DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

May 2, 2016

MEMORANDUM FOR: USEPA, REGION 2
ATTN: MR. ROBERT MORSE
Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

FROM: AFCEC/CIBE-Plattsburgh
8 Colorado Street, Suite 121
Plattsburgh, NY 12903

SUBJECT: Perfluorinated Compounds (PFCs) Release Determination Final Site Investigation Report for the former Griffiss Air Force Base, Rome, New York

Attached for your records is the Perfluorinated Compounds (PFCs) Release Determination Final Site Investigation Report, for the Former Fire Training Area, at the former Griffiss Air Force Base. Also attached are the Air Force responses to the USEPA comments to the August 2015 draft document. Per their November 4, 2015 email, the NYSDEC did not have any comments on the draft document.

If you have any questions, please contact me at 518-563-2871 or david.farnsworth@us.af.mil.

DAVID S. FARNSWORTH
Program Manager/BRAC Environmental Coordinator
BRAC Program Execution Branch

Attachments:
1. Site Investigation Report (CD and 2 CY)
2. Responses to Comments (CD and 2 CY)

cc:
NYSDEC (Mr. Heather Bishop)(Atch under sep cover)
AFCEC/CIBE (Mr. Sean Eldredge)(CD)
BRAC/AR (Administrative Record)(CD)

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

May 2, 2016

MEMORANDUM FOR: NYSDEC
ATTN: MS. HEATHER BISHOP
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FROM: AFCEC/CIBE-Plattsburgh
8 Colorado Street, Suite 121
Plattsburgh, NY 12903

SUBJECT: Perfluorinated Compounds (PFCs) Release Determination Final Site Investigation Report for the former Griffiss Air Force Base, Rome, New York

Attached for your records is the Perfluorinated Compounds (PFCs) Release Determination Final Site Investigation Report, for the Former Fire Training Area, at the former Griffiss Air Force Base. Also attached are the Air Force responses to the USEPA comments to the August 2015 draft document. Per their November 4, 2015 email, the NYSDEC did not have any comments on the draft document.

If you have any questions, please contact me at 518-563-2871 or david.farnsworth@us.af.mil.

DAVID S. FARNSWORTH
Program Manager/BRAC Environmental Coordinator
BRAC Program Execution Branch

Attachments:
1. Site Investigation Report (on CD and 2 CY)
2. Responses to Comments (on CD and 2 CY)

cc:
USEPA (Mr. Robert Morse)(Atch under sep cover)
NYSDOH (Ms. Ms. Kristen Kulow)(on CD and 1 CY)
AFCEC/CIBE (Mr. Sean Eldredge)(Atch under sep cover)
BRAC/AR (Administrative Record)(CD)

FINAL

Perfluorinated Compounds (PFCs) Release Determination At Multiple BRAC Bases

Site Investigation Report Former Griffiss Air Force Base Project No. THWA20147242

Contract FA8903-08-D-8766
Task Order 0177

Prepared for:

Air Force Civil Engineer Center
JBSA Lackland AFB, Texas
4PAE08 Contract

April 2016

Submitted by:

Amec Foster Wheeler Environment & Infrastructure, Inc.

amec foster wheeler

FINAL

PERFLUORINATED COMPOUNDS (PFCs) RELEASE DETERMINATION AT MULTIPLE BRAC BASES
SITE INVESTIGATION REPORT
FORMER GRIFFISS AIR FORCE BASE
PROJECT NO. THWA20147242

Prepared for:
Air Force Civil Engineer Center
Joint Base San Antonio – Lackland, Texas

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.

Contract FA8903-08-D-8766
Task Order 0177

April 2016

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ACRONYMS AND ABBREVIATION

Accutest	Accutest Laboratories
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film Forming Foam
AMEC	AMEC Environment & Infrastructure, Inc.
amsl	Above Mean Sea Level
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
AST	Aboveground Storage Tank
bgs	below ground surface
BRAC	Base Realignment and Closure
CSM	Conceptual Site Model
DoD	Department of Defense
DoDI	Department of Defense Instruction
EB	Equipment Blank
FB	Field Blank
FD	Field Duplicate
ft	feet/foot
FTA	Fire Training Area
GPS	Global Positioning System
HDPE	High Density Polyethylene
IDW	Investigation-Derived Waste
in	inch/inches
IRP	Installation Restoration Program
ISWPA	Installation Specific Work Plan Addendum
Law	Law Environmental, Inc.
LC/MS/MS	Liquid Chromatography and Tandem Mass Spectrometry
LOD	Limit of Detection
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NYSDEC	New York State Department of Environmental Conservation

O/WS	Oil/Water Separator
PAL	Project Action Limit
PFBS	Perfluorobutanesulfonic Acid
PFC	Perfluorinated Compounds
PFHpA	Perfluoroheptanoic Acid
PFHxS	Perfluorohexanesulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PHA	Provisional Health Advisory
PID	Photoionization Detector
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QPP	Quality Program Plan
RPD	Relative Percent Difference
SIR	Site Investigation Report
SOP	Standard Operating Procedure
UCM	Unregulated Contaminant Monitoring
UCMR3	Unregulated Contaminant Monitoring Rule Number 3
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WSA	Weapons Storage Area

EXECUTIVE SUMMARY

This Site Investigation Report (SIR) presents information regarding the perfluorinated compound (PFC) release determination activities at former Griffiss Air Force Base (AFB), Fire Training Area (FTA) site FT030P[1]. This Site Investigation is part of a United States Air Force (USAF)-wide initiative to assess the presence of PFCs at Base Realignment and Closure (BRAC) installations in accordance with Department of Defense (DoD) Instruction (DoDI) 4715.18, Emerging Contaminants, and driven by the 2012 Interim USAF Guidance on Interim Sampling and Response Actions for PFCs at Active and BRAC Installations (USAF Interim PFC Guidance) (USAF, August 2012). Based on these guidelines, the USAF is undertaking a systematic approach to evaluating FTAs that were operable between 1970 and 2000.

PFCs are a class of synthetic fluorinated chemicals used in many industrial and consumer products, including non-stick cookware, food packaging, waterproof clothing, fabric stain protectors, lubricants, paints, and firefighting foams such as aqueous film forming foam (AFFF). In 1970, the USAF began using AFFF to extinguish petroleum fires. Releases of AFFF to the environment routinely occurred during fire training exercises. From the early 1970s until 2002, the DoD purchased and used AFFF containing perfluorooctane sulfonic acid (PFOS) and/or perfluorooctanoic acid (PFOA) for firefighting and fire training exercises.

In 2009, the United States Environmental Protection Agency (USEPA) Office of Water issued Provisional Health Advisories (PHAs) for two PFCs, PFOS and PFOA, to protect humans from potential risk of exposure to PFOA and PFOS through drinking water (USEPA, 2009). PHAs represent reasonable, health-based hazard concentrations above which action should be taken to reduce exposure to these contaminants in drinking water. Per the USEPA, PHAs are not to be construed as legally enforceable Federal standards and are subject to change as new information becomes available (USEPA, 2012). The PHAs for PFOS and PFOA are 0.2 micrograms per liter (µg/L) and 0.4 µg/L, respectively. The State of New York does not currently regulate PFCs.

This site investigation was conducted as a voluntary action by the USAF to assess the presence or absence of PFCs at the former Griffiss AFB FTA in soil, groundwater, and surface water (i.e. stormwater). This work was performed in accordance with the Installation Specific Work Plan Addendum (ISWPA) (AMEC Environment & Infrastructure, Inc. [AMEC], November 2014) and General Quality Program Plan (QPP) (AMEC, July 2014). In the absence of Federal or State regulatory standards for PFCs, the General QPP and the ISWPA utilize Project Action Limits (PALs) for PFOS and PFOA based on the USEPA PHAs (0.2 µg/L PFOS and 0.4 µg/L PFOA in groundwater and surface water) and USAF-calculated screening values derived from

[1] The former FTA historically has been addressed under the Installation Restoration Program (IRP) using site designation FT030. To manage and administer the PFC-related site investigation, characterization, and mitigation activities, the USAF has defined the site with a new identification that adds a "P" to the IRP side identification. The corresponding site identification (i.e. FT030P) is used throughout this document. The "P" designator identifies the PFC component to this project and separates this work as an exclusive entity from other work that may have been done within the FTA in the past.

Office of Superfund Remediation and Technology Innovation residential and direct contact criteria (5 milligrams per kilogram (mg/kg) PFOS and 12 mg/kg PFOA in soil and sediments).

Beginning in the 1960s, firefighting training activities at the base were conducted at the FT030P site located just west of the northwestern end of the main runway, between Six Mile Creek and the Mohawk River (Law Environmental, Inc., [Law], 1996). FT030P consisted of one fire training pit, 200 feet (ft) in diameter, three underground storage tanks (USTs), one above ground storage tank (AST), and an oil/water separator (O/WS). Waste fuel would be dumped on the ground in the pit, ignited, and extinguished with AFFF.

Prior conceptual site models (CSM) for the Installation Restoration Program (IRP) areas did not account for releases of AFFF at the FTA and other potential sources of PFCs. Geology at FT030P consists of fill, glaciofluvial deposits, till, and bedrock. Groundwater is encountered between 10 and 15 ft below ground surface (bgs). Bedrock is shale and is estimated to be approximately 30 ft bgs beneath the Site. A layer of till overlies the shale unit. Bedrock generally dips from the northeast to southwest across the former installation at depths ranging from 0 to 130 ft bgs (FPM, 2006).

The investigation area has a storm sewer system that collects surface water runoff and potential groundwater infiltration. The storm sewer runs through and under FT030P and discharges into the Mohawk River, approximately 3,900 ft to the west. Groundwater flow is generally southwest toward the Mohawk River.

This SIR documents the sampling that was conducted from 17 November 2014 to 20 November 2014 and consisted of the following:

- 10 Soil borings (four for lithology descriptions) and 18 soil samples,
- 9 Groundwater samples, and
- 2 Surface water (i.e. stormwater) samples.

All samples were analyzed for the following six PFCs:

- PFOS,
- PFOA,
- Perfluorohexanesulfonic acid (PFHxS),
- Perfluoroheptanoic acid (PFHpA),
- Perfluorononanoic acid (PFNA), and
- Perfluorobutanesulfonic acid (PFBS).

PFHxS, PFHpA, PFNA, and PFBS do not have PALs. Therefore, only the results of PFOS and PFOA are discussed in detail and presented in figures. All laboratory analytical data are presented in tables.

PFOS and PFOA in soil samples from six borings sampled at FT030P were detected, but at concentrations below the soil PALs. However, PFOS and/or PFOA were detected in the full depth of the vadose zone sampled.

The groundwater sampling program included the collection of water from nine temporarily installed monitoring wells. Groundwater samples exceeded the PAL for PFOS in the nine sampling locations at FT030P and exceeded the PAL for PFOA in one location.

PFOS was detected in water collected from one of the two storm sewer locations sampled during this investigation. Concentrations of PFOS in stormwater at the location south/southwest of FT030P exceeded the PAL. PFOA was not detected in either storm sewer location sampled during this investigation. No PFCs were detected in the stormwater sampling location north/northeast of FT030P.

All six PFCs were detected in groundwater at FT030P. PFOS, PFOA, and PFHxS were detected in the soil. In addition, PFOS was detected in storm sewer surface water, indicating that PFCs may be discharged into the storm sewer drainage system via surface water run-off and/or potential groundwater infiltration.

Based on results of this site investigation, additional investigation is recommended to evaluate potential human exposure pathways in accordance with the USAF Interim PFC Guidance (USAF, August 2012).

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1.0 INTRODUCTION

This Site Investigation Report (SIR) presents information regarding perfluorinated compound (PFC) release determination activities at former Griffiss Air Force Base (AFB), Fire Training Area (FTA) site FT030P[2]. This SIR has been prepared under Contract No. FA8903-08-D-8766, Task Order 0177 between Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) and the Air Force Civil Engineer Center (AFCEC). This site investigation is part of a United States Air Force (USAF)-wide initiative to assess the presence of PFCs at Base Realignment and Closure (BRAC) installations in accordance with Department of Defense (DoD) Instruction (DoDI) 4715.18, Emerging Contaminants (DoD, 2009). The 2012 Interim USAF Guidance on Interim Sampling and Response Actions for PFCs at Active and BRAC Installations (USAF, August, 2012) guided the BRAC site investigation.

This work was performed in accordance with the Final Installation Specific Work Plan Addendum (ISWPA) (AMEC Environment & Infrastructure, Inc. [AMEC], November 2014) and General Quality Program Plan (QPP) (AMEC, July 2014). These documents were prepared using the Uniform Federal Policy Quality Assurance Project Plan (QAPP), United States Environmental Protection Agency (USEPA) guidance (USEPA, March 2012), and AFCEC protocols. The New York State Department of Environmental Conservation (NYSDEC) approved the ISWPA on 12 September 2014. The USEPA provided minimal comments on 19 October 2014, which were addressed through email correspondence to the USEPA's satisfaction.

1.1 PERFLUORINATED COMPOUNDS OVERVIEW

PFCs are a class of synthetic fluorinated chemicals used in many industrial and consumer products, including non-stick cookware, food packaging, waterproof clothing, fabric stain protectors, lubricants, paints, and firefighting foams such as aqueous film forming foam (AFFF). In 1970, USAF began using AFFF to extinguish petroleum fires. From the early 1970s until 2002, DoD purchased and used AFFF containing perfluorooctane sulfonic acid (PFOS) and/or perfluorooctanoic acid (PFOA) for firefighting and fire training exercises. Releases of AFFF to the environment routinely occurred during fire training exercises. Additionally, a wide range of materials used by the general public are potential sources for the release of PFCs to the environment.

1.2 REGULATORY FRAMEWORK

The Safe Drinking Water Act includes a process that USEPA must follow to identify and list unregulated contaminants that may require a national drinking water regulation in the future. Two primary methods used by the USEPA to evaluate contaminants in drinking water are the Contaminant Candidate List and Unregulated Contaminant Monitoring (UCM) Programs. PFOS and PFOA are included on the USEPA

[2]The former FTA historically has been addressed under the Installation Restoration Program (IRP) using site designation FT030. To manage and administer the PFC-related site investigation, characterization, and mitigation activities, the USAF has defined the site with a new identification that adds a "P" to the IRP side identification. The corresponding site identification (i.e. FT030P) is used throughout this document. The "P" designator identifies the PFC component to this project and separates this work as an exclusive entity from other work that may have been done within the FTA in the past.

Contaminant Candidate List Number 3 and are part of the UCM Rule Number 3 (UCMR3), which require monitoring by public water systems to evaluate the presence of these compounds in the water supply.

