the Underhill Jericho Fire Department. The fire department has a foam-capable tanker (9 Tanker 2), 3 portable “foam packs,” a Gator equipped with a Task Force Tips® (TFT) Foam-Pro system, and stores approximately 3 5-gallon buckets (15 gallons) of AFFF at the Jericho Fire Station as well as Class A foams.

4.1 Skidder Tire Fire

During interviews, the Captain of the Underhill Jericho Fire Department recalled one incident where foam was used at Ethan Allen TS, a copy of the incident report was provided. On 9 January 2015, the Underhill Jericho Fire Department responded with foam to a tire fire on a skidder located on a road within the facility boundary. An interviewee with a firsthand knowledge of the incident reported that the location was approximately 44°29'2.25"N and 72°55'1.96"W. The incident report indicates that the response to the fire was use of a water supply engine (9 Engine 4) and foam was applied to the fire. VTARNG contacted the Underhill Jericho Fire Department to determine the type of foam that was used. This correspondence confirmed that the type of foam used was not AFFF and that it did not contain PFAS (**Appendix B**). Because of this, the location of the skidder tire fire is not considered a potential source area.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Ethan Allen Training Site, VT			
REVISED	11/9/2018	GIS BY	MS	11/9/2018
SCALE	1:6,000	CHK BY	JL	11/9/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/9/2018

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Emergency Response Areas

AECOM
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Germantown, MD 20876

Figure 4-1

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5. Adjacent Sources

Two potential off-site PFAS sources adjacent to the Ethan Allen TS facility were identified during the PA through interviews (**Appendix B**). Review of the Third Unregulated Contaminant Monitoring Rule database did not return any results for a PFAS release within the vicinity of Ethan Allen TS. Data Resources used are provided in **Appendix A**. **Figure 5-1** presents the location of potential adjacent source areas.

5.1 Underhill Jericho Fire Department

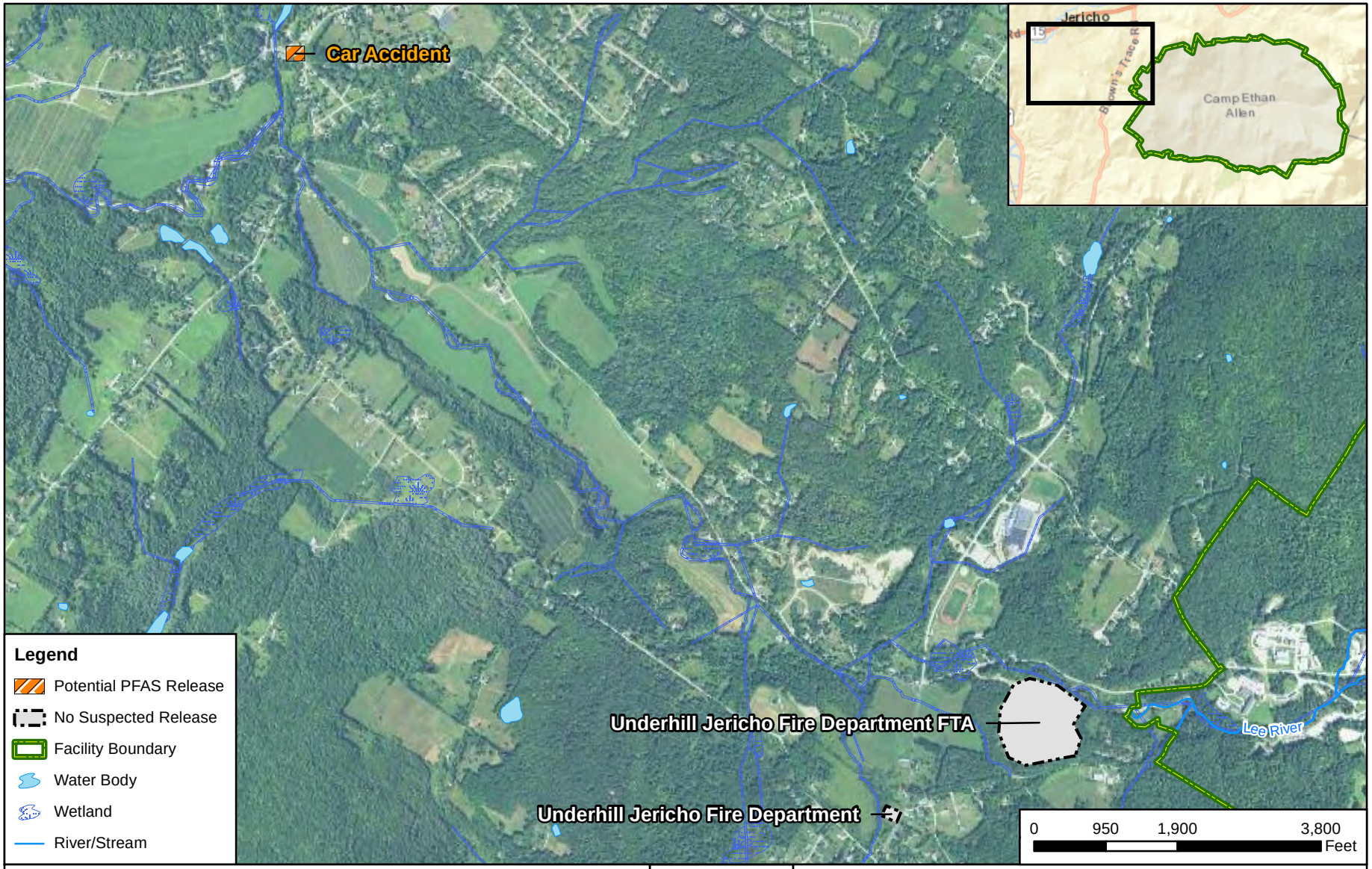
Emergency response at Ethan Allen TS is supported by the Underhill Jericho Fire Department. The Jericho Fire Station is located approximately 1 mile from the main gate of the Ethan Allen TS. Approximate geographic coordinates are 44°28'33.11"N and 72°58'7.91"W. According to interviewees, the fire department has a foam-capable tanker (9 Tanker 2), 3 portable “foam packs,” a Gator equipped with a TFT Foam-Pro system, and stores approximately 3 5-gallon buckets (15 gallons) of AFFF at the Jericho Fire Station. Both Chemguard 3% AFFF and Ansul T-Storm AR-AFFF 3% are stored at the fire station. Expired foam is reportedly disposed of at the Chittenden Solid Waste Facility. Instances of AFFF spills were not noted during interviews.

5.2 Underhill Jericho Fire Department FTA

Interviewees reported that the fire department conducts informal fire training at a gravel pit located on an adjacent portion of their property that is situated just before the main gate for Ethan Allen TS along Lee River Road. Approximate geographic coordinates are 44°28'44.68"N and 72°57'40.22"W. The fire department has used the gravel pit as a FTA for over 25 years. Training includes utilization of a mobile home and wooden pallets as training props. Water is typically used during training; however, a few instances of Class A foam use were noted during interviews. AFFF was reportedly not used during any training activities.

5.3 Car Accident

AFFF was reportedly applied to a car fire that occurred at the western end of Lee River Road where it intersects with State Route 15. Approximate geographic coordinates are 44°30'14.44"N and 72°59'53.16"W. Details regarding the incident were not available; however, interviewees recalled that approximately 1-gallon of AFFF was applied to the fire at the end of suppression activities. Because AFFF was applied to the car fire, the location may be a potential source of PFAS adjacent to Ethan Allen TS.