In 2009, the USEPA Office of Water issued Provisional Health Advisories (PHAs) for two PFCs, PFOS and PFOA, to protect humans from potential risk of exposure to PFOA and PFOS through drinking water (USEPA, 2009). According to the 2012 Edition of the Drinking Water Standards and Health Advisories (USEPA, 2012), the PHAs are informal technical guidance to assist Federal, State, and local officials in response to drinking water contamination. PHAs represent reasonable, health-based hazard concentrations above which action should be taken to reduce exposure to these contaminants in drinking water. Per the USEPA, PHAs are not to be construed as legally enforceable Federal standards and are subject to change as new information becomes available (USEPA, 2012). The PHAs for PFOS and PFOA are 0.2 micrograms per liter (µg/L) and 0.4 µg/L respectively. The State of New York does not currently regulate PFCs.

Under the DoDI 4715.8, the USAF considers PFOS and PFOA to be emerging contaminants because (1) they may have been released to the environment, (2) they present a potential unacceptable human health or environmental risk, and (3) regulatory standards are evolving.

1.3 PROJECT OBJECTIVES

The USAF Interim PFC Guidance outlines a systematic evaluation process that begins with assessing FTAs that were operable between 1970 and 2000. This site investigation is a voluntary action by the USAF to assess the presence or absence of PFCs in soil, groundwater, and surface water (i.e. stormwater) at the former Griffiss AFB FTA (FT030P). In the absence of Federal or State regulatory standards for PFCs, the General QPP and the ISWPA utilize Project Action Limits (PALs) for PFOS and PFOA. **Table 1-1** identifies the PALs for PFCs assessed in the site investigation. The USEPA PHAs for PFOS and PFOA were adopted for groundwater and surface water and are based on a non-cancer hazard quotient = 1. The PALs used for soil and sediment were taken from the USAF Interim PFC Guidance and are screening values calculated by the USAF based on the USEPA Office of Superfund Remediation and Technology Innovation sub-chronic toxicity criteria, using default residential and direct contact parameters for the USEPA's Regional Screening Level calculator.

The specific objectives of this investigation, as stated in the ISWPA, were to:

- Assess whether there are PFCs in surface soil, subsurface soil, and groundwater at FT030P from past use of AFFF at the site for firefighting training;
- Assess whether there are PFCs in groundwater downgradient of the FTA pit, within the airfield fence line; and
- Assess whether PFCs are present in surface water and sediments within the storm sewer system at FT030P.

All samples were analyzed for the following six PFCs:

- PFOS,
- PFOA,
- Perfluorohexanesulfonic acid (PFHxS),
- Perfluoroheptanoic acid (PFHpA),
- Perfluorononanoic acid (PFNA), and
- Perfluorobutanesulfonic acid (PFBS).

This report discusses and provides a comparison of the analytical results to PALs for PFOS and PFOA. PFHxS, PFHpA, PFNA, and PFBS do not have PALs. Section 5.0 provides discussion on data usability and presents the results of analysis. Therefore, only the results of PFOS and PFOA are discussed in detail and presented in figures, yet all data are presented in tables.

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2.0 SITE DESCRIPTION AND OPERATIONAL HISTORY

Griffiss AFB was established as the Rome Air Depot on 1 February 1942. Construction of the installation began in August 1941 and flying operations on the depot airfield began on 18 February 1942. Prior to construction of the installation, the land was primarily pasture and cropland with scattered farmsteads, except for a small housing subdivision, with more than 100 lots which had been established in the mid-1930s, in what is now the central portion of the airfield (AMEC, November 2014). **Figure 2-1** and **Figure 2-2** show the location of the former base and its layout.

During World War II, activities at the installation centered on aircraft engine maintenance and repair, and the training of air depot groups in engine repair. Electronic research activities began in 1949 at Griffiss AFB. The Watson Laboratory complex transferred from Red Bank, New Jersey and became the Rome Air Development Center in June 1951 (later known as Rome Laboratory). The original northwest-southeast trending runway was upgraded and extended in the early 1950s to handle jet fighter aircraft for the 49th Fighter Interceptor Squadron that was stationed at Griffiss AFB. Various fighter interceptor aircraft were at Griffiss AFB from 1950 to 1987 (AMEC, November 2014).

In 1956, a major expansion of the existing airfield was initiated, including the construction of a new 11,500-(ft)-long runway (Runway 15/33), associated taxiways, Aprons 1 and 2, and an Alert Apron. The Barge Canal Bulk Fuel Storage Area and associated hydrant fueling systems at Aprons 1 and 2 were also completed in the late 1950s. The Weapons Storage Area (WSA) was constructed in the late 1950s in the northeastern portion of the installation, east of the new runway. This facility replaced a small munitions storage bunker facility which had been constructed in the early 1950s to the west (AMEC, November 2014).

In 1970, the 416th Bombardment Wing of the Strategic Air Command was activated at Griffiss AFB, requiring construction of support facilities for KC-135 tanker and B-52 bomber aircraft adjacent to Aprons 1 and 2 and the Alert Apron. These facilities included a series of aircraft maintenance hangars (or nose docks) adjacent to Apron 2 and various industrial shops and administrative buildings on a hill overlooking the three aprons. The WSA was expanded in the late 1970s and early 1980s with the construction of a number of storage igloos and other support facilities for the air launch cruise missile, and the short range attack missile (AMEC, November 2014).

Griffiss AFB was designated for realignment by the BRAC commission in 1993 and closed in 1995. The New York Air National Guard continued its air operations and managed the airfield until October 1998, at which time the military flying mission at Griffiss ended. Parcels at the property have been, and continue to be, transferred to the Griffiss Local Development Corporation, which promotes, facilitates and oversees the redevelopment of the former installation. All property transfer actions at Griffiss are complete as of January 2014. Significant facilities at the former installation include the Griffiss Business and Technology Park, the Air Force Research Laboratory, Defense Finance and Accounting Service, and the Eastern Air

Defense Sector. The current Griffiss International Airport is owned and operated by Oneida County (AMEC, November 2014).

The Base Fire Control Department operated a FTA just west of the northwestern end of the main runway. This FTA (FT030P) was located between Six Mile Creek and the Mohawk River. FT030P was in operation from the 1960s to base closure in 1995 to simulate aircraft fuel fires. Petroleum fires were set for burning and extinguishing practice approximately three times a year. JP-4 fuel and waste JP-4 were the most common fuels used in the fire training exercises (Law Environmental, Inc., [Law], 1995).

FT030P activities originally occurred on bare soil at this site. In 1985, contaminated soil was removed, and a new FTA was constructed at the same location. Approximately 500 cubic yards of soil were removed during the remedial action. The reconstructed FTA consisted of a clay-lined concrete basin that was approximately 100 ft in diameter and contained a mock aircraft in its center. A JP-4 underground storage tank (UST) was located northeast of the concrete basin. The UST supplied the fuel through an underground pipeline to ignite fires. An oil/water separator (O/WS) system was used to collect the waste liquids generated during fire training; however, the system capacity was reportedly insufficient to handle the volume of waste liquids generated during the training exercises and frequently overflowed (Air Force, 2009). The historical layout of FT030P is illustrated on **Figure 2-3** and includes Former UST 6365-1, UST 6365-2, UST 6365-3, O/WS 6365-1, O/WS 6365-2, aboveground storage tank (AST) 6365-C, and the former 100 ft diameter FTA dish and mock-up location.

In 1993, the original 4,000-gallon O/WS and two USTs were replaced by a 10,000-gallon O/WS. The new O/WS transferred aqueous waste to a sanitary lift station and petroleum waste to the remaining UST until 1996, when the UST was replaced with an AST. The concrete basin, covering gravel, and surrounding asphalt were removed in 1998. The O/WS, AST, and contaminated soils were removed in 1999 (FPM, 2007). Soils from the excavation activities were land farmed on Apron 1 and Apron 2 (see **Figure 2-2**) along with other contaminated soil from the installation.

In 1994, a remedial investigation was performed to determine the nature and extent of environmental contamination at and around the FTA. Volatile organic compounds (VOCs) were detected in 11 groundwater samples, primarily in the western half of the FTA. An additional groundwater investigation took place in 1997, to assess the impact of fuel spilled previously from one of the USTs at the FTA. Five monitoring wells were installed around the spill location and quarterly sampling began in July of 1997. In October 1998 and January 1999, concentrations of VOCs and semi volatile organic compounds were below the New York State Groundwater Standard Cleanup Guidance and therefore, the wells were decommissioned. Four additional monitoring wells were installed in November 2003 and groundwater monitoring took place through September 2004. Sampling results confirmed that VOC concentrations were below detection limits with the exception of one monitoring well. In 2005, an oxygen release compound treatment system was installed in the monitoring well to promote the aerobic biodegradation of the petroleum contamination. Oxygen release compound treatment was again performed at the

monitoring well in the fall of 2006. Sampling data in March 2007 confirmed the absence of VOC detections above the New York State standard cleanup guidance (Air Force, 2009).

Non-PFC site contaminants were addressed under a separate Record of Decision and included land use controls for soil vapor intrusion at the site. The site has been closed out as of March 2015 with unrestricted use (FPM, 2015).

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3.0 PRELIMINARY CONCEPTUAL SITE MODEL

The information in this section is based on a review of historical and regional information and does not include information obtained during this investigation. An updated conceptual site model is provided in Section 6.1.

3.1 FACILITY PROFILE

Griffiss is situated on 3,552 acres in the lowlands of the Mohawk River Valley in Oneida County, about two miles northeast of Rome, New York. FT030P makes up approximately 8 acres and was used for fire training exercises from the 1960s through 1995, which involved the use and release of AFFF. Previous investigations involved the removal of fuel-contaminated soil from the FTA (AMEC, November 2014).

3.2 PHYSICAL PROFILE

The topography of the overall installation is fairly flat, with elevations ranging from 435 to 595 ft above mean sea level (amsl). Precipitation totals approximately 45.6 in of rain each year. FT030P is relatively flat, open grasslands with a maximum relief of less than 1 ft. The approximate elevation at FT030P is 490 ft amsl (Law, 1995).

3.2.1 Geology

The geologic strata at FT030P consists of glacial and glaciofluvial deposits (fine to coarse sand with variable quantities of silt and gravel), glacial till, and bedrock. The bedrock consists of the Utica Shale, a gray and black carbonaceous unit with a high/medium organic content, and is encountered at 0 to 130 ft below ground surface (bgs) with the depth to bedrock under the main flightline area being approximately 30 ft. A layer of glacial till overlies the Utica Shale. Bedrock beneath the former AFB generally dips from the northeast to the southwest (Law, 1995).

3.2.2 Surface Water

Surface water drainage at the former Griffiss AFB occurs in four separate drainage areas: Mohawk River drainage, Three Mile Creek drainage, Six Mile Creek drainage, and the Erie Canal drainage. The Mohawk River receives stormwater discharge from the western portion of the former installation, including FT030P (**Figure 3-1**). Three Mile Creek receives surface water and stormwater drainage from the central and southern areas of the former base. Six Mile Creek receives surface water and stormwater discharge from areas east of the flightline, flightline area, former nose dock, and a number of buildings and roadways east of the flightline. The flow from the southwest area and the former base housing area is discharged to the city of Rome storm sewer system. There are no surface water bodies located at FT030P. A storm sewer system runs though and beneath FT030P. Stormwater from the storm sewer system discharges to the Mohawk River (Law, 1995).

3.2.3 Groundwater/Hydrogeology

Groundwater at FT030P ranges from 10 to 15 ft bgs in the overburden aquifer. Groundwater flow is generally to the west and southwest toward the Mohawk River **(Figure 3-2)**. An unconfined aquifer exists at the FTA with hydraulic conductivity of 4.17 $x10^{-3}$ ft/minute, hydraulic gradient 0.008 ft/ft and groundwater flow rate of 88 ft/year (Law, 1995).

3.3 RELEASE PROFILE

PFCs had the potential to be released during fire training exercises that involved the use of AFFF via direct infiltration into the pit and/or overflow of the O/WS. Fire training exercises occurred approximately three times per year for 25 years (1970-1995). AFFF contained PFCs, which may have infiltrated and become absorbed to soils. PFCs may also have percolated to the overburden groundwater and infiltrated into the underlying storm sewer. Groundwater flows toward the Mohawk River. The storm sewer discharges stormwater to the Mohawk River (Law, 1995).

3.4 POTENTIAL RECEPTORS

FT030P site is currently part of the Griffiss International Airport. Land use is not expected to change in the future. Potential receptors associated with current and future land use that might come into contact with PFCs in soils may include: ground maintenance workers, utility workers, industrial workers, construction workers, trespassers, and biota. Other potential receptors include inland plant species, reptiles, birds, soil invertebrates, and mammals that inhabit or migrate through the site.

Groundwater flow direction from FT030P is to the west and southwest. Possible receptors include downgradient private or public drinking water wells, if present. Groundwater from FT030P potentially discharges to Mohawk River. Stormwater from the storm sewer system under FT030P discharges to the Mohawk River. Receptors that could come into contact with PFCs include biota and recreational anglers (AMEC, November 2014).

4.0 SAMPLING ACTIVITIES

Sample media evaluated include surface/subsurface soils, groundwater, and surface water (i.e. stormwater).

Sampling activities followed the QPP (AMEC, July 2014) and the ISWPA (AMEC, November 2014). Standard operating procedures (SOPs) and protocols used in conducting this investigation were derived from, or were in accordance with, USEPA guidance documents. Field sampling plans in the form of addenda to the project QPP were generated detailing the activities to be conducted at FT030P. The NYSDEC approved the ISWPA without comment on 12 September 2014. The USEPA provided minimal comments on 19 October 2014, which were addressed through email correspondence to the USEPA's satisfaction.

The following data collection activities were completed to achieve the project objectives:

- Collection and laboratory analysis of soil samples from soil borings drilled at FT030P where firefighting training occurred and AFFF was likely to have been used;
- Collection and laboratory analysis of groundwater samples from temporary monitoring wells within FT030P as well as downgradient of the Site; and
- Collection and laboratory analysis of surface water samples from the storm sewer system.

4.1 PRE-SAMPLING ACTIVITIES

A site visit was held at the former Griffiss AFB from 10-11 November 2014. The purpose of this visit was to: (1) familiarize Amec Foster Wheeler personnel with the site layout; (2) locate and stake out all sampling locations including temporary monitoring wells, storm sewer catch basin locations, and soil boring locations; and, (3) begin the airfield access badging application process for Amec Foster Wheeler's field crew. Amec Foster Wheeler met with airfield security to begin background checks for field crew and confirmed security access/requirements and logistics for working on the airfield. Upon field mobilization, PULS (utility contractor) cleared utilities at the borings locations.

4.2 ENVIRONMENTAL SAMPLING

Sampling of soil, groundwater, and surface water was conducted from 17 November 2014 through 20 November 2014. A summary of the field sampling activities is provided in **Table 4-1** and are described in the following sections. **Appendix A** includes the field forms and logs prepared during the investigation activities.

4.2.1 Soil Boring Advancement/Abandonment and Soil Sampling

Field exploration consisted of drilling ten borings at FT030P. Locations are shown on **Figure 4-1**. Four of the ten borings were advanced for lithologic descriptions only. Six borings were advanced and sampled for lithologic descriptions and PFC analyses. The borings were completed by Aztech Technologies, Inc. out of Ballston Spa, NY, from 17-19 November 2014, using direct-push technology. A Geoprobe 6610 DT equipped with a Macrocore^{TM} sampler, approximately 2.5-inch (in) outside diameter and 5-ft long, was

used for soil boring advancement. The Macrocore™ sampler was lined with a new acetate sleeve for each 5-ft soil core.

The first 3 to 5 ft of each borehole was cleared using a hand auger to ensure that no utility lines were present. Soil cores were collected continuously until the overburden groundwater was encountered. Soil samples from six borings were collected for PFC analysis approximately every 3 to 5 ft, starting at the ground surface, as shown on **Figure 4-1**. Soil borings were screened with a photoionization detector (PID) to assess if there were VOCs in the soil. The only location that had a PID detection was at FT030P-004 (15.6 parts per million). All soils were logged following the SOP defined in the QPP (AMEC, 2014). Soil samples were collected and placed in a stainless steel bowl and mixed with a stainless steel spoon to gather a composite sample at each depth. Bowls and spoons were decontaminated with an alconox/PFC-free water scrub and a PFC-free water rinse. Disposable gloves were changed in between collecting each sample to prevent cross-contamination. All samples were placed in pre-labeled high density polyethylene (HDPE) sample bottles for transport to Accutest Laboratory (Accutest) in Orlando, Florida for analysis of PFCs by liquid chromatography and tandem mass spectrometry (LC/MS/MS). A field data sheet was completed for each location and can be found in **Appendix A-4**. A global positioning system (GPS) receiver was used to locate each boring location.

A geologic cross section is provided in **Figure 4-2**. The orientation of the cross section is shown on **Figure 4-1**. This cross section shows the approximate depth of the water table and the storm sewer at the Site. Logging of soil borings indicate that surface soils at FT030P consists of a fill layer. The depth of fill ranges from 1 to 6 ft bgs. Below the fill layer is a glaciofluvial layer consisting of silty-sand mixtures with trace/some gravel. A field data sheet was compiled for each soil boring location and can be found in **Appendix A-5**.

Borehole locations were backfilled using soil cuttings from each hole, supplemented with bentonite chips as required to complete the backfilling.

The drilling subcontractor constructed a temporary decontamination pad to decontaminate the downhole equipment between each soil boring. Fluids produced during the decontamination process were disposed on the ground surface at the end of field work.

4.2.2 Surface Water Sampling

Two sediment samples were to be collected as part of the site investigation to determine if the stormsewer system contained sediments impacted by PFCs. The two locations were to be paired with stormwater sample locations shown on **Figure 4-3**. The sample locations were manhole catch basins. No sediments were encountered, therefore no samples were collected.

Two surface water samples from the storm sewer system at FT030P were collected from locations FT030P-011 and FT030P-012, north/northeast and south/southwest of the FT030P fire training pit. Sample locations are shown on **Figure 4-3**. The samples were collected by removing the catch basin grate and using a stainless steel cup attached to an extension rod. The cup was dipped into the water and used to

fill the sample jars. The cup was then decontaminated with an alconox/PFC-free water scrub and a PFC-free water rinse. Field data sheets were filled out for each sample location and are found in **Appendix A-4**. Field parameters were collected at each location and are presented on **Table 4-2.**

4.2.3 Groundwater Sampling

Groundwater samples were collected at nine locations (FT030P-002 though FT030P-010) from temporary monitoring wells installed in nine of ten soil borings described in Section 4.2.1. Groundwater sample locations are shown on **Figure 4-4**. After each soil boring was completed, a 10-ft long, 0.01 in slotted polyvinyl chloride screen was installed, backfilled with sand, and sealed with bentonite chips. The well screens were installed across the water table. The temporary wells were purged with a peristaltic pump and dedicated HDPE tubing prior to sampling. The wells were pumped until the purge water was free of entrained sands and silt, approximately 1 to 2 gallons per well. The tubing was then attached to a water quality meter flow cell and sampled using a low-flow sampling technique. Field data sheets were filled out for each sample location and are located in **Appendix A-4**. Stabilized groundwater monitoring parameters are presented on **Table 4-3**. The purge water was discharged to the ground at each well location. Water levels ranged from 10.61 to 14.81 ft bgs at the time of sampling, as shown on **Table 4-4.** The relative elevations were used to estimate the potentiometric contours shown on **Figure 3-2**. Based on this interpretation groundwater appears to be flowing to the west and southwest of the potential source area.

4.3 DEVIATIONS FROM THE INSTALLATION SPECIFIC WORK PLAN ADDENDUM

Although collection of sediment was proposed in the work plan, there was a lack of depositional material present in either storm sewer. Therefore, Amec Foster Wheeler was unable to collect sediment samples.

4.4 SURVEYING

A rod and level was used to determine the relative elevations of the temporary monitoring wells. A location survey was then conducted using a GPS receiver to locate the sample points. All locations were tied to FT030P-008, which was assigned a reference elevation of 100 ft. **Table 4-4** presents the survey data.

4.5 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation derived waste (IDW) consisted of soil cuttings from soil boring advancement, groundwater sampling purge water, decontamination water, disposable personal protective equipment (PPE), and other trash. As approved by NYSDEC, soil cuttings were placed back in the boring as backfill. Decontamination IDW water was discharged directly to the ground surface. Purge water from monitoring well sampling was discharged to the ground surface in the vicinity of the well. PPE and other trash were placed in plastic bags and discarded into a sanitary trash container onsite, which was then disposed of at a sanitary landfill.

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5.0 SAMPLING RESULTS

All samples were analyzed for PFOS, PFOA, PFHxS, PFHpA, PFNA, and PFBS in accordance with the QPP, ISWPA Interim PFC Guidance by Accutest, a DoD – ELAP accredited lab, located in Orlando, Florida. Accutest analyzed the samples for PFCs by USEPA Method 537 modified using LC/MS/MS.

5.1 DATA USABILITY

The validation of data from soil, groundwater, and surface water (i.e. stormwater) samples was completed in January 2015. A description of the data validation scope, data validation procedures, and data validation observations and actions is presented in the data validation report in **Appendix B.** All data were deemed to be useable based on the data validation findings.

USEPA Stage 4 data validation was performed on 10% of the samples for each media, and USEPA stage 2B on the remaining samples. Field and equipment blanks were not validated as these samples were used to assess data usability for the field samples. The validation was performed following the logic identified in the Contract Laboratory Program Data Validation Functional Guidelines for Evaluating Organic Analyses (USEPA, June 2014).

A subset of results was qualified as estimated values (J/UJ) for reasons explained in **Appendix B**.

Qualifiers used in association with the final validated results include the following:

- U: The analyte was analyzed for, but was not detected above the reported limit of detection (LOD);
- J: The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample;
- UJ: The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

The estimated results will be identified in the discussions of results for each media in the following sections. Interpretations on the impact of the validation qualification actions on data usability will be included when appropriate.

In addition to the field samples, matrix spike/matrix spike duplicates (MS/MSDs), field blanks (FBs), equipment blanks (EB) and field duplicates (FDs) were analyzed for quality control measures. MS/MSD samples are taken in order for the laboratory to see its ability to successfully recover an analyte in a specific sample or closely related sample matrices. FB samples are used to determine if sample collection, storage, preparation, and analysis systems produce false positive results. EB samples are collected to assess if decontamination procedures in the field are suitable to prevent cross contamination between samples. FD samples are collected to evaluate method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection. The laboratory case narrative

for the sample delivery group and the data validation report with validated laboratory data sheets are presented in **Appendix B**.

5.1.1 Quality Control Blanks

Target analytes (PFOS, PFOA, PFHxS, PFHpA, PFNA, and PFBS) were not detected in laboratory method blanks or field and equipment blanks associated with these samples. These results indicate that no laboratory contamination or field contamination occurred during the collection or analysis of these samples.

5.1.2 Matrix Spike/Matrix Spike Duplicate

Laboratory MS/MSD analyses were performed on soil samples GRIFS-SO-006 and GRIFS-SO-020, and surface water sample GRIFS-SW-003. Recoveries were within the QPP-specified 70 to 130% limits and precision values were less than the QPP-specified maximum of 30% for the surface water indicating good accuracy and precision in the surface water media. For the soil sample, PFOS recoveries were outside the specified limits at 67% and 425% in the MS and MSD performed on sample GRIFS-SO-020. Additionally, the relative percent differences (RPDs) between MS and MSD were high for PFHpA (33%), PFOA (33%), PFNA (37%), and PFBS (32%). As indicated in the data validation report in **Appendix B**, soil sample results were not qualified due to the MS/MSD recoveries because the concentration of PFOS in the original field sample was too high to provide usable recovery data. The other compounds with high RPDs were not detected in the sample, and no qualification was needed.

5.1.3 Field Duplicates

Field duplicates were collected at two soil locations, one surface water location, and one groundwater location. Duplicate results are summarized in **Appendix B**. Good agreement of results was reported for the soil and surface water samples indicating good sampling and analytical precision for these media. Results for groundwater sample/duplicate pair GRIFS-GW-001 and GRIFS-GW-002 did not meet precision goals for PFHxS and PFOS. Compounds were detected in the original sample and not in the field duplicate, therefore results for PFHxS and PFOS were qualified as estimated in the data validation report in **Appendix B**. The result for PFOS (0.617 µg/L) in the original sample GRIFS-GW-001 was an order of magnitude above the LOD reported for PFOS in the duplicate (0.016 µg/L). The original sample concentration was greater than the PAL of 0.2 µg/L. PFOS was detected in all groundwater locations at concentrations greater than the PAL, and therefore, the uncertainty in the field duplicate results is not interpreted to be a significant data gap regarding the characterization of PFOS in the groundwater.

5.2 SOIL RESULTS

A summary of PFC analytical results for soils is presented in **Table 5-1** and shown on **Figure 5-1**. Results are summarized below**.** PFCs were detected at each soil boring location, however, none of the concentrations detected exceeded the soil PALs (PFOS – 5 milligrams per kilogram [mg/kg]; PFOA – 12 mg/kg). The following bullets summarize the PFOS and PFOA results for each boring location sampled:

- FT030P-001: PFOS was detected from ground surface to 10 ft bgs in three of three samples at concentrations ranging from 0.0239 mg/kg to 0.0523 mg/kg. There was no PFOA detected.
- FT030P-002: PFOS was detected from 3 – 10 ft bgs in two of three samples at concentrations ranging from 0.0177 mg/kg to 0.137 mg/kg. There was no PFOA detected.
- FT030P-003: PFOS was detected from ground surface to 10 ft bgs in three of three samples at concentrations ranging from 0.0133 J mg/kg to 0.122 mg/kg. There was no PFOA detected.
- FT030P-004: PFOS was detected from ground surface to 10 ft bgs in three of three samples at concentrations ranging from 0.0565 mg/kg to 0.935 J mg/kg. There was no PFOA detected.
- FT030P-005: PFOS was detected from 3 – 10 ft bgs in two of two samples at concentrations ranging from 0.0157 J mg/kg to 0.488 J mg/kg. PFOA was detected from 8 – 10 ft bgs in one sample at a concentration of 0.0568 J mg/kg.
- FT030P-006: PFOS was detected from ground surface to 10 ft bgs in three out of three samples at concentrations ranging from 0.638 J mg/kg to 1.6 J mg/kg. There was no PFOA detected.

Samples GRIFS-SO-011 and GRIFS-SO-020 were collected as FDs during the soil sampling event. PFOS was detected in both samples, but at concentrations below the PAL. PFOA was non-detect in both duplicate samples.

5.3 SURFACE WATER RESULTS

A summary of PFC analytical results for surface water (i.e. stormwater) PAL exceedances is presented in **Table 5-2** and is summarized below. **Figure 5-2** shows the concentrations PFOS and PFOA at the sample locations.

- GRIFS-SW-011 is the upgradient sample point before the storm sewer flows through and beneath FT030P. The bottom of the catch basin structure was measured at 9.7 ft bgs. PFOS and PFOA were non-detect at this location.
- GRIFS-SW-012 is the downgradient sample point in the storm sewer system after passing beneath the former FTA. The bottom of the catch basin structure was measured at 16 ft bgs. PFOS at 0.285 µg/L and 0.289 µg/L (duplicate) was above the PAL of 0.2 µg/L. PFOA was not detected at this location.

5.4 GROUNDWATER RESULTS

A summary of PFC analytical results for groundwater is presented in **Table 5-3** and is summarized below. Sampling results are shown on **Figure 5-3**. Groundwater from all temporary monitoring well locations exceeded the PAL for PFOS (0.2 µg/L). FT030P-006 was the only location where groundwater exceeded the PAL for PFOA (0.4 µg/L). The following bullets summarize the PFOS and PFOA sampling results for each groundwater sampling location:

- FT030P-002: Well screen was set from 7 to 17 ft bgs and the water level was measured at 11.68 ft bgs. A field duplicate was collected at this location. PFOS was detected at 0.617 J µg/L, above the PAL. PFOA was detected below the PAL.
- FT030P-003: Well screen was set from 7 to 17 ft bgs and the water level was measured at 10.66 ft bgs. PFOS was detected at 3.11 µg/L, above the PAL. PFOA was detected below the PAL.
- FT030P-004: Well screen was set from 7 to 17 ft bgs and the water level was measured at 10.61 ft bgs. A split sample was collected at this location and sent to Vista Analytical Laboratory for quality control. PFOS was detected at 4.7 µg/L in the regular sample and 3.59 J µg/L in the split sample, both above the PAL. PFOA was detected below the PAL.
- FT030P-005: Well screen was set from 7 to 17 ft bgs and the water level was measured at 11.36 ft bgs. PFOS was detected at 9.51 µg/L above the PAL. PFOA was detected below the PAL.
- FT030P-006: Well screen was set from 7 to 17 ft bgs and the water level was measured at 11.25 ft bgs. PFOS was detected at 60.1 µg/L above the PAL. PFOA was detected at 0.533 J above the PAL.
- FT030P-007: Well screen was set from 7 to 17 ft bgs and the water level was measured at 10.61 ft bgs. PFOS was detected at 1.91 µg/L above the PAL. PFOA was detected below the PAL.
- FT030P-008: Well screen was set from 7 to 17 ft bgs and the water level was measured at 14.30 ft bgs. PFOS was detected at 5.23 µg/L above the PAL. PFOA was detected below the PAL.
- FT030P-009: Well screen was set from 8 to 18 ft bgs and the water level was measured at 14.61 ft bgs. PFOS was detected at 6.00 µg/L above the PAL. PFOA was detected below the PAL.
- FT030P-010: Well screen was set from 8 to 18 ft bgs and the water level was measured at 14.49 ft bgs. PFOS was detected at 8.63 µg/L above the PAL. PFOA was detected below the PAL.

6.0 DISCUSSION OF RESULTS

The data quality objective; to determine if a confirmed release of PFCs has occurred, as outlined in **Worksheet #11** of the general QPP (AMEC, 2014) has been met. PFCs are present in the three media sampled. PFOS was detected above its respective PAL in surface water and groundwater. PFOA was detected above its respective PAL in groundwater. PFOS and PFOA were detected below their respective PALs in soil.