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PROJECT	Preliminary Assessment for PFAS at Ethan Allen Training Site, VT			
REVISED	11/9/2018	GIS BY	MS	11/9/2018
SCALE	1:22,800	CHK BY	JL	11/9/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/9/2018

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TITLE

Adjacent Sources

AECOM

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Figure 5-1

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6. Conceptual Site Model

Based on the PA findings, one AOI was identified at Ethan Allen TS: AOI 1 Biathlon Facility. The AOI location is shown on **Figure 6-1**. The following sections describe the CSM components and the specific CSMs developed for AOI 1. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Dermal contact is not considered to be a potential exposure pathway as studies have shown very limited absorption of PFAS through the skin (NGWA, 2018). Receptors at the current Ethan Allen TS include site workers, construction workers, recreational users, trespassers, and off-facility residents. The CSM for the facility indicates which specific receptors could potentially be exposed to PFAS.

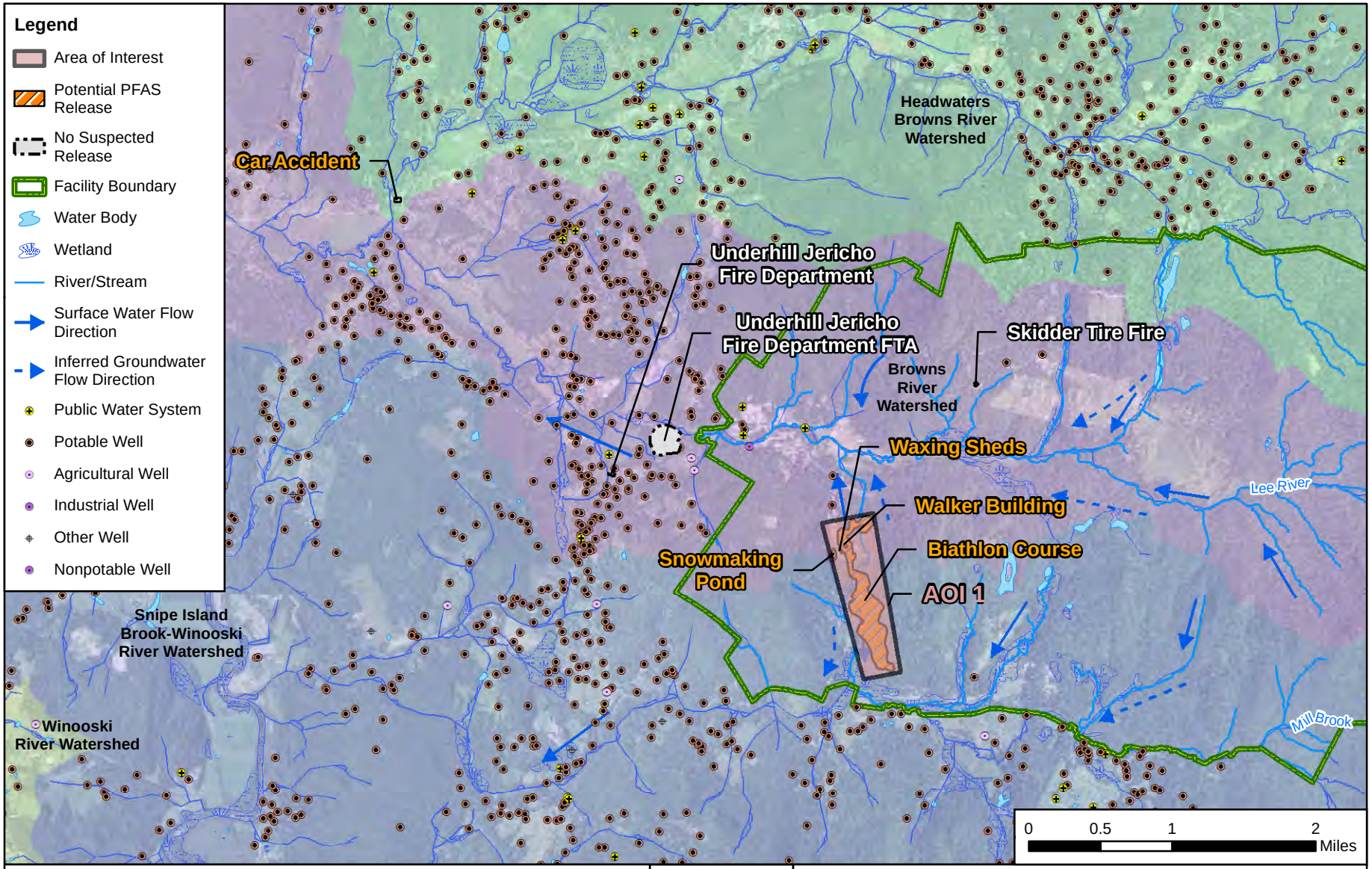
6.1 AOI 1: Biathlon Facility

AOI 1 includes 3 non-FTAs associated with the biathlon course at Ethan Allen TS; the Waxing Areas, Biathlon Course, and the Snowmaking Pond. A potential source of PFAS comes from the use of PFAS containing ski wax, as wax shavings are left in and swept from the Wax Sheds and Walker Building by the patrons of the biathlon facility. Remnants of the residual wax are left on the snow surface along the 5 kilometer Biathlon Course and thus can travel with melting snow. PFAS have consistently been detected in groundwater from a potable well located at the Walker Building (well #40293) above the Vermont Department of Health Drinking Water HA level of 20 ppt but below the USEPA Drinking Water HA of 70 ppt (Tetra Tech 2018). Shallow and deep groundwater wells are used to supply water to the Snowmaking Pond. Because PFAS has consistently been detected in deep groundwater from the nearby Walker Building, the Snowmaking Pond, and areas where man-made snow was used to supplement the biathlon course, may be secondary sources of PFAS.

AOI 1 is divided by the Browns River watershed, draining the Lee River, and the Snipe Island Brook-Winooski River watershed, draining Mill Brook. The overall direction of groundwater flow in the Lee River and Mill Brook Valleys is east to west, while localized flow is from the valley walls to the Lee River or Mill Brook. The primary drinking-water source for the Ethan Allen TS has been the Champlain Water District system since 1999; however, bedrock wells are still occasionally used at the General Dynamics Armament Systems, Inc. facility along with several individual buildings and firing ranges within Ethan Allen TS. Additionally, numerous domestic wells are located off-facility in both Lee River and Mill Brook Valleys. Because well #40293 has combined PFAS concentrations above the Vermont HA of 20 ppt, the drinking water pathway via ingestion is complete for site workers, construction workers, recreational users, and trespassers; the ingestion pathway is potentially complete for off-facility residents.

Ground-disturbing activities to surface soil at AOI 1 could result in site worker, construction worker, recreational users, and trespassers exposure to potential PFAS contamination. Ground-disturbing activities to subsurface soil could result in site worker and construction worker exposure to potential PFAS contamination. Therefore, the exposure pathways for inhalation of soil particles and ingestion of soil are potentially complete for these receptors. Site workers, construction workers, recreational users, trespassers, and off-facility residents may wade in the Snowmaking Pond, Lee River, or Mill Brook; these receptors may be exposed to potential PFAS contamination in surface water and sediment. Therefore, the exposure pathway via ingestion is potentially complete for these receptors.

The CSM for the Biathlon Facility is shown on **Figure 6-2**.



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PROJECT	Preliminary Assessment for PFAS at Ethan Allen Training Site, VT			
REVISED	11/28/2018	GIS BY	MS	11/28/2018
SCALE	1:63,360	CHK BY	JL	11/28/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/28/2018

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Areas of Interest

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Figure 6-1

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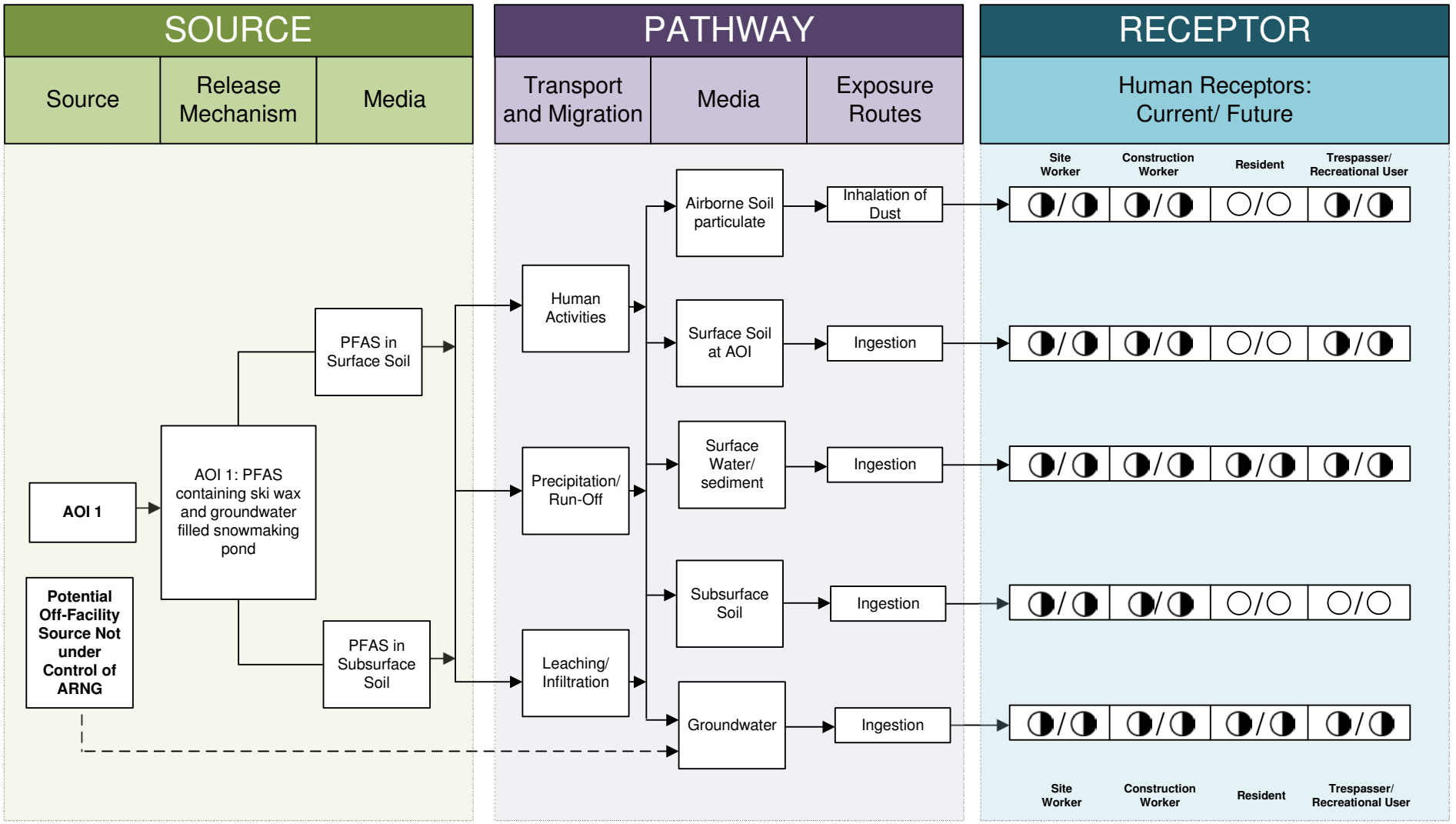

LEGEND

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

Figure 6-2
Conceptual Site Model
AOI 1 – Biathlon Facility

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7. Conclusions

This report presents a summary of available information gathered during the PA on the use of AFFF and other PFAS-related activities at Ethan Allen TS. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS releases (**Table 7-1**) was identified at the Ethan Allen TS during the PA. **Figure 7-1** presents a summary of PA findings.

Table 7-1 AOIs at Ethan Allen TS

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Biathlon Facility	VTARNG and public	Approximately 1972 to present

Based on the potential PFAS releases at this AOI, there is potential for exposure to PFAS contamination in surface soil via inhalation and ingestion by site workers, construction workers, and recreational users/trespassers; in subsurface soil via ingestion by site workers and construction workers; in groundwater, surface water and sediment via ingestion by site workers, construction workers, off-facility residents, and recreational users/trespasser.

The Underhill Jericho Fire Department occasionally uses AFFF to respond to fires within the area. Interviewees recalled approximately 1-gallon of AFFF specifically being used on a car fire located off-facility at the intersection of Lee River Road and State Route 15, downgradient of the Ethan Allen TS.

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 facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS containing materials in training, firefighting, or other non-traditional activities (such as high grade ski wax), or on its disposition.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of the use of PFAS containing materials at the facility. Sometimes the provided information was vague or conflicted with other sources. 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 was first historically used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. 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, current personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected where possible. **Table 7-2** summarizes the uncertainties associated with the PA.

Table 7-2 Uncertainties

Location	Source of Uncertainty
AOI 1 Biathlon Facility – Ski Wax	The frequency of ARNG versus private entity use is unknown as well as whether the waxes used contain PFAS or not. Additionally, the initial date that PFAS containing wax was used at the facility is not known.
AOI 1 Biathlon Facility – Snowmaking Pond	The exact locations where artificial snow, created from water taken from the pond, was applied along the 5 kilometer biathlon track are unknown. However, based on interviews during the VSI, approximately 3.3 kilometers of track can be covered with artificial snow.
AOI 1 Biathlon Facility – Snowmaking Pond	It is not known if water within the snowmaking pond contains PFAS. PFAS were confirmed in deep groundwater at a nearby well; however, the well that supplies water to the snowmaking pond has not been tested for PFAS to date.
AOI 1 Biathlon Facility – Off-Site Snow	During the 2017 ski season, approximately 120-160 tons of snow was transported to the facility for use at the biathlon course. Transported snow may have contained PFAS prior to entering the facility and introduces a source of uncertainty.
AOI 1 Biathlon Facility – Waxing Areas	The disposal of remnant ski wax shavings from waste bins located in the Waxing Sheds and Walker Building is unknown. Interviewees suggested that contents were emptied in facility trash bins for municipal waste disposal but were not certain if this was the standard operating procedure.
AOI 1 Biathlon Facility – Walker Building Area	In general, the area of ski wax deposition was predominantly around the Walker Building where biathlon participants start and finish. The degree of impact from the deposition of ski wax is unknown.
General	Locations where the Underhill Jericho Fire Department responded to local emergencies off-facility with AFFF are not known. One location was identified during interviews; however, additional locations may be present within the surrounding communities of Jericho and Underhill.