PFOS and PFOA have PALs, are discussed in detail, and are included on figures. Other PFCs (PFBS, PFHpA, PFHxS, and PFNA) were also found at concentrations above detection limits. However, since no PALs are established for these compounds, these sample results are only included in the analytical summary tables.

The specific objectives of this investigation, as defined in the ISWPA and restated in the introduction of this report, are listed below in italics. They are followed by a bulleted summary of how well the objective was met along with considerations of potential data gaps.

1. *Assess whether there are PFCs in surface soil, subsurface soil, and groundwater at FT030P from past use of AFFF at the site for firefighting training.*

    - PFOS and PFOA were detected in surface soil and subsurface soil at concentrations below the PALs. PFOS was detected in samples collected from locations in the former FTA pit, west of the pit, near the former O/WS, and near UST 6365-1. PFOA was detected in the former FTA pit only.

    - PFOS was detected in groundwater at concentrations above the PALs. The highest concentration was detected in the sample collected immediately west of the former FTA dish and mock-up location. The sample near the former O/WS had a PFOS concentration above the PAL. PFOA was detected in groundwater at concentrations below the PAL, except for one detection above the PAL in the sample collected immediately west of the former FTA dish and mock-up location.

2. *Assess whether there are PFCs in groundwater downgradient of the fire training pit, within the airfield fence line.*

    - PFOS was detected above the PAL in groundwater at all 3 samples collected downgradient of FT030P near the airfield fence line.

3. *Assess whether PFCs are in surface water and sediment within the storm sewer system at FT030P.*

    - PFOS was detected above the PAL in water in the storm sewer system at the location downstream of FT030P.

    - No PFCs were detected in the location upstream of FT030P source areas.

- There was no sediment available in either storm sewer catch basin, so no sediment samples were collected.

6.1 UPDATED CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) summarizes the constituents of concern and provides a description of the physical characteristics and the migration tendencies of each chemical of interest within the environment. The purpose of the CSM is to understand overall site conditions. Based on data collected during this site investigation, the CSM has been updated from the preliminary CSM presented in **Worksheet #10** of the ISWPA (AMEC, 2014) and described in **Section 3.0**. The updated CSM is provided on **Table 6-1**. The CSM has limitations in that not all aspects of it were revisited as part of the scope of this SIR. Limitations include water level data over time and groundwater flow direction. The following is a brief summary of the updated CSM:

PFCs were detected in surface and subsurface soil, groundwater, and surface water in the storm sewer at FT030P. It appears that the former pit and O/WS are the primary known residual sources of PFCs in soil.

PFCs have infiltrated to groundwater and are migrating downgradient in the shallow overburden groundwater. Groundwater at FT030P ranges from 10 ft to 15 ft bgs as measured in the November 2014 site investigation. PFOS and PFOA are present above the PAL in the overburden groundwater from FT030P to the west and southwest following the overburden groundwater flow directions. The furthest downgradient samples collected to the west and southwest contain all PFOS above the PAL, and one sample collected to the west contains PFOA above the PAL. Therefore, the potential pathway for human exposure via groundwater downgradient of FT030P cannot be ruled out at this time.

A storm sewer runs though and beneath FT030P. This system drops from 9.7 ft bgs to 16 ft bgs as it passes beneath the former FTA. Since the storm sewer drops below the water table, groundwater containing PFCs may be infiltrating the drainage system. There are two catch basins at the site that collect surface water run-off into the storm sewer. Surface water in the catch basin downgradient of the source area contains PFOS above the PAL. The storm sewer eventually discharges into the Mohawk River approximately 3,900 ft southwest of FT030P. Due to the distance and topography between the catch basins and FT030P, it is unlikely that the storm sewer collects sediment-laden surface water runoff containing PFCs.

The residential areas west and south of the FTA are reportedly served by the public water supply system. However, it is possible that some residences may have water wells being used for irrigation purposes. In addition, the Mohawk Glen Golf Course, immediately southwest of FT030P, may have irrigation wells. Stormwater and groundwater discharge points into the Mohawk River, southwest of FT030P beyond the golf course, could be potential sources of exposure for human receptors.

6.2 RECOMMENDATIONS

Based on the results of this site investigation and interpretation of the CSM, Amec Foster Wheeler recommends the following additional investigations be undertaken to evaluate potential human exposure pathways

1. Perform groundwater investigation to assess downgradient potential human exposure pathways including potential groundwater seepage/infiltration to surface water.
2. Re-sample the two storm sewer catch basins at FT030Pto corroborate the initial results. Collect a sample from the storm sewer catch basin in the middle of the FTA to better assess groundwater intrusion into the drainage system, given the potential for human exposure at the discharge location.
3. Review the storm drainage system plans and collect samples from other locations between FT030P to the Mohawk River and other storm sewers that connect into the storm sewer system that flows to the Mohawk River. Evaluate impacts from other potential PFC sources, given the potential for human exposure at the discharge location.
4. Interview Mohawk Glen Golf Course personnel southwest of the former FTA to determine the source of the water used for irrigation and consumption, and to collect samples if necessary, in order to evaluate potential human exposure pathways.
5. Update the private drinking water use survey and confirm that off-base properties south and west of the former FTA are served by public water.
6. Assess the potential presence of PFCs at the Griffiss stormwater discharge point(s) to streams and the Mohawk River to evaluate potential human exposure pathways. If warranted, perform an ecological evaluation/assessment of the streams/Mohawk River to evaluate potential human receptor exposure pathways, such as fish consumed by recreational anglers.

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7.0 REFERENCES

Air Force, July 2009. Proposed Plan - Final: Fire Training Protection Area AOC, July, 2009.

AMEC, November 2014. Final Installation Specific Work Plan Addendum (ISWPA): Former Griffiss Air Force Base (Perfluorinated Compounds [PFCs] Release Determination at Multiple BRAC Bases), November, 2014.

AMEC, July 2014. Final (Revision 1), PFCs Release Determination at Multiple BRAC Bases, Quality Program Plan (QPP), Contract FA8903-08-D-8766, Task Order 0177, July 2014.

AMEC, July 2014. General Quality Program Plan, Perfluorinated Compounds [PFCs] Release Determination at Multiple BRAC Bases, July, 2014.

DoD, 2009. Department of Defense Instruction 4715.18, Emerging Contaminants, Certified current through 11 June 2016.

Ecology and Environment, November 1997. Draft Report for Supplemental Investigations of Area of Concern, November, 1997.

FPM, April 2006. Monitoring Report: On-Base Groundwater AOCs, April, 2006.

FPM, October 2007. Soil Vapor Intrusion Evaluation, October, 2007.

FPM, January 2015. Soil Vapor Intrusion Evaluation and Closure Report FT-030 Fire Protection Training Area, January 2015.

Law Environmental, Inc., August 1995. Volume 1 and Volume 28 Draft Primary Report Remedial Investigation Griffiss Air Force Base, New York, 1995.

Law Environmental, Inc., December 1996. Volume 28: Draft-Final Primary Report- Remedial Investigation Fire Protection Training Area of Concern, December 1996.

USAF, August 2012. Interim USAF Guidance on Sampling and Response Actions for Perfluorinated Compounds at Active and Base Realignment and Closure Installations, August 2012.USEPA, March 2012. Uniform Federal Policy Quality Assurance Project Plan, March 2012.

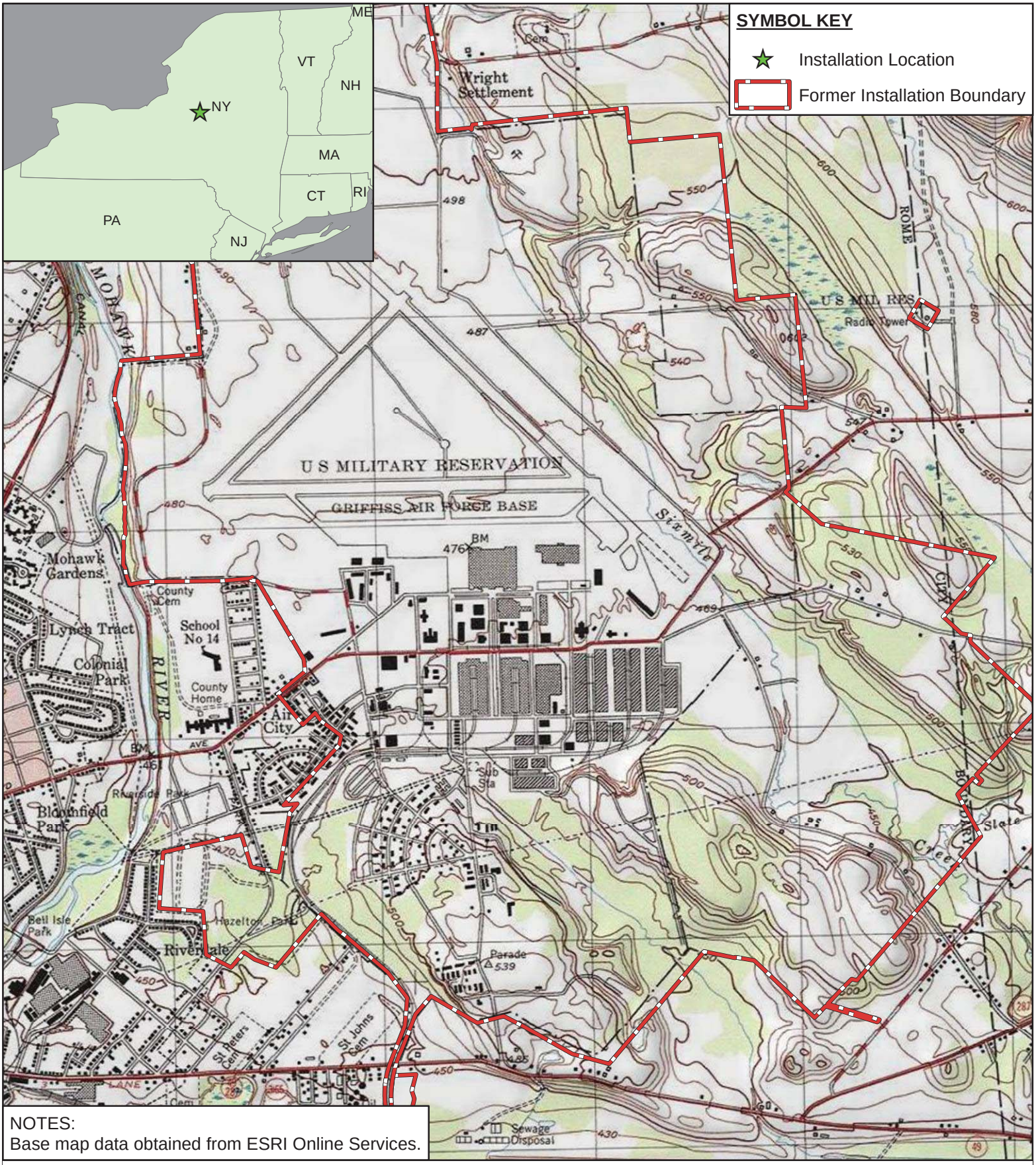
USEPA, January 2009. Provisional Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), January 2009.

USEPA, March 2012. Uniform Federal Policy Quality Assurance Project Plan, March 2012.

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FIGURES

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NOTES:
Base map data obtained from ESRI Online Services.

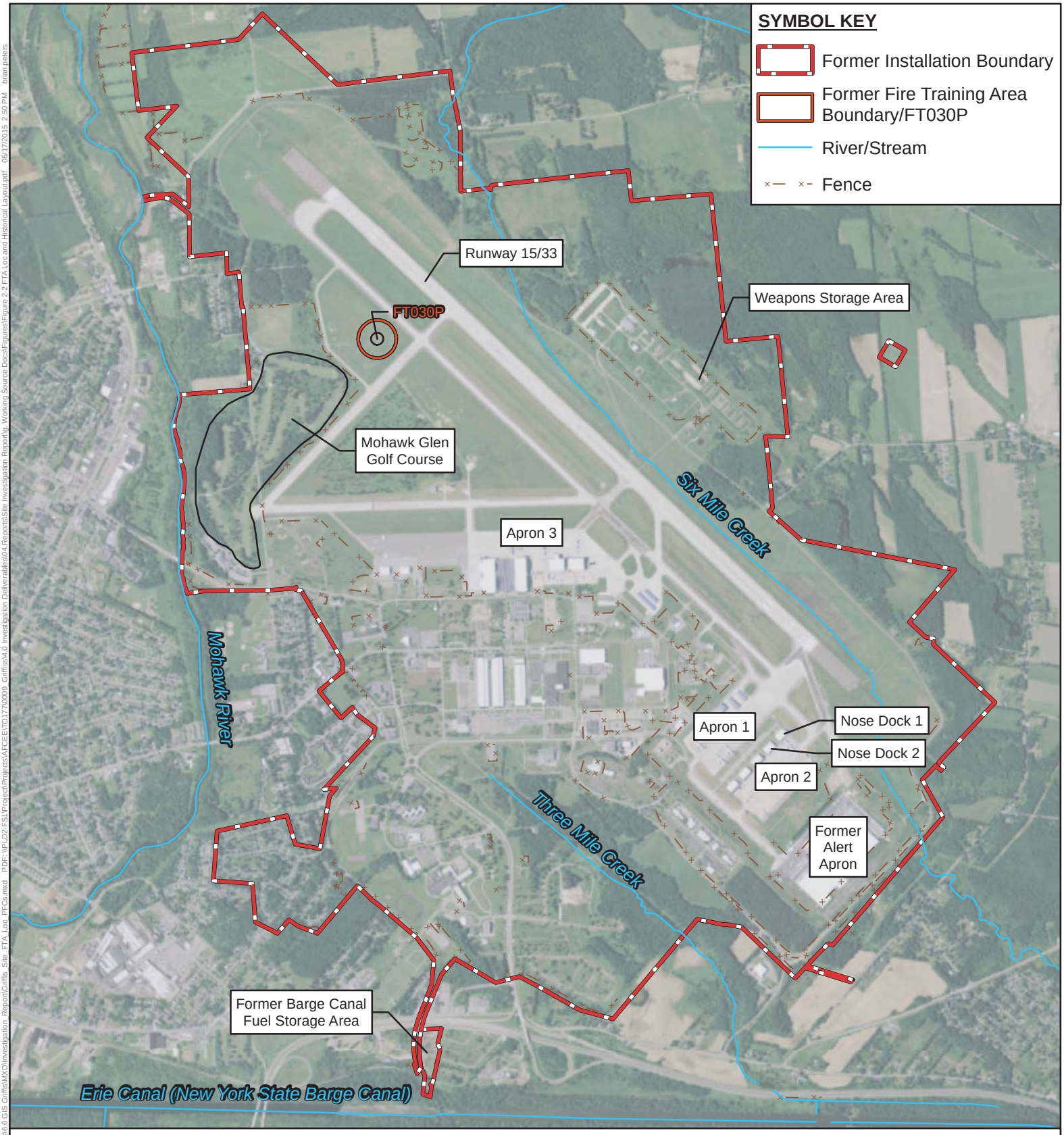
Air Force Civil Engineer Center
2261 Hughes Avenue
Building 171, Ste 155
JBSA Lackland, Texas 78236