7.3 Potential Future Actions

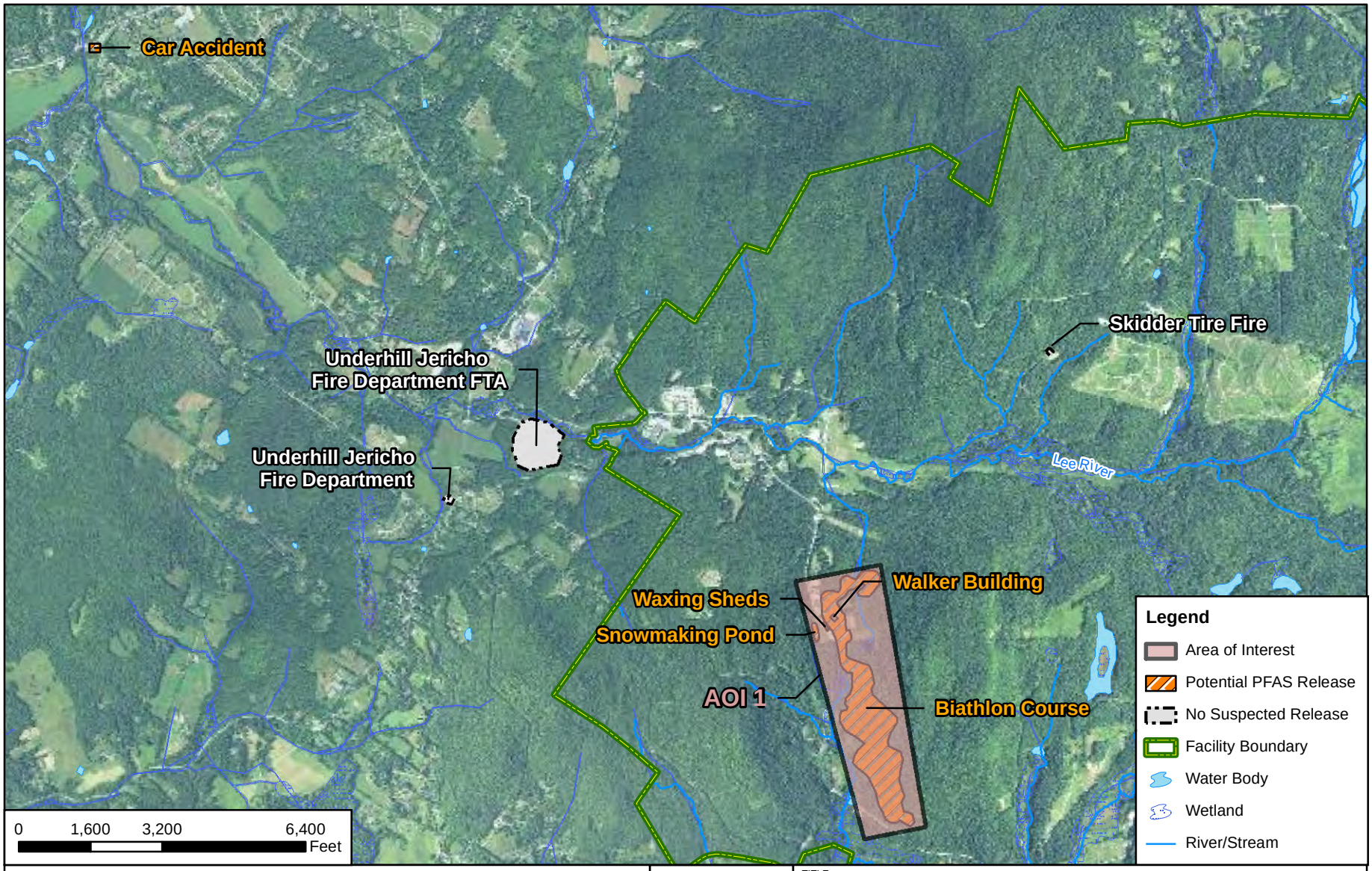
Based on the documented absence of the use or release of PFAS-containing materials at the Skidder Tire Fire, evidence does not indicate that current or former VTARNG activities in these areas contributed PFAS contamination to soil, groundwater, surface water, or sediment at Ethan Allen TS. The Ethan Allen TS Skidder Tire Fire will not move forward in the CERCLA process.

Interviews and records (covering 1970s to present) indicate that current or former ARNG activities related to the biathlon course may have resulted in potential PFAS releases at AOI 1 identified during the PA. Based on the CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at the AOI. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a SI.

ARNG is evaluating an SI at Ethan Allen TS based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to receptors.

Table 7-3 PA Findings Summary

Area of Interest	AOI Location	Rational	Potential Future Action
AOI 1 Biathlon Facility	44°28'3.07"N and 72°56'12.84"W	PFAS containing ski wax may have been released to site media.	Proceed to an SI; focus on soil, groundwater, surface water, and sediment



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Ethan Allen Training Site, VT			
REVISED	11/26/2018	GIS BY	MS	11/26/2018
SCALE	1:38,401	CHK BY	AZ	11/26/2018
Base Map: National Agricultural Imagery Program, 2016		PM	RG	11/26/2018

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TITLE

Summary of Findings

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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8. References

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Appendix A
Data Resources

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Data resources will be provided separately on CD. Data resources for Ethan Allen Training Site include:

Environmental Data Resources Report

- 2018 The EDR Radius Map Report with GeoCheck; Aerial Photo Decade Package; & Certified Sanborn Map Report; Target Property Ethan Allen Training Site, 113 Ethan Allen Rd, Jericho, VT 05465.

Previous Investigations Completed

- Clark, S.F., Jr., Chalmers, Ann, Mack, T.J., and Denner, J.C., 2005, Hydrogeologic Framework and Water Quality of the Vermont Army National Guard Ethan Allen Firing Range, northern Vermont, October 2002 through December 2003: U.S. Geological Survey Scientific Investigations Report 2005-5159, 48 p.
- Quarterly PFOS and PFOA Sampling and Analysis Reports, Training Site Ethan Allen Range, Vermont. March 2017 through February 2018.
- Well completion report Walker Building Well
- Well completion report for Snowmaking Pond water supply well

Leasing Information

- Supplemental Agreement No. 1 to License No. DACA51-3-78-571
- Supplemental Agreement No. 2 to License No. DACA51-3-78-571
- Supplemental Agreement No. 3 to License No. DACA51-3-78-571
- Supplemental Agreement No. 4 to License No. DACA51-3-78-571
- Supplemental Agreement No. 5 to License No. DACA51-3-78-571

Regulatory Advisory

- Vermont Department of Health Memorandum on Drinking Water Health Advisory for Five PFAS

Miscellaneous Data Resources

- Underhill Jericho Fire Department AFFF Inventory
- Underhill Jericho Fire Department incident report for Skidder Tire Fire
- Koffhoff, M., Müller, J., Jürling, H., Schlummer, M., Fiedler, D., 2015. *Perfluoroalkyl and polyfluoroalkyl substances in consumer products*. Environ Sci Pollut Res (2015) 22:14546–14559.

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Appendix B

Preliminary Assessment Documentation

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Appendix B.1
Interview Records

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PA Interview Questionnaire – Fire Station

Facility: UNDERHILL F.D.
Interviewer: GVS P
Date/Time: 5/17/18

Interviewee: HARRY S. / MICHAEL M. **Title:** CAPT. **Phone Number:** — **Email:** —	Can your name/role be used in the PA Report? (Y) or N Can you recommend anyone we can interview? Y or (N)

1. Roles or activities with the Facility/years working at the Facility.

CAPT./FIREFIGHTING
EDUCATION → SENIOR HOUSING, DAYCARE, SCHOOLS ETC.
RESCUE

CLASS A FOAM

2. What can you tell us about the history of ~~AFFF~~ at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

UNDERHILL F.D. IS NOT A C.AFS EQUIPPED F.D. (i-e. NO USE OF COMPRESSED AIR FOAM SYSTEMS)

~~Maintenance (e.g., ramp washing)~~
(Fire Training Areas GRAVEL LOT AREA NEAR ENTRANCE TO CAMP EA
(Firefighting (Active Fire)
(Crash
~~Fire Suppression Systems~~ (Hangers/Dining Facilities)
Fire Protection at Fueling Stations OFF-FACILITY/AS/IF APPLICABLE
~~Non-Technical/Recreational/ Pest Management~~

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems? NONE AT F.D. OR CAMP E.A.

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? CLASS A

(1) FOAM CAPABLE TRUCK - CARRIES (2) 5 GAL BUCKETS OF FOAM
1,750 GALS (50 GALS OF WHICH IS AFFF)
(3) "TASK FORCE TIPS PRO/pak FOAM PACKS" CARRIED ON VARIOUS F.D. EQUIP

5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

UNK. OLD AFFF GOES TO CHITTENDEN SOLID (WASTE) FACILITY
CAPT. BUYS FOAM

PA Interview Questionnaire – Fire Station

Facility: UNDERHILL F.D.
Interviewer: GUS R.
Date/Time: 5/17/18

6. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?
NOT G CAMPEA

8. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material? IN F.D. & IN BUCKETS @ F.D. & ON TRUCK
JERICHO F.D. HAS (3) 5 GAL BUCKETS (15 GALS)

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated? AT F.D.

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?
(1) TRUCK & (3) FOAM PACKS CARRIED ON VARIOUS VEHICLES (ATV's, SIDE BY SIDE ETC.)

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past? VHC, BUT NOT RECALLED

PA Interview Questionnaire – Fire Station

Facility: UNDERHILL F.D.
Interviewer: GVSP.
Date/Time: 5/17/18

12. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

(1) FTA - GRAVEL LOT @ ENTRANCE TO CAMP EA. USED FOR 25 YEARS
FTA USED
ONLY TYPE A FOAM USED, NOT AFFF. - UP TO 8 TIME/YEAR
NOT A "FORMAL" FTA - LAND IS OWNED BY F.D.
MOBILE HOME USED FOR TRAINING PROP
HAY PALLETS ALSO USED

13. What types of fuels/flammables were used at the FTAs?

(2) CLASS A FOAM RELEASED USED THAT WAS RECALLED
(1) FT LAST FALL
(1) 6/15/18 → 200 GALS H_2O; <10 GALS CLASS-A FOAM USED

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

8 X/YEAR - NO AFFF USED, ONLY CLASS A FOAM

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us?

EMS = UNDERHILL/JERICHO → AGREEMENT W/ ESSEX FOR RESCUE - 1ST RESPONSE - 100 SQ MILES COVERAGE
FIRE = FLOODS/FIRES/INJURIES (CAR ACCIDENTS - RESCUES/ALL TERRAINS)
F.D. IS NON-PROFIT, NO EMS LICENSE

16. Did individual units come on-post with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

UNDERHILL = 1ST RESPONDERS TO CAMP EA; NO RECOLLECTION OF OTHER F.D.'S RESPONDING W/FOAM

PA Interview Questionnaire – Fire Station

Facility: UNDERHILL F. D.
Interviewer: GVS D.
Date/Time: 5/17/18

17. Did military routinely or occasionally fire train off-post? List units that you can recall used/trained at various areas. UNK

18. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?
- LOGGER SKIDDER TIRE FIRE 3 YEARS AGO
  CLASS A FOAM WAS USED, NOT AFFF
- CAR FIRES ON RIVER RD & RT 115 ⇒ <1 GAL AFFF USED
  THAT RECALLED FOR THESE 2 INCID. / NO OTHR. INCID. RECALLED W/ FOAM

19. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?
SKIDDER TIRE FIRE INCIDENT REPORT PROVIDED DURING INTERVIEW

20. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?
NONE THAT RECALLED

21. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?
NONE RECALLED

PA Interview Questionnaire – Fire Station

Facility: WINDSOR HILL F.D.
Interviewer: GUS G.
Date/Time: 5/17/18

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved? NONE RECALLED

23. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?
DISPOSED OF @ SOLID WASTE FACILITY - CHITTENDEN

24. Do you recommend anyone else we can interview? If so, do you have contact information for them?
NO

PA Interview Questionnaire - Other

Facility: CAMP ETHAN ALLEN TS
Interviewer: GUS R.
Date/Time: 5/17/18

Interviewee: CAMP EATS **Title:** BIATHALON STAFF **Phone Number:** — **Email:** —	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:

BIATHALON STAFF, HEAD OF TRAINING AT SKI FACILITY

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?

ACCORDING TO STAFF:

LOW-SNOW PREMP YEAR/SEASON, FEB/MARCH SPRING 2017

- SNOW-MAKING PUMP FAILED THIS SEASON, LOW PREMP & SNOW PACK = TRUCKED-IN SNOW TO SKI-TRACK FROM:

1) BURLINGTON AIRPORT AIRFIELD
2) DOWN-RANGE OF ETHAN ALLEN T.S.
3) DECLINATION STATION
4) HYDE PARK

TRUCKS = 10 TON EACH ⇒ 30-40 TONS TRUCKED-IN FROM EACH LOCATION. SNOW PLACED IN POND & ON TRACK (ABOUT 2.5KM OF COVERAGE OF TRACK)

- CANTONMENT SNOW NOT USED - GRITTY/SALTY
- ROOMS IN BACK OF BIATHALON BUILDING (WALKER BUILDING) DESIGNED FOR WAXING OF SKIS
- WAX W/ PFAS USED AS "HIGH COMPETITIVE" WAX (EXPENSIVE) USED ALMOST EXCLUSIVELY FOR COMPETITION

Known Uses	
Use	SKI WAX
Procurement	VARIOUS
Disposition	STORED/USED ON SKIIS
~~Storage (Mixed)~~	
~~Storage (Solution)~~	
Inventory, Off-Spec	N/A
Containment	N/A
SOP on Filling	N/A
Leaking Vehicles	N/A
Nozzle and Suppression System Testing	N/A
Dining Facilities	NONE
Vehicle Washing	N/A
Ramp Washing	N/A
Fuel Spill Washing and Fueling Stations	N/A
Chrome Plating or Waterproofing	N/A

OVER

PA Interview Questionnaire - Other

Facility: CAMP ETHAN ALLEN TS
Interviewer: GIS R.
Date/Time: 5/7/18

~NON-PFAS WAX USED 90-95% OF THE TIME

WAXING HUTS:

BEFORE EVENTS/COMPETITIONS, A HUT KEY IS GIVEN TO COMPETITORS

20 HUTS - KEY RETURNED AFTER COMPETITION, HUTS LOCKED & CLEANED

HUTS - ≈ 15'X15' - WOOD CONSTRUCTION; WOOD (PLYWOOD) FLOOR SET ABOVE GRADE (FOOTINGS UNDERNEATH)