N

FIGURE 2-1
Installation Location
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 250 500 1,000 1,500 2,000 2,500 Meters
0 2,000 4,000 6,000 8,000 Feet

03/19/2015	Griffis_Site_Installation_Loc	
PROJ: 775290177	Drawn: BRP	



Source: 2011 Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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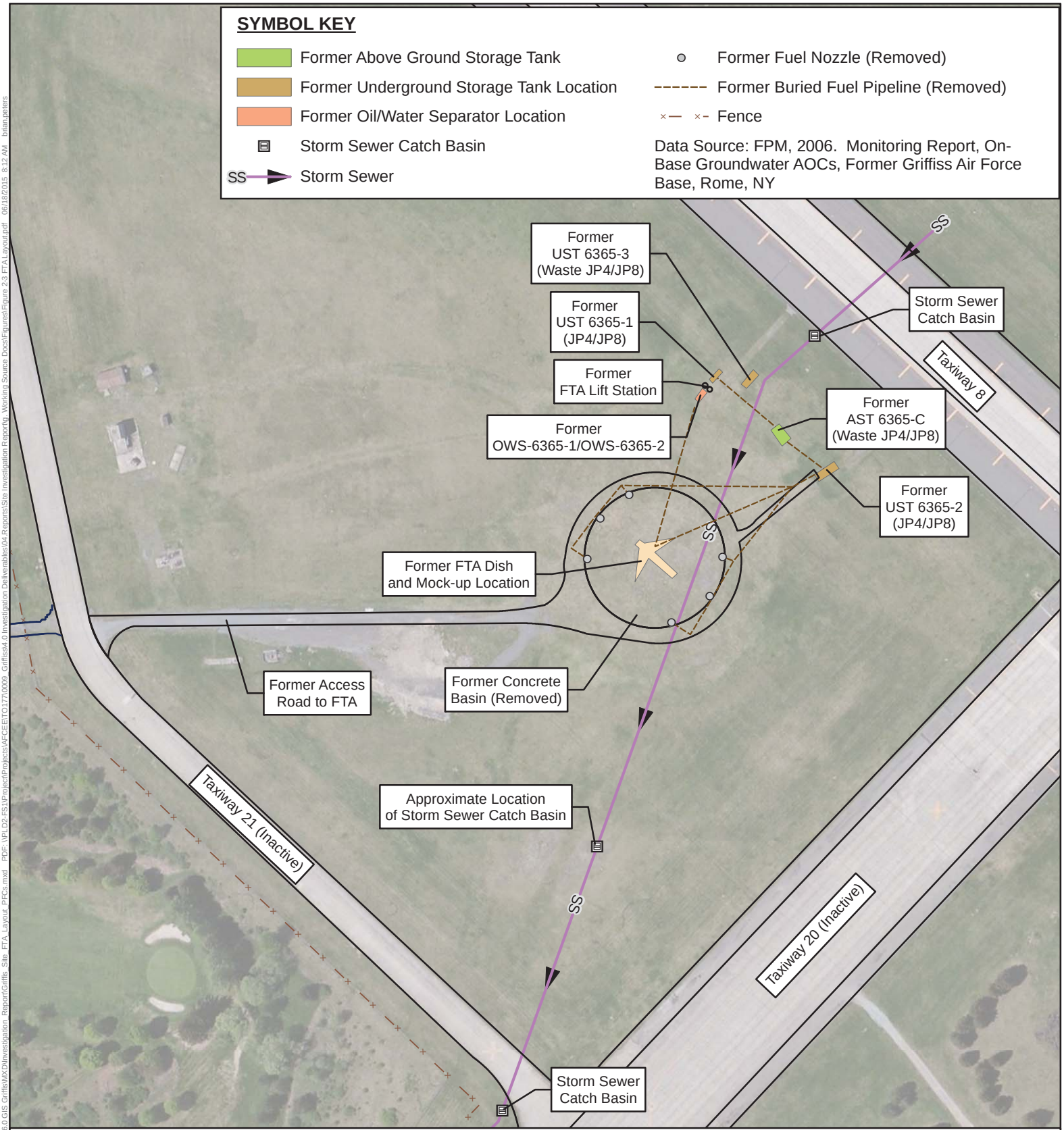
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FIGURE 2-2
FT030P Location and Historical Layout
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 250 500 1,000 1,500 2,000 2,500 Meters
0 2,300 4,600 6,900 9,200 Feet

06/17/2015	Griffis_Site_FTA_Loc_PFCs	
PROJ: 775290177	Drawn: BRP	Chk: PSB

Document: \\PLD2-FS1\Projects\AFCEE\TO17\70009_Griffiss\MXD\Investigation_Report\Griffis_Site_FTA_Loc_PFCs.mxd PDF: \\PLD2-FS1\Projects\Projects\AFCEE\TO17\70009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\g_Working Source Docs\Figures\Figure 2-2 FTA Loc and Historical Layout.pdf 06/17/2015 2:50 PM brian.peters



Source: 2011 Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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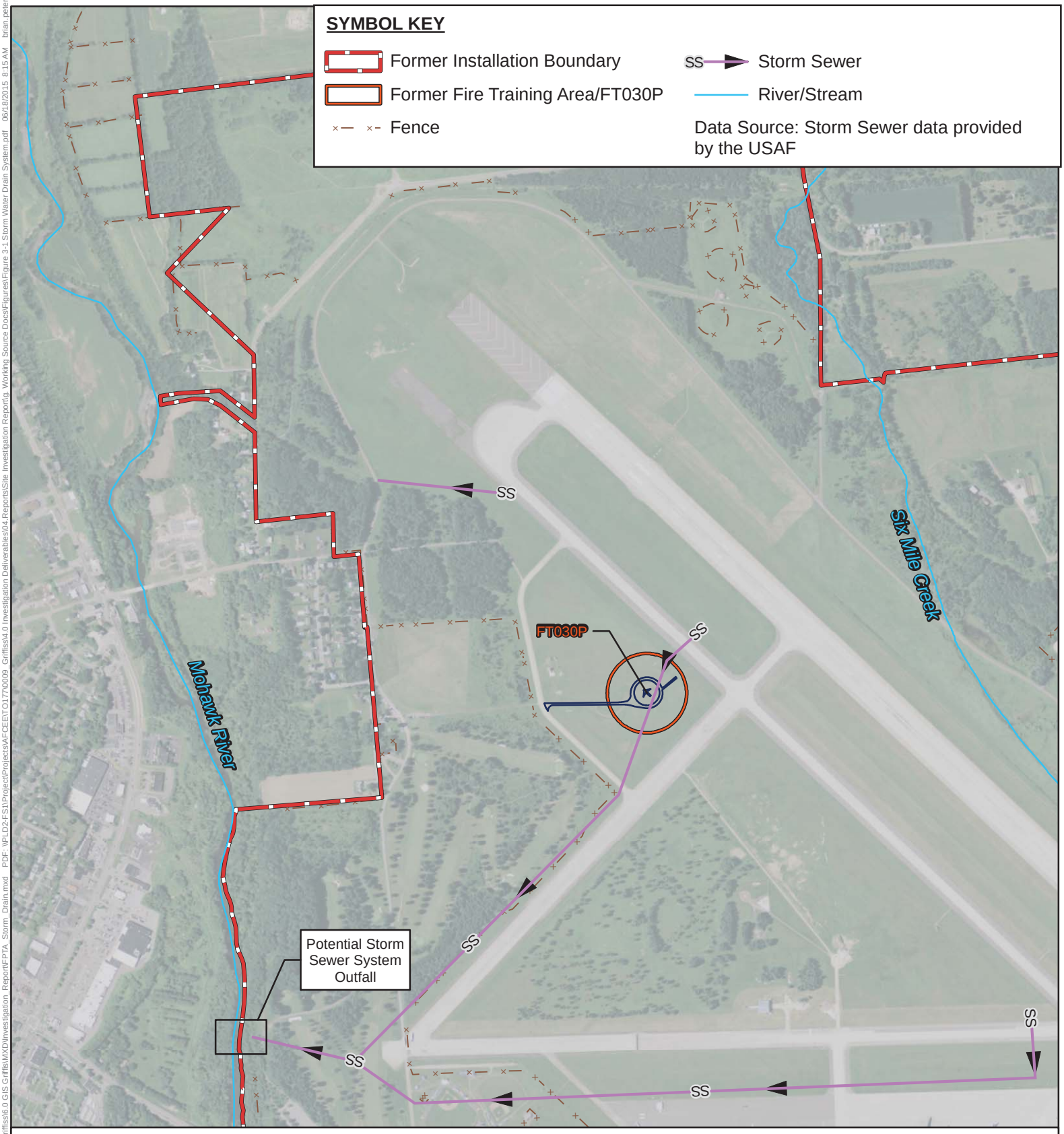
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FIGURE 2-3
Fire Training Area Site Layout
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/18/2015	Griffis_Site_FTA_Layout_PFCs	
PROJ: 775290177	Drawn: BRP	Chk: PSB

Document: \\PLD2-FS1\Project\Projects\AFCEE\TO17\70009_Griffiss\MXD\Investigation_Report\Griffis_Site_FTA_Layout_PFCs.mxd PDF: \\PLD2-FS1\Project\Projects\AFCEE\TO17\70009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\g_Working Source Docs\Figures\Figure 2-3 FTA Layout.pdf 06/18/2015 8:12 AM brian.peters



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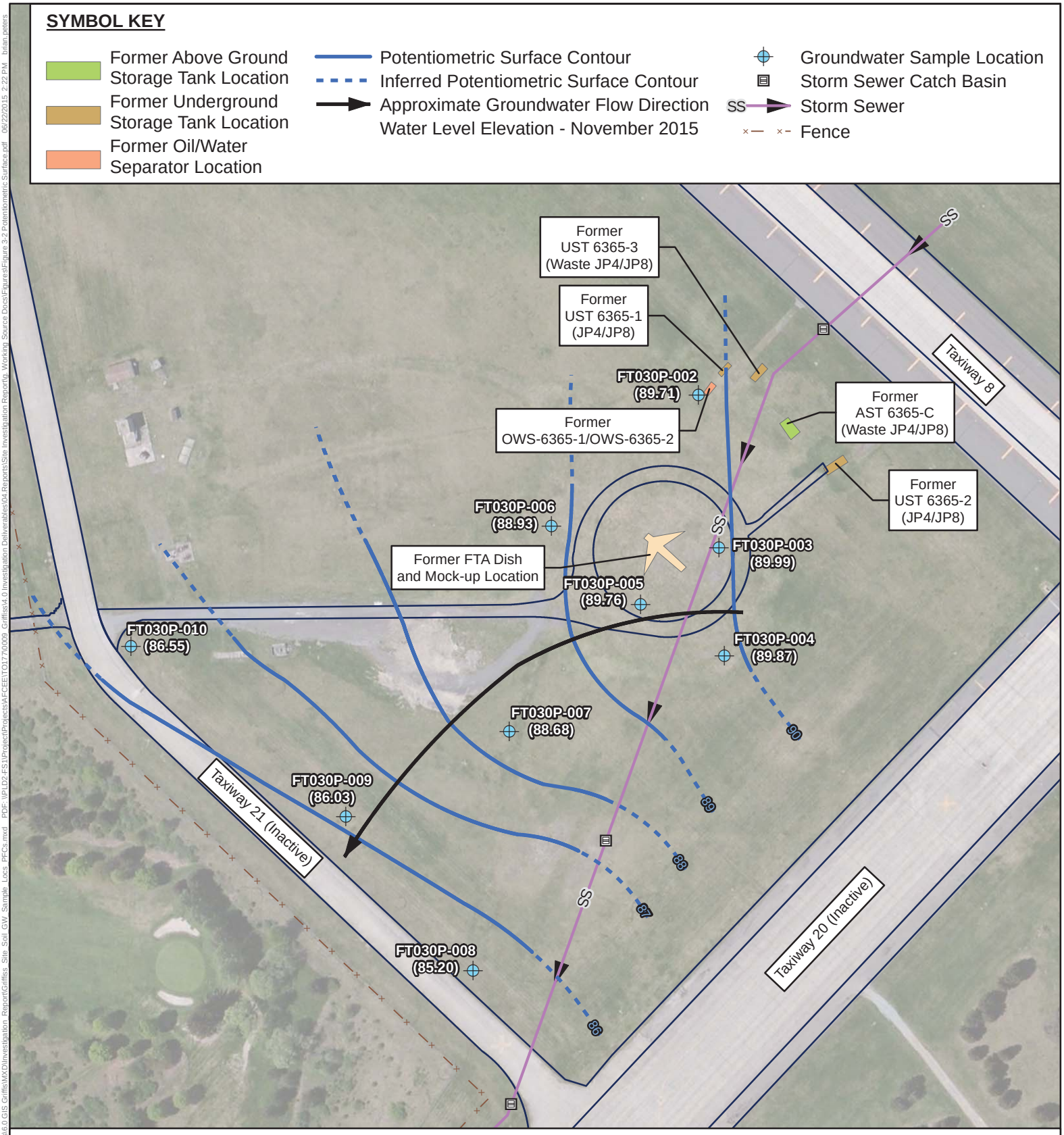
FIGURE 3-1
Stormwater Drainage System
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 100 200 400 600 800 1,000 Meters

0 1,100 2,200 3,300 4,400 Feet

06/17/2015	FPTA_Storm_Drain	
PROJ: 775290177	Drawn: BRP	

Document: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\FPTA_Storm_Drain.mxd PDF: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\fg_Working Source Docs\Figures\Figure 3-1 Storm Water Drain System.pdf 06/18/2015 8:15 AM brian.peters