~ EACH HAS ONE FAN POWERED VENT ABOVE DOOR, WINDOWS & A PLYWOOD WORK TABLE

~ HARDEN WAX PITCHED TO TRASH CANS (PLASTIC) &/OR SWEPT OUT OF HUT

~ BINS EMPTIED TO LARGER TRASH BINS - DISPOSED OF OFFSITE W/ GENERAL MUNICIPAL WASTE STREAM

CAMP ETHAN ALLEN TS USED BY:

- EA BIATHALON CLUB
- MANSFIELD NORDIC
- VARIOUS HIGHSCHOOLS

WELL - AREA AROUND WELL USED TO FLOOD

FRENCH DRAIN INSTALLED AROUND WALKER BLDG. & ROOF DRIP-LINE

SNOW MAKING

SNOW MAKING POND ⇒ PEOPLE SOMETIMES SWIM IN IT

SKI TRACK - 5K PAVED TOTAL 2.3KM MEN; 2.5KM WOMEN

Li, Jennifer J (Germantown)

From: Banks, LeeAnn <LeeAnn.Banks@vermont.gov>
Sent: Thursday, November 08, 2018 12:02 PM
To: Li, Jennifer J (Germantown)
Subject: RE: ARNG PFAS: Ethan Allen Training Site - Tire Fire

Yes, that is true.

Lee Ann

Lee Ann Banks, P.E.
Environmental Compliance Manager
State of VT Military Department
Vermont Army National Guard
Ph: (802) 338-3327
Cell: (802) 999-7210

-----Original Message-----
From: Li, Jennifer J (Germantown) <jennifer.j.li@aecom.com>
Sent: Thursday, November 8, 2018 11:59 AM
To: Banks, LeeAnn <LeeAnn.Banks@vermont.gov>
Cc: Packer, Bonnie M CTR NG NGB ARNG (US) <bonnie.m.packer.ctr@mail.mil>; Tim Peck (Timothy.J.Peck@usace.army.mil) <Timothy.J.Peck@usace.army.mil>; Stenberg, Laurie <laurie.stenberg@aecom.com>; Raggambi, Gustav <gustav.raggambi@aecom.com>; Anthony, Jacqueline <Jacqueline.Anthony@vermont.gov>
Subject: ARNG PFAS: Ethan Allen Training Site - Tire Fire

Thank you Lee Ann,

To confirm our conversation regarding the foam used on the tire fire, VT ARNG contacted the Underhill Jericho Fire Department to confirm the type of foam used on this tire fire and were informed that the type of foam used was not AFFF and did not contain PFAS.

Thanks again,
Jen

Jennifer J. Li
Environmental Scientist
GeoEnvironmental & Remediation Services, DC Metro D +1-301-820-3476 M +1-301-272-4948 jennifer.j.li@aecom.com

-----Original Message-----
From: Banks, LeeAnn [mailto:LeeAnn.Banks@vermont.gov]
Sent: Thursday, November 08, 2018 11:25 AM
To: Li, Jennifer J (Germantown)
Subject: FW: [Non-DoD Source] FW: PFAS in surface water potentially flowing from Camp Johnson (UNCLASSIFIED)

Lee Ann Banks, P.E.
Environmental Compliance Manager
State of VT Military Department

Vermont Army National Guard
Ph: (802) 338-3327
Cell: (802) 999-7210

-----Original Message-----
From: Anthony, Jacqueline <Jacqueline.Anthony@vermont.gov>
Sent: Wednesday, November 7, 2018 2:39 PM
To: Packer, Bonnie M CTR (US) <bonnie.m.packer.ctr@mail.mil>; Banks, LeeAnn <LeeAnn.Banks@vermont.gov>
Subject: RE: [Non-DoD Source] FW: PFAS in surface water potentially flowing from Camp Johnson (UNCLASSIFIED)

Bonnie,

We spoke with LTC Roy and have attached a map with a red dot where the release of the foam occurred. Just to reiterate, the foam that was used did not contain PFAS. I've also attached pictures from the event.

Please let me know if you need anything else.

Thanks,
Jackie

Jacqueline Anthony
State of Vermont Military Dept
Vermont Army National Guard
Ph: 802-338-3353
Cell: 410-231-8100

-----Original Message-----
From: Packer, Bonnie M CTR (US) <bonnie.m.packer.ctr@mail.mil>
Sent: Wednesday, November 07, 2018 1:10 PM
To: Banks, LeeAnn <LeeAnn.Banks@vermont.gov>
Cc: Anthony, Jacqueline <Jacqueline.Anthony@vermont.gov>
Subject: FW: [Non-DoD Source] FW: PFAS in surface water potentially flowing from Camp Johnson (UNCLASSIFIED)

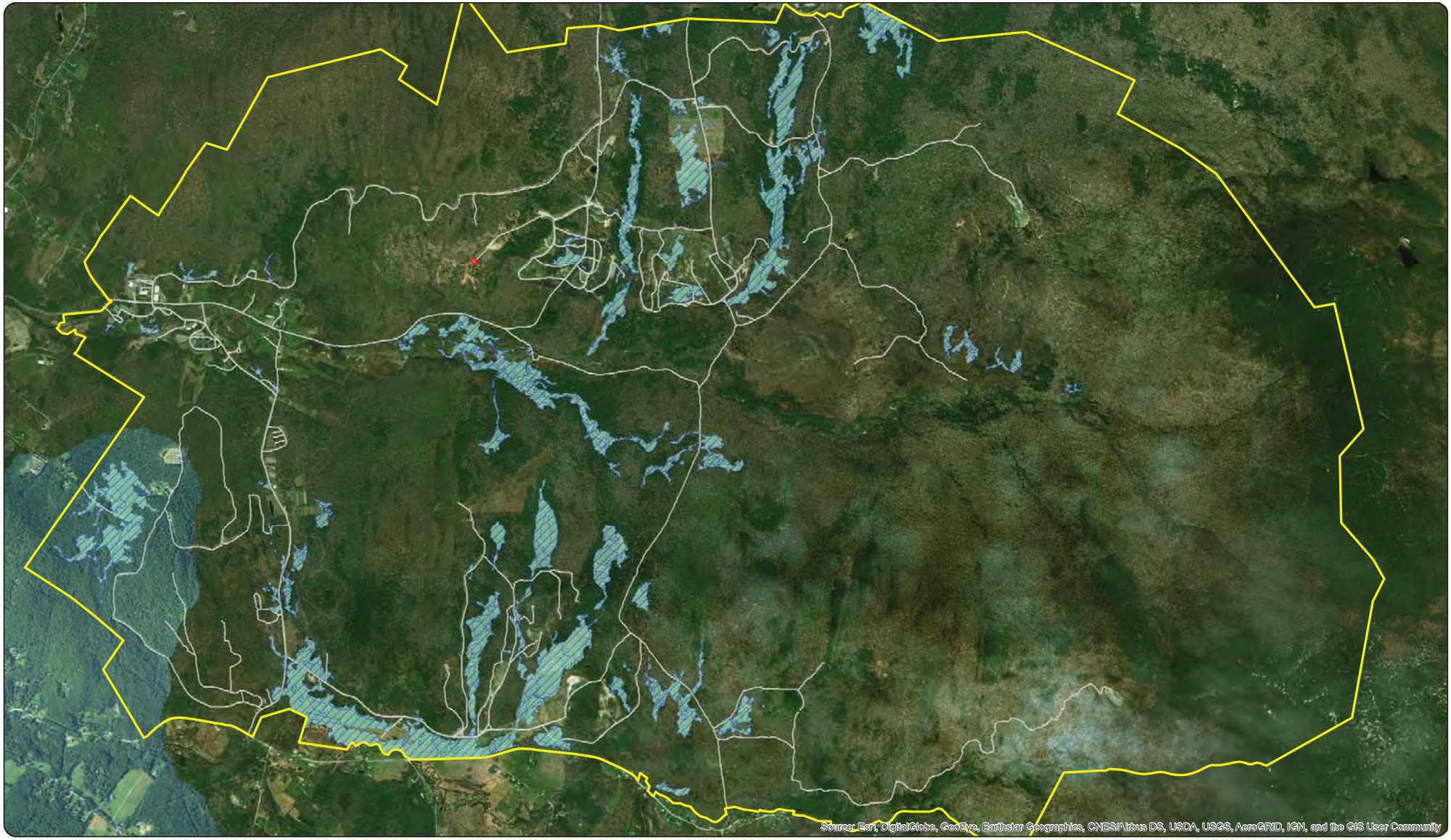
CLASSIFICATION: UNCLASSIFIED

LeeAnn and Jackie
Hopefully this answers your question.
Please see if you can get LTC Roy to put an X marks the spot on a map for the PFAS release on Camp Ethan Allen.
He is a fist hand witness and wants to be the one to put the mark on a map.

Thank you .

Bonnie Packer, PhD
Project Manager
ARNG Cleanup Division (ARNG-IED)
Contractor: Strata-Geo, LLC
Herbert R. Temple, Jr., Army National Guard Readiness Center (TARC)
111 S. George Mason Drive
Arlington, VA 22204
703-607-7977

EAFR



Ryan Ochs
Vermont Military Department
August 2017

0 0.125 0.25 0.5 0.75 1
Miles

Appendix B.2
Visual Site Inspection Checklists

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Visual Site Inspection Checklist

Names(s) of people performing VSI: GUS R.

Recorded by: GUS R.

ARNG Contact: BONNIE P. / LEEANN B. / LT. COL. ROY

Date and Time: 5/17/18

Method of visit (walking, driving, adjacent): DRIVE/WALK

Source/Release Information

Site Name / Area Name / Unique ID: CAMP ETHAN ALLEN TS (SKI FACILITY/BIATH. FIRING RANGES)

Site / Area Acreage: PROPERTY = 11,000 ACRES ; SKI COURSE/TRAILS/FACILITIES = ?

Historic Site Use (Brief Description): MOSTLY FORESTED LANDS, LOGGING ACTIVITIES

Current Site Use (Brief Description): CROSS COUNTRY SKI & BIATHLON FACILITY
VT ARNG MOUNTAIN WARFARE SCHOOL - ALSO USED BY OTHERS

Physical barriers or access restrictions: AUTHORIZED VISITORS ONLY FOR X-COUNT. SKI RACING/
RESTRICTED TO VT ARNG STAFF TRAINING

1. Was PFAS used (or spilled) at the site/area? Y / N AFFF (Y → IN THE FORM OF HIGH QUALITY
1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014): SKI WAXES

2. Has usage been documented? Y / N
2a. If yes, keep a record (place electronic files on a disk):
USED TO WAX SKI'S - HIGH PERFORMANCES WAXES ARE KNOWN TO / MAY HAVE PFOA/PFAS

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**
3a. Indicate what businesses are located near the site
NO IMMEDIATE TENANTS TO SKI AREA/FACILITY. GENERAL DYNAMICS ALSO USES / OCCUPIES A PORTION OF THE PROPERTY

4. Is this site located at an airport/flightline? Y / N
4a. If yes, provide a description of the airport/flightline tenants: N/A

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:

N/A

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

N/A

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

N/A

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

WALKER BLDG. HAS SUBDRAIN/SUBSURFACE BENEATH ROOF/DRIP LINE ~CONNECTS TO STORMWATER DRAINAGE PIPE NEAR STARTING AREA

Transport / Pathway Information

Migration Potential:

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

1a. If so, note observation and location: SURFACE WATER DRAINS TO LEE RIVER TO NORTH - GW DIVIDE CENTRAL - FLOW IS TO SOUTH TO MILL BROOK - BOTH FEATURES FLOW OFF INSTALLATION

2. Is there channelized flow within the site/area? [(Y) / N]

2a. If so, please note observation and location: DRAINAGE DITCHES/FEATURES THROUGHOUT 11,000 ACRE FACILITY; AT SKI FACILITY; NEWER (LAST 10 YEARS) STORMWATER DRAINAGE PIPE INSTALLED, OUTFALLS TO NORTH OF WALKER BLDG, TO A TRIBUTARY OF LEE RIVER

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

3a. If so, please note the location: POTABLE (1) WELL AT SKI FACILITY OBSERVED. STICK-UP WELL OTHER WELLS (2) EXIST (DID NOT OBSERVE) → SOUTH OF

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

4a. If so, please note the location: TRADITIONAL POND USED FOR SNOWMAKING PURPOSES - WATER PUMPED FROM POND VIA PIPE TO SEVERAL "DOG-HOUSES" W/ VALVE PITS USED TO SUPPLY WATER TO SNOW MAKING MACHINES

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

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

N/A

6. Does an adjacent non-ARNG PFAS source exist? [Y / (N)]

6a. If so, please note the source and location.

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

JERICHO FIRE DEPARTMENT FOR INTERVIEWS

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):

USED TO BE OLD STORM DRAIN & STARTING AREA - AREA REPORTED TO FLOOD (INCLUDING AROUND WELL HEAD). 10 YEARS AGO, NEW STORM DRAIN (3 DROP INLET) INSTALLED; DEEP OBSERVED

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

2a. If not vegetated, briefly describe the site/area composition:

TO ACCOMODATE FUTURE PEDESTRIAN TUNNEL PROPOSED TO BE CONSTRUCTED & TO CONNECT STARTING AREA W/ FIRING RANGE

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

3a. If yes, describe the location and extent of the erosion:

VARIOUS DITCHES NEXT TO SKI COURSE (INCISED) LIKELY OTHER AREAS OF THE PROPERTY ARE W/ EROSION DUE TO AREAS W/ STEEP TERRAIN

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: NUMEROUS LOW-LYING WETLAND AREAS, SPRINGS & (2) LARGER PONDS. ONE POND USED FOR SNOWMAKING - ITS FED BY NATURAL SPRINGS, 1 DEEPER WELL & 1 SHALLOW WELL OBSERVED FISH IN LAKE

SNOWMAKING POND = ≈ 1 ACRE
LARGER POND ≈ 1.5 ACRES

Receptor Information

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

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

AUTHOURIZED VISITORS & VT ARNG STAFF

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:

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

3a. If so, please note the location/distance:

NORTH OF "PROPERTY"; NONE NEAR SKI FACILITY; SOLDIERS/VISITORS DO "BUNK" AT TRAINING FACILITY BUILDING/SCHOOL

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

4a. If so, please note the location/distance/type:

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

5a. If so, please note the location/distance/type: NUMEROUS

Visual Survey Inspection Log

Additional Notes AREA AROUND POTABLE WELL RELENTLY RAISED (ENGINEER FILLED) - WELL HEAD RAISED; PREVIOUSLY GRADED & USED TO FLOOD
NEW BUILDING CONSERVATED IN 2015