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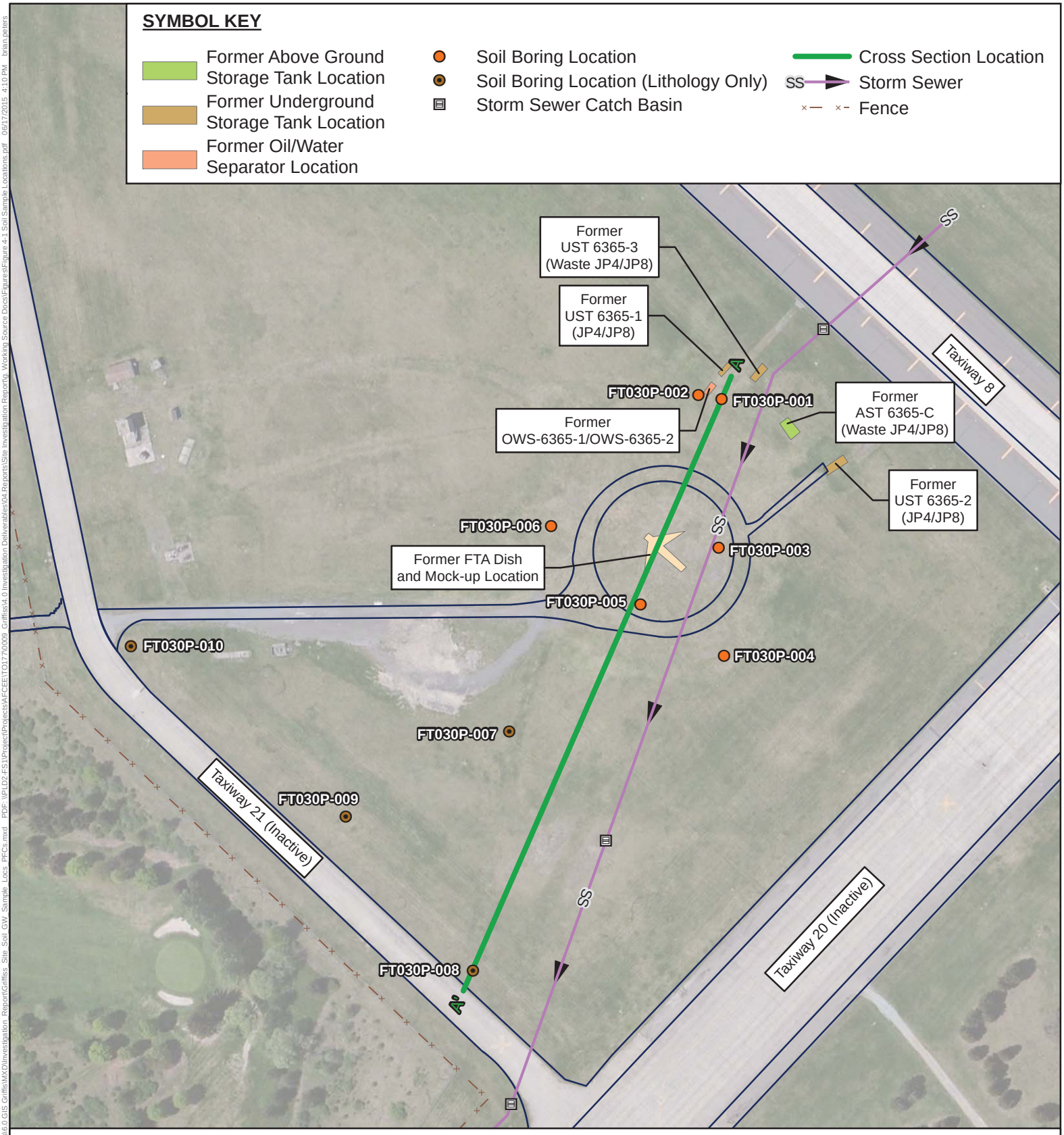
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FIGURE 3-2
Current Potentiometric Surface Contours
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/22/2015	Griffiss_Site_Soil_GW_Sample_Locs_PFCs	
PROJ: 775290177	Drawn: MJW	Chk: PSB

Document: \\PLD2-FS1\Projects\AFCEE\T01770009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\Griffiss_Site_Soil_GW_Sample_Locs_PFCs.mxd PDF: \\PLD2-FS1\Projects\AFCEE\T01770009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\g_Working Source Docs\Figures\Figure 3-2 Potentiometric Surface.pdf 06/22/2015 2:22 PM brian.peters



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FIGURE 4-1
Soil Sample Locations
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/17/2015	Griffiss_Site_Soil_GW_Sample_Locs_PFCs	
PROJ: 775290177	Drawn: MJW	Chk: PSB

Document: \\PLD2-FS1\Project\Projects\AFCEE\T01770009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\Griffiss_Site_Soil_GW_Sample_Locs_PFCs.mxd PDF: \\PLD2-FS1\Project\Projects\AFCEE\T01770009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\g_Working Source Docs\Figures\Figure 4-1 Soil Sample Locations.pdf 06/17/2015 4:10 PM brian.peters

A

A'

FPTA Pit Area

GRIFS-FT030P-001

GRIFS-FT030P-002
Offset 40' NW

GRIFS-FT030P-003
Offset 80' NE

GRIFS-FT030P-006
Offset 160' NW

GRIFS-FT030P-005
Offset 5' NE

GRIFS-FT030P-004
Offset 160' NE

GRIFS-FT030P-007
Offset 100' NW

GRIFS-FT030P-009
Offset 280' NW

GRIFS-FT030P-008

Fill

SM/SP

GM/GP

Storm Sewer
Catch Basin

Inferred invert depth of Storm Sewer
Offset 80' NE

Inferred invert depth of Storm Sewer
Offset 120' NE

Elevation (ft amsl)

105
100
95
90
85
80
75
70

Vertical Scale: 1" = 5'

Horizontal Scale: 1" = 100'

0 100 200

KEY

GP = poorly graded gravels, gravel-sand mixtures little or no fines

GM = silty gravels, gravel-sands-silt mixtures

SP = poorly graded sands, gravelly sands, little or no fines

SM = silty-sands, sand-silt mixtures

Legend

Well Screen

Boring

Groundwater Level
(18-Nov-14 and 19-Nov-14)

Storm Sewer

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Figure 4-2
Geologic Cross Section at FT030P
Site Investigation Report
Griffis Air Force Base, New York

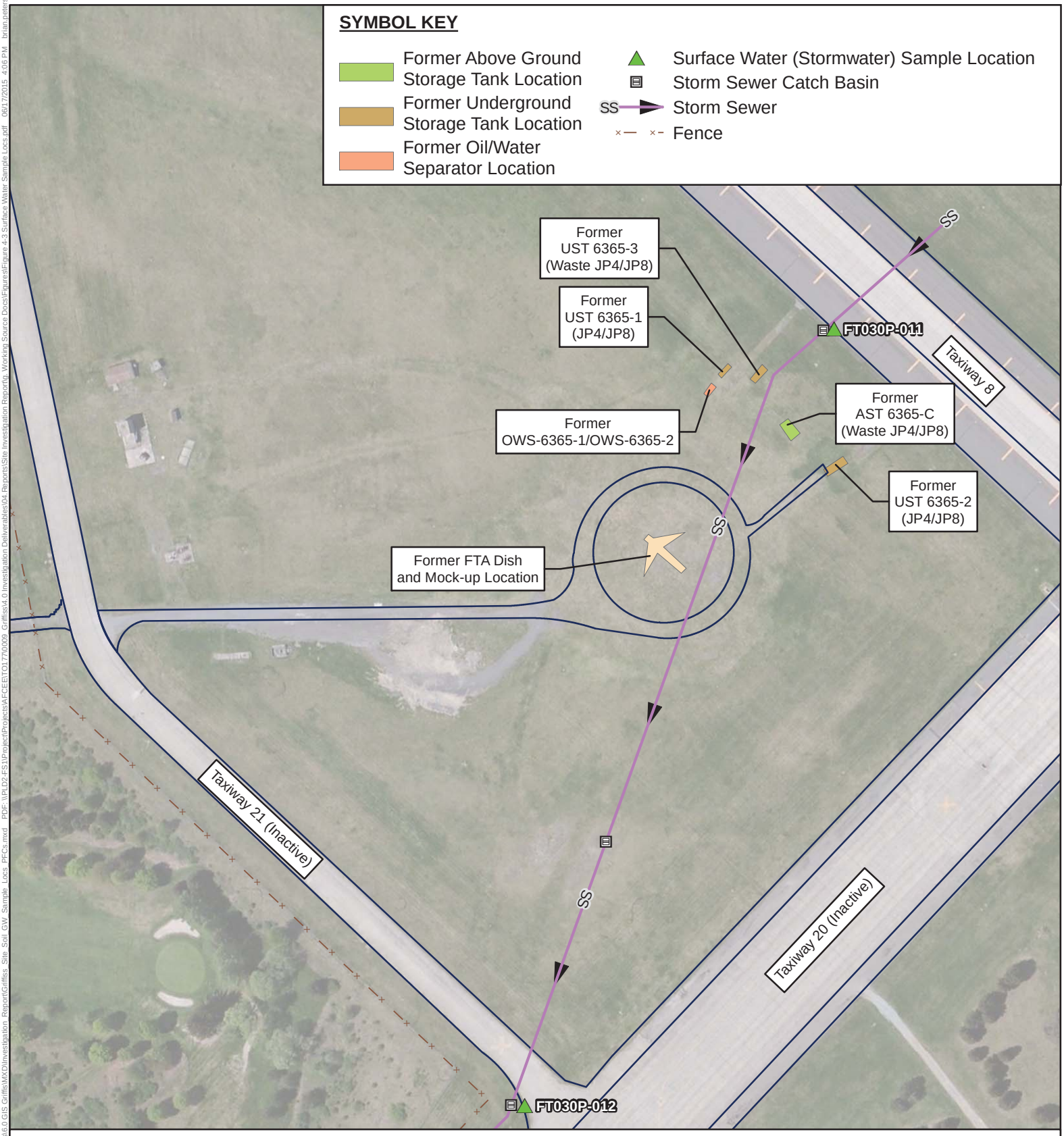
Horizontal Scale, 1" = 50'

0 50 100

Prepared/Date: JPH 4/15/15
Checked/Date: DL 4/15/15

PROJ: 775290177

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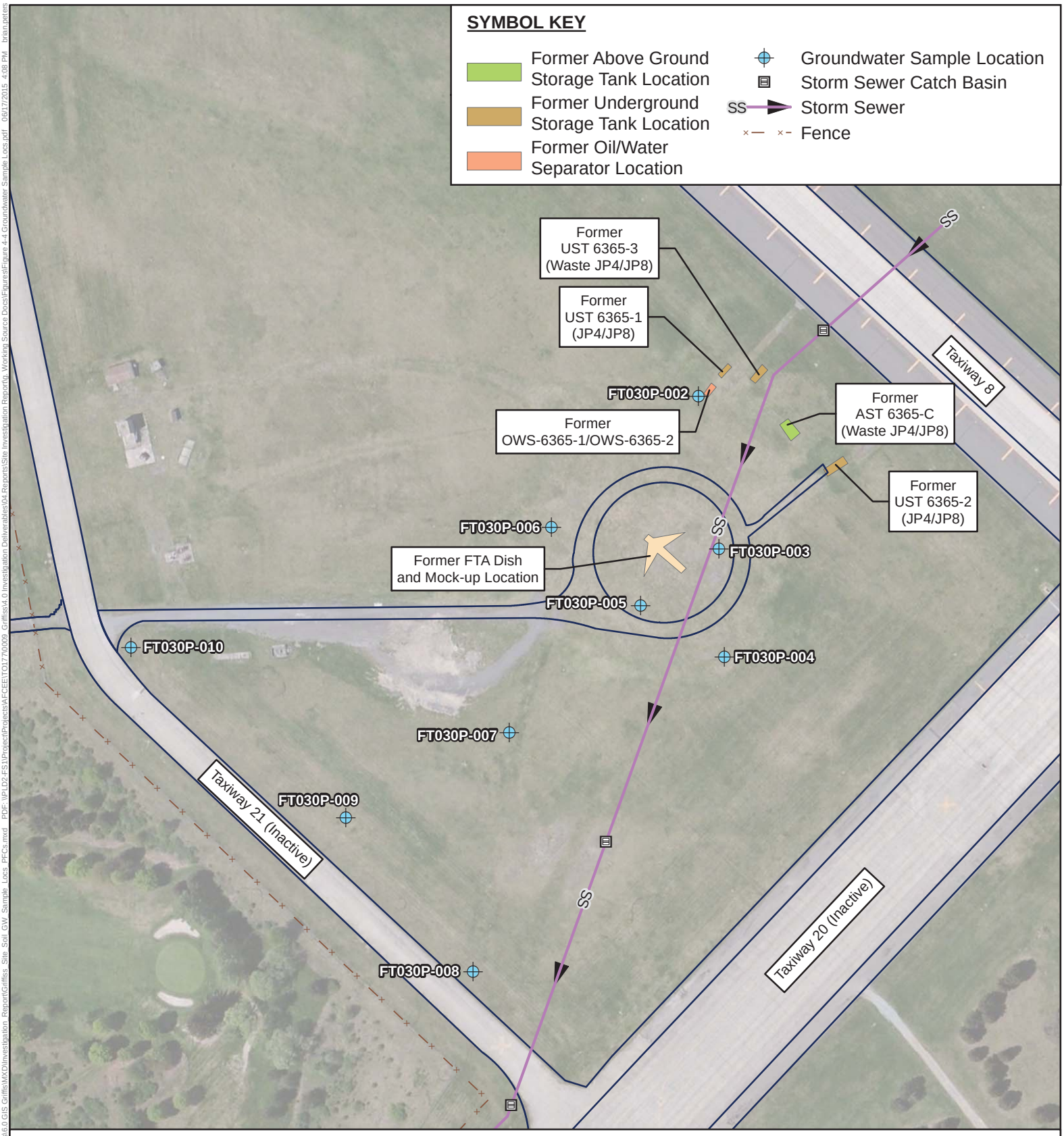
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FIGURE 4-3
Surface Water (Stormwater) Sample Locations
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/17/2015	Griffiss_Site_Soil_GW_Sample_Locs_PFCs	
PROJ: 775290177	Drawn: MJW	Chk: PSB

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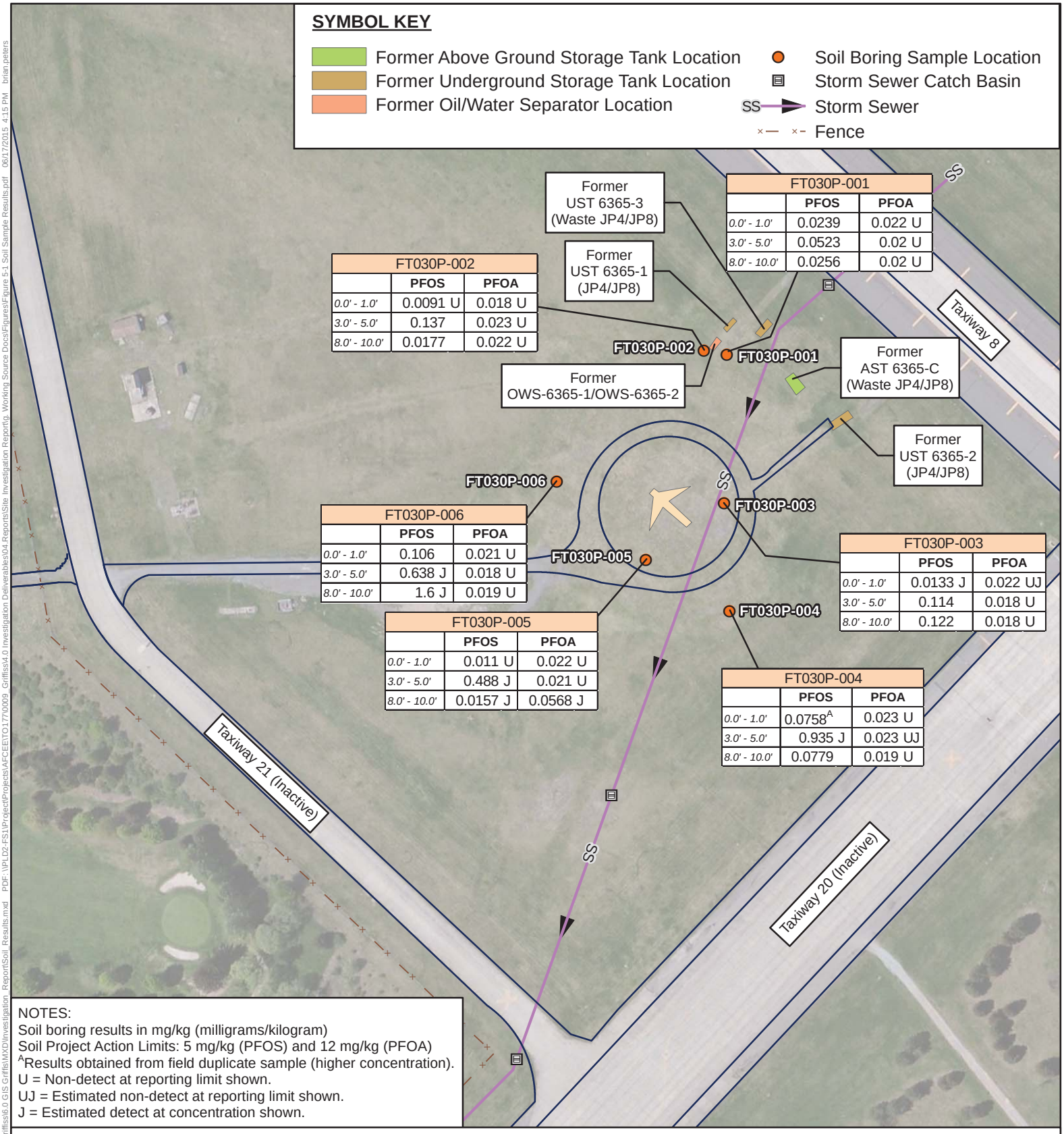
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FIGURE 4-4
Groundwater Sample Locations
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/17/2015	Griffiss_Site_Soil_GW_Sample_Locs_PFCs	
PROJ: 775290177	Drawn: MJW	Chk: PSB

Document: \\PLD2-FS1\Projects\AFCEE\T01770009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\Griffiss_Site_Soil_GW_Sample_Locs_PFCs.mxd PDF: \\PLD2-FS1\Projects\AFCEE\T01770009_Griffiss\4.0 Investigation Deliverables\04 Reports\Site Investigation Report\Fig_Working Source Docs\Figures\Figure 4-4 Groundwater Sample Locs.pdf 06/17/2015 4:08 PM brian.peters



FT030P-001	PFOS	PFOA
0.0' - 1.0'	0.0239	0.022 U
3.0' - 5.0'	0.0523	0.02 U
8.0' - 10.0'	0.0256	0.02 U

FT030P-002	PFOS	PFOA
0.0' - 1.0'	0.0091 U	0.018 U
3.0' - 5.0'	0.137	0.023 U
8.0' - 10.0'	0.0177	0.022 U

FT030P-003	PFOS	PFOA
0.0' - 1.0'	0.0133 J	0.022 UJ
3.0' - 5.0'	0.114	0.018 U
8.0' - 10.0'	0.122	0.018 U

FT030P-004	PFOS	PFOA
0.0' - 1.0'	0.0758[A]	0.023 U
3.0' - 5.0'	0.935 J	0.023 UJ
8.0' - 10.0'	0.0779	0.019 U

FT030P-005	PFOS	PFOA
0.0' - 1.0'	0.011 U	0.022 U
3.0' - 5.0'	0.488 J	0.021 U
8.0' - 10.0'	0.0157 J	0.0568 J

FT030P-006	PFOS	PFOA
0.0' - 1.0'	0.106	0.021 U
3.0' - 5.0'	0.638 J	0.018 U
8.0' - 10.0'	1.6 J	0.019 U

NOTES:
Soil boring results in mg/kg (milligrams/kilogram)
Soil Project Action Limits: 5 mg/kg (PFOS) and 12 mg/kg (PFOA)
[A]Results obtained from field duplicate sample (higher concentration).
U = Non-detect at reporting limit shown.
UJ = Estimated non-detect at reporting limit shown.
J = Estimated detect at concentration shown.

Source: 2011 Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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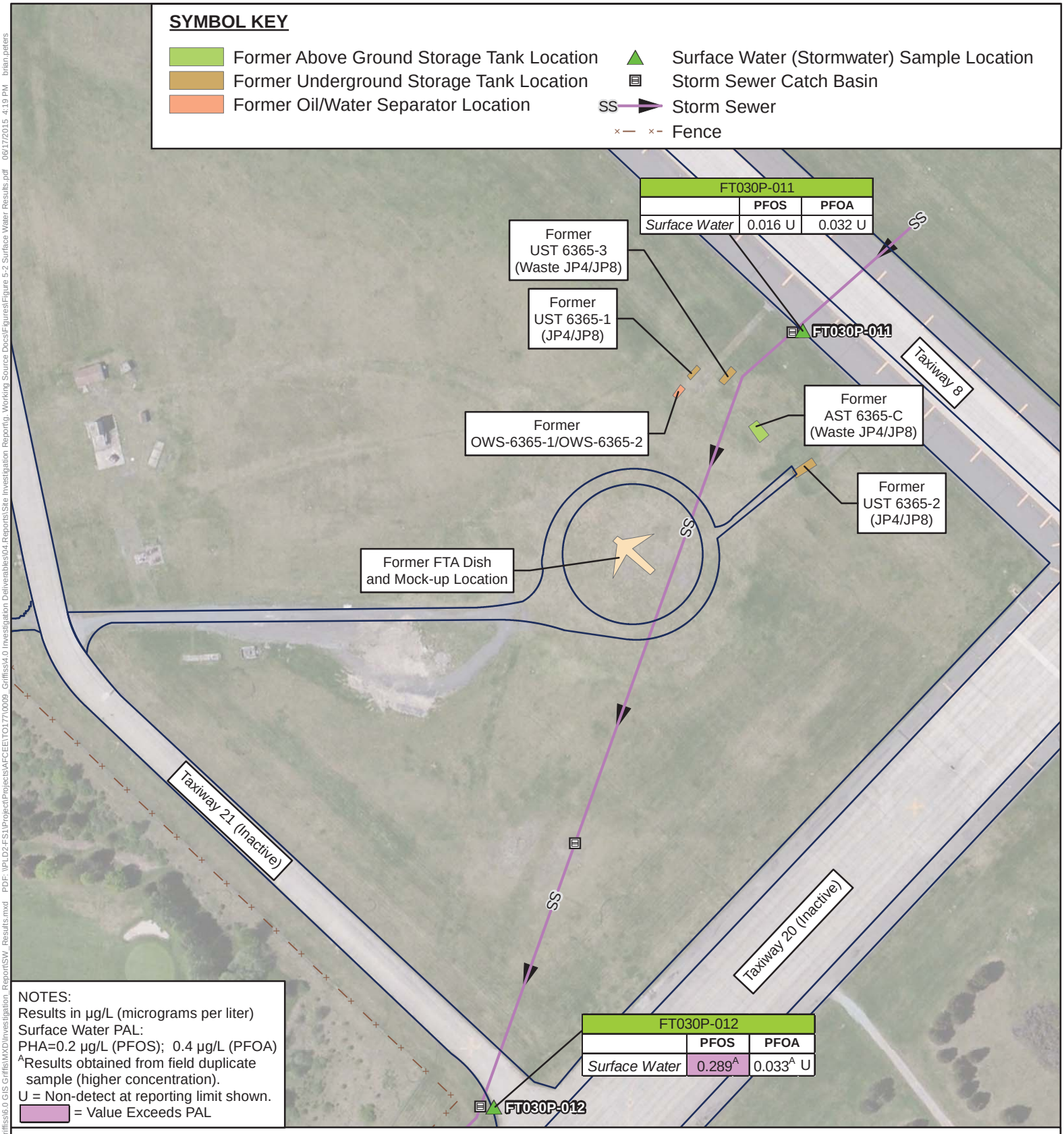
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FIGURE 5-1
Soil Boring Sampling Results - PFOS/PFOA
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

06/17/2015 | Soil_Results
PROJ: 775290177 | Drawn: BRP | Chk: PSB

Document: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\04.0 Investigation Deliverables\04 Reports\Site Investigation Report\g_Working Source Docs\Figures\Figure 5-1 Soil Sample Results.pdf 06/17/2015 4:15 PM brian.peters
PDF: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\Soil_Results.mxd



NOTES:
Results in µg/L (micrograms per liter)
Surface Water PAL:
PHA=0.2 µg/L (PFOS); 0.4 µg/L (PFOA)
[A]Results obtained from field duplicate sample (higher concentration).
U = Non-detect at reporting limit shown.
= Value Exceeds PAL

Source: 2011 Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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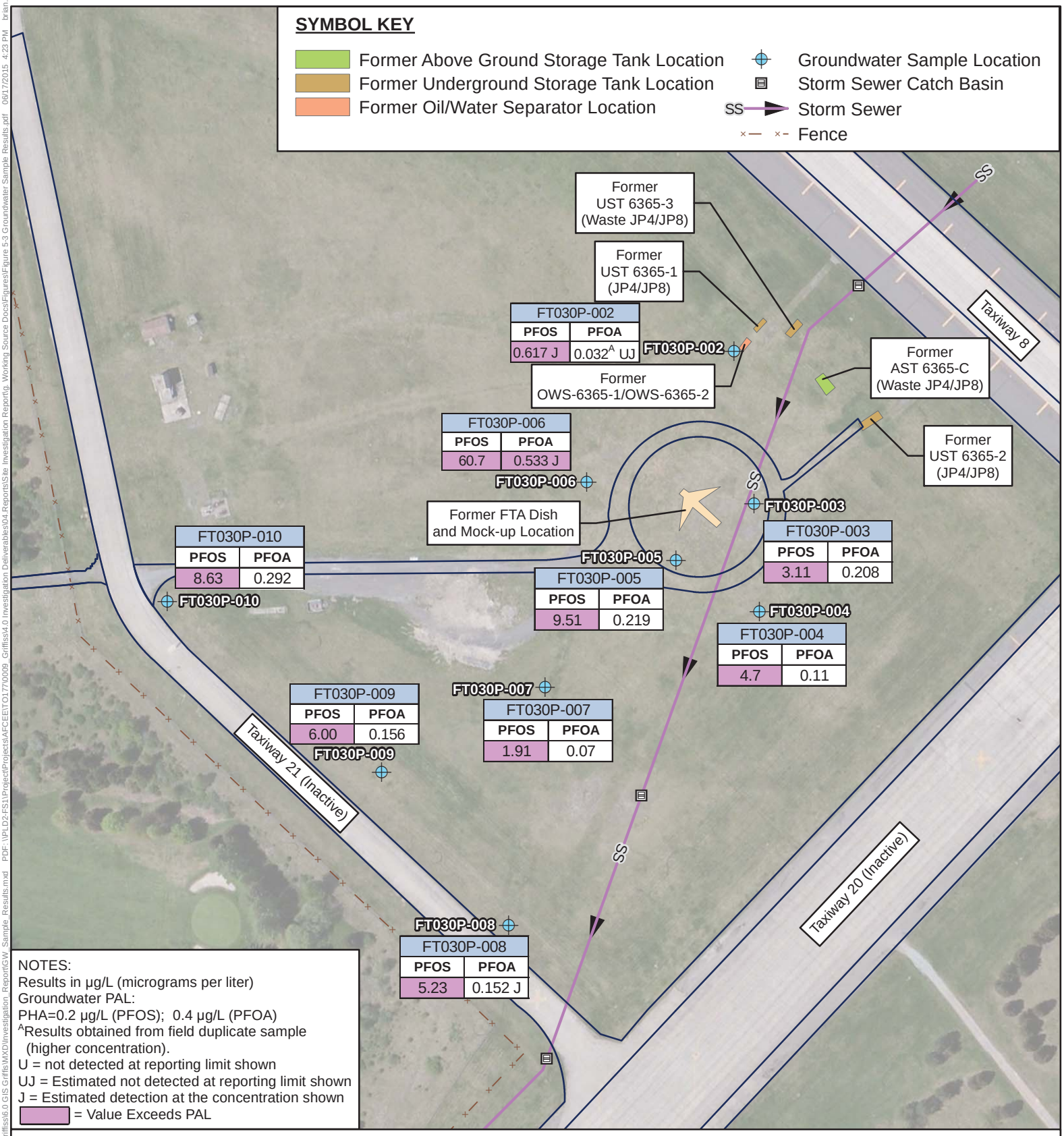
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FIGURE 5-2
Surface Water (Stormwater) Sampling Results - PFOS/PFOA
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

04/14/2015	SW_Results	
PROJ: 775290177	Drawn: BRP	Chk: PSB

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NOTES:
Results in µg/L (micrograms per liter)
Groundwater PAL:
PHA=0.2 µg/L (PFOS); 0.4 µg/L (PFOA)
[A]Results obtained from field duplicate sample (higher concentration).
U = not detected at reporting limit shown
UJ = Estimated not detected at reporting limit shown
J = Estimated detection at the concentration shown
= Value Exceeds PAL

Source: 2011 Aerial Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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FIGURE 5-3
Groundwater Sampling Results - PFOS/PFOA
Site Investigation Report
Former Griffiss Air Force Base
Rome, New York

0 25 50 100 150 200 250 Meters
0 200 400 600 800 Feet

04/14/2015	GW_Sample_Results	
PROJ: 775290177	Drawn: BRP	Chk: PSB

Document: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\6.0 GIS Griffiss\MXD\Investigation_Report\GW_Sample_Results.mxd PDF: \\PLD2-FS1\Project\Projects\AFCEE\TO17\700009_Griffiss\4.0 Investigation Deliverables\04.Reports\Site Investigation Report\g Working Source Docs\Figures\Figure 5-3 Groundwater Sample Results.pdf 06/17/2015 4:23 PM brian.peter

TABLES

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Table 1-1
Project Action Limits for PFOA and PFOS Analysis
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base

Method/Instrument	Media	Project Action Limits*
LC/MS/MS (USEPA Method 537 Modified)	Surface Water Groundwater	PFOS 0.2 µg/L PFOA 0.4 µg/L
LC/MS/MS (USEPA Method 537 Modified)	Soil Sediment	PFOS 5 mg/kg PFOA 12 mg/kg

Notes:

LC/MS/MS = Liquid Chromatogrphy and Tandem Mass Spectrometry

µg/L = micrograms per liter

mg/kg = milligrams per kilogram

Project Action Limits = Surface Water/Groundwater: USEPA Office of Water 2009 issued Provisional Health Advisories (PHA) for drinking water.

Project Action Limits = Soil/Sediment: USAF-calculated screening values for soils and sediment derived from Office of Superfund Remediation and Technology Innovation (OSRTI) residential and direct contact criteria.