Photographic Log

Photo ID/Name	Date & Location	Photograph Description
#1	5/17/18 TS	TO SOUTH, SHEDS
#2	" "	TO SOUTH, GRASS/SHEDS
#3		TO SOUTH, SHEDS
#4		TO SW, SHEDS & FIELD
#5		TO SOUTH. WALKER BLDG
#6		TO WEST, TS/WALKER/SKI COURSE
#7		TO NORTH, SD. COVER
#8		TO NORTH; SKI COURSE
#9		TO NORTH, SPRING
#10		TO NORTH, VALVE PIT
#11		DOGHOUSE/VALVE
#12		VALVEPIT
#13		DOGHOUSE
#14		TO SOUTH WALKER BLDG
#15		TO EAST, WALKER BLDG
#16		POET
#17		POET
#18		SOUTH, WALKER BLDG
#19		"
#20		WELL HEAD/STICKUP
#21		SD COVER
#22		PROP INLET
#23		SNOWMAKING POND & PUMPHOUSE
#24		WELL
#25		POND

Appendix B.3
Conceptual Site Model Information

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Preliminary Assessment – Conceptual Site Model Information

Site Name: Camp Ethan Allen Training Site

Why has this location been identified as a site? PFAS was detected in potable water wells at and within the vicinity of a biathlon facility that is used by the VTARNG and public.

Are there any other activities nearby that could also impact this location? No other nearby activities were noted.

Training Events

Have any training events with AFFF occurred at this site? No AFFF training events have occurred

If so, how often? Not Applicable (N/A).

How much material was used? Is it documented? N/A

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? Surface water flows to the north and the south – the Green Mountains ridgeline defines a drainage divide

Average rainfall? Approximately 40 inches per year

Any flooding during rainy season? Flooding during the rainy season is possible

Direct or indirect pathway to ditches? Both direct and indirect pathways exist

Direct or indirect pathway to larger bodies of water? Both direct and indirect pathways exist to the Lee River and Mill Brook

Does surface water pond any place on site? Yes, in ditches, springs and low-lying wetland areas

Any impoundment areas or retention ponds? Two larger 1 to 1½-acre ponds and wetland areas

Any NPDES location points near the site? Unknown

How does surface water drain on and around the flight line? No flight line is associated with the property

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Groundwater flow is from east to west; highly variable localized flow likely

Depth to groundwater? 10 to 20 ft bgs

Uses (agricultural, drinking water, irrigation)? Potentially potable wells; Champlain Water District provides drinking water to the facility

Any groundwater treatment systems? A POET/filtration system exists within the Walker Building

Any groundwater monitoring well locations near the site? Yes

Is groundwater used for drinking water? Wells are potentially potable

Are there drinking water supply wells on installation? Yes

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient? Yes, numerous drinking water wells are off-post and associated mostly with residential dwellings

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No

If so, do we understand the process and which water is/was treated at the plant? N/A

Do we understand the fate of sludge waste? N/A

Is surface water from potential contaminated sites treated? No

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? N/A

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? N/A

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker **X**

Construction Worker **X**

Recreational User **X**

Residential

Child

Ecological **X**

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

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur? The storm water drainage system was upgraded approximately 10 years ago, replacing a shallower system in the same location. No other drainage infrastructure noted.

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Appendix C
Photographic Log

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APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 1

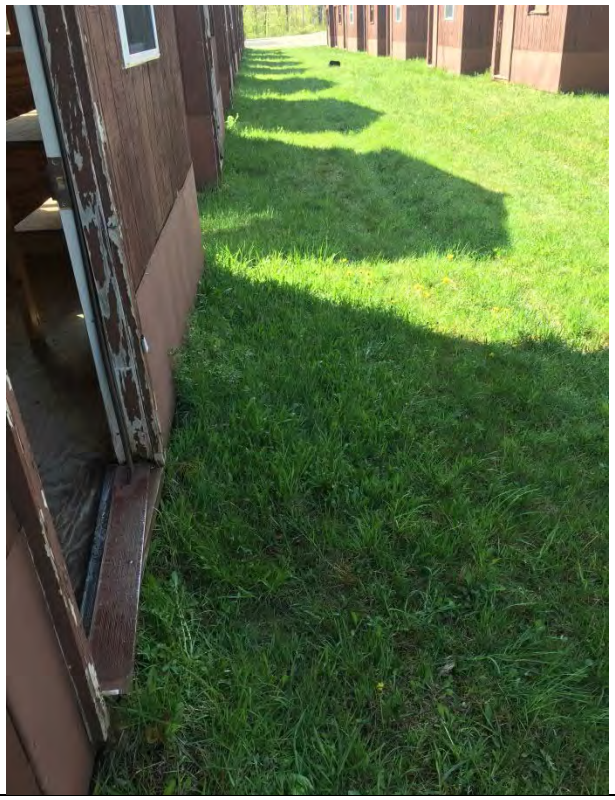
Description:

View to the south of Waxing Sheds. The artificial pond is situated behind the crest of the grass covered hill; right side of the photograph.

Photograph No. 2

Description:

View to the south of grassy area in between two rows of Waxing Sheds.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 3

Description:

View to the south of Waxing Sheds and surrounding area.

Photograph No. 4

Description:

View to the southwest of waxing sheds, roadway and grassy areas.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 5

Description:

View to the south of Walker Building. Note wellhead in center of photograph.

Photograph No. 6

Description:

View to the west of the course starting area, new structure and Walker Building. The approximate 20 feet wide asphalt covered ski track is visible in the left side and bottom right corner of the photograph.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 7

Description:

View to the north of steel cover covering access-way to the stormwater drainage pipe.

Photograph No. 8

Description:

View to the north of low-lying areas adjacent to ski track.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 9

Description:

View to the north of spring adjacent to ski track.

Photograph No. 10

Description:

View to the north of wooden shed covering corrugated pipe/valve pit used for artificial snowmaking purposes.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 11

Description:

View of snowmaking water valve/nozzle situated adjacent to snowmaking shed.

Photograph No. 12

Description:

View of corrugated pipe/valve pit inside snowmaking shed.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 13

Description:

View to the south of snowmaking shed and Walker Building.

Photograph No. 14

Description:

View to the south of asphalt paved ski track, starting area/structure, new structure and Walker Building.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 15

Description:

View of Kinetico Water Systems water filtration system inside Walker Building.

Photograph No. 16

Description:

View of a component of the water filtration system inside the Walker Building.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 17

Description:

View of the south side of the Walker Building. The Waxing Huts are in the background of the photograph.

Photograph No. 18

Description:

View to the south of the west facing side of the Walker Building and new structure under construction. Artificial fill placed during construction is visible in the center of the photograph. The water well head is situated in the center left portion of the photograph.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 19

Description:

View of water well #40293 well head; re-constructed as stick-up (casing). The south side of the Walker Building is visible in the right side of the photograph. The Waxing Huts are in the background.

Photograph No. 20

Description

View to the south of steel plate covering the stormwater drainage infrastructure.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 21

Description:

View to the south of a steel grate/drop inlet associated with the stormwater drainage infrastructure.

Photograph No. 22

Description:

View to the east of pump house associated with the artificial pond used for storing water, for snowmaking purposes.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 23

Description:

View to the north of well/well house associated with the artificial pond used for storing water, for snowmaking purposes.

Photograph No. 24

Description:

View to the southeast of the artificial pond used to store water for snowmaking purposes.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Ethan Allen Training Site	Vermont

Photograph No. 25

Description:

Photograph provided by VTARNG, Skidder Tire Fire response. Underhill Jericho Fire Department applied non-AFFF foam to Skidder Tire Fire.