*PFHxS, PFHpA, PFNA, and PFBS do not have established PALs and are therefore not included in this table.

Table 4-1
PFC Release Determination Sampling Summary
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

Site ID	Temporary Monitoring Well Installations	Soil Borings Advance	Soil	Ground water	Storm Sewer Water	Storm Sewer Sediment[d]	Laboratory-Supplied Water
FT030P	9	10	18	9	2	0	0
QA/QC Samples	Field Duplicates (1:10)		2	1	1	0	0
	Field Blank (1 per lot of lab supplied water)[a]		0	0	0	0	1
	Equipment Rinsates (1:10 each piece of sampling equipment)[b]		0	0	0	0	3
	MS/MSD (1:20)[c]		2	1	1	0	0
	Grand Totals		**22**	**11**	**4**	**0**	**4**

Notes:
ID = Identification
MS/MSD = Matrix spike/matrix spike duplicate
QA/QC = Quality Assurance/Quality Control
(a) Field blank is a sample of PFC-free water. One sample per batch of laboratory provided water was analyzed.
(b) Equipment rinsates are samples of water poured over sampling equipment to assess potential for cross-contamination. Or
(c) Additional sample volume was provided for MS/MSD analysis at a frequency of one sample for every 20 samples.
(d) Sediments were not collected.

Table 4-2
Surface Water Sampling Field Parameters
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

Location ID	Sample ID	Date	pH	Temperature (Celsius)	Specific Conductance (ms/CM)	Turbidity (ntu)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
FT030P-011	GRIFS-SW-001	19-Nov-14	6.4	12	0.21	3.4	6.3	200
FT030P-012	GRIFS-SW-002 GRIFS-SW-003	19-Nov-14	7.7	12	0.18	4.1	7.7	180

Notes:

ID = identification

mg/L = milligrams per liter

ms/CM = millisiems per centimeter

mv = millivolts

ntu = nephelometric turbidity unit

Table 4-3
Groundwater Sampling Field Parameters
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

Location ID	Sample ID	Date	Level (ft)	Purge Rate (ml/mn)	pH	Temp (Celsius)	Specific Conductance (ms/CM)	Turbidity (ntu's)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mv)
FT030P-002	GRIFS-GW-001 GRIFS-GW-002	18-Nov-14	11.68	100	6.1	8	0.19	7	5	-43
FT030P-003	GRIFS-GW-003	19-Nov-14	10.66	175	6.4	10	0.18	2.6	6.7	-60
FT030P-004	GRIFS-GW-004	19-Nov-14	10.61	200	6.3	10	0.15	4.7	6.1	-37
FT030P-005	GRIFS-GW-005	19-Nov-14	11.36	200	6.5	11	0.23	5.4	3.4	50
FT030P-006	GRIFS-GW-006	19-Nov-14	11.25	200	6.6	11	0.28	2.6	1.3	34
FT030P-007	GRIFS-GW-007	19-Nov-14	10.61	150	6.3	10	0.16	3.7	7.1	-34
FT030P-008	GRIFS-GW-008	19-Nov-14	14.3	200	6.3	11	0.13	15.1	7.4	56
FT030P-009	GRIFS-GW-009	19-Nov-14	14.61	200	6.4	10	0.16	2	7.4	-50
FT030P-010	GRIFS-GW-010	19-Nov-14	14.49	150	6.4	9	0.14	6.4	7	-60

Notes:

ft = feet

ID = Identification

mg/L = milligrams per liter

ml/min = milliliters per minute

ms/CM = millisiems per centimeter

mv = millivolts

ntu = nephelometric turbidity unit

Table 4-4
Groundwater Elevations
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

Location ID	Northing	Easting	Screen Depths (ft bgs)	Depth to Water (ft bgs)	Relative Ground Elevation (ft)	Relative Water Elevation (ft)
FT030P-002	1130301.135	1182165.755	7-17	11.68	101.39	89.71
FT030P-003	1130332.384	1181930.348	7-17	10.66	100.65	89.99
FT030P-004	1130340.718	1181763.681	7-17	10.61	100.48	89.87
FT030P-005	1130211.551	1181842.848	7-17	11.36	101.12	89.76
FT030P-006	1130074.051	1181963.681	7-17	11.25	100.18	88.93
FT030P-007	1130000.468	1181647.015	7-17	10.61	99.29	88.68
FT030P-008[a]	1129953.218	1181278.265	7-17	14.80	100.00	85.20
FT030P-009	1129757.385	1181515.765	8-18	14.61	100.64	86.03
FT030P-010	1129426.134	1181778.265	8-18	14.49	101.04	86.55

Notes:

ID = Identification

ft = feet

bgs = below ground surface

[a] = reference point for survey: 100.00 ft

Table 5-1
Summary of Soil Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	5	12
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
FT030P-001-SB	GRIFS-SO-001	17-Nov-14	0.0-1.0	N	0.011 U	0.011 U	0.011 U	0.011 U	0.0239	0.022 U
	GRIFS-SO-002	17-Nov-14	3.0-5.0	N	0.01 U	0.01 U	0.01 U	0.01 U	0.0523	0.02 U
	GRIFS-SO-003	17-Nov-14	8.0-10.0	N	0.01 U	0.01 U	0.01 U	0.01 U	0.0256	0.02 U
FT030P-002-SB	GRIFS-SO-004	17-Nov-14	0.0-1.0	N	0.0091 U	0.0091 U	0.0091 U	0.0091 U	0.0091 U	0.018 U
	GRIFS-SO-005	17-Nov-14	3.0-5.0	N	0.012 U	0.012 U	0.012 U	0.012 U	0.137	0.023 U
	GRIFS-SO-006	17-Nov-14	8.0-10.0	N	0.011 U	0.011 U	0.011 U	0.011 U	0.0177	0.022 U
FT030P-003-SB	GRIFS-SO-007	17-Nov-14	0.0-1.0	N	0.011 U	0.011 UJ	0.011 U	0.011 UJ	0.0133 J	0.022 UJ
	GRIFS-SO-008	17-Nov-14	3.0-5.0	N	0.0089 U	0.0089 U	0.0089 U	0.0089 U	0.114	0.018 U

Notes:
FD = Field Duplicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
mg/kg = milligrams per kilogram
UJ = Estimated non-detect at reporting limit shown.

Project Action Limit = USAF-calculated screening values for soils and sediments derived from Office of Superfund Remediation and Technology Innovation residential and direct contact criteria.

Table 5-1
Summary of Soil Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	5	12
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
FT030P-003-SB	GRIFS-SO-009	17-Nov-14	8.0-10.0	N	0.009 U	0.009 U	0.009 U	0.009 U	0.122	0.018 U
FT030P-004-SB	GRIFS-SO-010	18-Nov-14	0.0-1.0	N	0.011 U	0.011 U	0.011 U	0.011 U	0.0565	0.023 U
	GRIFS-SO-011	18-Nov-14	0.0-1.0	FD	0.011 U	0.011 U	0.011 U	0.011 U	0.0758	0.022 U
	GRIFS-SO-012	18-Nov-14	3.0-5.0	N	0.011 U	0.011 UJ	0.0162	0.011 UJ	0.935 J	0.023 UJ
	GRIFS-SO-013	18-Nov-14	8.0-10.0	N	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0779	0.019 U
FT030P-005-SB	GRIFS-SO-014	18-Nov-14	0.0-1.0	N	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.022 U
	GRIFS-SO-015	18-Nov-14	3.0-5.0	N	0.01 U	0.01 U	0.01 U	0.01 U	0.488 J	0.021 U
	GRIFS-SO-016	18-Nov-14	8.0-10.0	N	0.0097 U	0.0097 UJ	0.153	0.0097 UJ	0.0157 J	0.0568 J

Notes:
FD = Field Duplicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
mg/kg = milligrams per kilogram
UJ = Estimated non-detect at reporting limit shown.

Project Action Limit = USAF-calculated screening values for soils and sediments derived from Office of Superfund Remediation and Technology Innovation residential and direct contact criteria.

Table 5-1
Summary of Soil Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	5	12
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
FT030P-006-SB	GRIFS-SO-017	18-Nov-14	0.0-1.0	N	0.01 U	0.01 U	0.01 U	0.01 U	0.106	0.021 U
	GRIFS-SO-018	18-Nov-14	3.0-5.0	N	0.0091 U	0.0091 U	0.0091 U	0.0091 U	0.638 J	0.018 U
	GRIFS-SO-019	18-Nov-14	8.0-10.0	N	0.0093 U	0.0093 U	0.00748 J	0.0093 U	1.6 J	0.019 U
	GRIFS-SO-020	18-Nov-14	8.0-10.0	FD	0.0094 U	0.0094 U	0.00618 J	0.0094 U	1.39 J	0.019 U

Notes:
FD = Field Duplicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
mg/kg = milligrams per kilogram
UJ = Estimated non-detect at reporting limit shown.

Project Action Limit = USAF-calculated screening values for soils and sediments derived from Office of Superfund Remediation and Technology Innovation residential and direct contact criteria.

Table 5-2
Summary of Storm Sewer Water Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	0.2	0.4
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FT030P-011	GRIFS-SW-001	19-Nov-14	0.0-0.0	N	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.032 U
FT030P-012	GRIFS-SW-002	19-Nov-14	0.0-0.0	N	0.016 U	0.0113 J	0.135	0.016 U	**0.285**	0.032 U
	GRIFS-SW-003	19-Nov-14	0.0-0.0	FD	0.017 U	0.0115 J	0.137	0.017 U	**0.289**	0.033 U

Notes:
Purple Shaded = Exceeds Project Action Limit
FD = Field Duplicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
µg/L = micrograms per liter

Project Action Limit = USEPA Office of Water, 2009, Provisional Health Advisories (PHAs) for drinking water.

Table 5-3
Summary of Groundwater Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	0.2	0.4
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FT030P-002-MW	GRIFS-GW-001	18-Nov-14	11.0	N	0.017 U	0.0102 J	0.0683 J	0.017 UJ	**0.617 J**	0.0236 J
	GRIFS-GW-002	18-Nov-14	11.0	FD	0.016 U	0.016 UJ	0.016 UJ	0.016 UJ	0.016 UJ	0.032 UJ
FT030P-003-MW	GRIFS-GW-003	19-Nov-14	11.0	N	0.163	0.0715	1.27	0.016 U	**3.11**	0.208
FT030P-004-MW	GRIFS-GW-004	19-Nov-14	11.0	N	0.032 U	0.0735	0.598	0.032 U	**4.7**	0.11
	GRIFS-GW-004_SS	19-Nov-14	11.0	FR	0.0154	0.0545	0.29 J	0.00428 J	**3.59 J**	0.0743
FT030P-005-MW	GRIFS-GW-005	19-Nov-14	11.0	N	0.192	0.135	1.62	0.08 U	**9.51**	0.219
FT030P-006-MW	GRIFS-GW-006	19-Nov-14	11.0	N	0.7	0.444	4.7	0.32 U	**60.7**	**0.533 J**
FT030P-007-MW	GRIFS-GW-007	19-Nov-14	11.0	N	0.0248	0.0472	0.413	0.0102 J	**1.91**	0.07

Notes:
Purple Shaded = Exceeds Project Action Limit
FD = Field Duplicate Sample
FR = Field Replicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
µg/L = micrograms per liter
UJ = Estimated non-detect at reporting limit shown.

Project Action Limit = USEPA Office of Water, 2009, Provisional Health Advisories (PHAs) for drinking water.

Table 5-3
Summary of Groundwater Analytical Testing Results
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base, New York

				Analyte:	Perfluorobutanesulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)
				Project Action Limit:	NA	NA	NA	NA	0.2	0.4
Location	**Sample ID**	**Sample Date**	**Sample Depth (ft.)**	**Sample Type**	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FT030P-008-MW	GRIFS-GW-008	19-Nov-14	11.0	N	0.083 U	0.0834 J	1.07	0.083 U	**5.23**	0.152 J
FT030P-009-MW	GRIFS-GW-009	19-Nov-14	11.0	N	0.0893	0.0926	1.01	0.0291 J	**6.00**	0.156
FT030P-010-MW	GRIFS-GW-010	19-Nov-14	11.0	N	0.0989 J	0.198	1.75	0.0585 J	**8.63**	0.292

Notes:
Purple Shaded = Exceeds Project Action Limit
FD = Field Duplicate Sample
FR = Field Replicate Sample
ft = Feet
ID = Identification
J = Estimated detect at concentration shown.
N = Normal Field Sample
NA = Not applicable
U = Non-detect at reporting limit shown.
µg/L = micrograms per liter
UJ = Estimated non-detect at reporting limit shown.

Project Action Limit = USEPA Office of Water, 2009, Provisional Health Advisories (PHAs) for drinking water.

Table 6-1
Conceptual Site Model Summary
PFC Release Determination
Site Investigation Report, Former Griffiss Air Force Base

Facility Profile	Physical Profile	Release Profile	Land Use and Exposure Profile	Ecological Profile
Installation Description: • Years of operation: 1942 – 1998 (*last three years as an Air National Guard Base)*. • Former Griffiss AFB ~ 3,552 acres. • Investigation Area ~ 8 acres. • Activities at the former base included activities dedicated primarily to two specific goals: (1) national defense (fighter and bomber missions) and (2) the research, testing and development of sophisticated electronic communication systems and the associated support activities. • Primary mission of the former Griffiss AFB was the maintenance and implementation of both air refueling operations and long-range bombardment capability (Air Force Logistics Command, Strategic Air Command, and Air Combat Command). **FT030P History:** • Located just west of the Taxiway 8, near the northwestern end of the main runway. • The FT030P was used from the 1960s through 1995. • Petroleum fires were set for burning and extinguishing practice approximately three times per year. • Prior to 1985, fire training activities occurred on bare soil. In 1985, fuel-contaminated soil was removed and a new clay lined concrete basin with a mock aircraft was constructed. A JP-4 UST was used to supply fuel through an underground pipeline to ignite fire. An O/WS was used to collect waste liquids generated during fire training. • The entire concrete basin, covering gravel, and surrounding asphalt along with impacted soils were removed in 1998. In 1999, remaining O/WSs, tanks, and superficial contaminated soils were removed and land farmed on Apron 1 and Apron 2 along with other contaminated soil from across the installation. The treated	**Site Characteristics:** • FT030P is ~ 8 acres. **Topography:** • The installation is relatively flat. • FT030P is relatively flat with a maximum relief of less than 1 ft. • Approximate site elevation is 490 ft above mean sea level. **Vegetation:** • FT030P has low grass vegetation. **Surface Water:** • FT030P is not located near natural surface drainage features. The Mohawk River is located approximately 3,900 ft west of the site. • Runoff is channeled into the base storm drain system which discharges to the Mohawk River. **Soils:** • Soils at FT030P are generally sand and gravel with varying amounts of silt and clay. **Geology:** • Bedrock at FT030P is encountered at approximately 30 ft below ground surface (bgs) and comprises Utica Shale, a gray and black carbonaceous unit with a high/medium organic content. • Deposits lying above the Utica Shale consist of clay, silt, sand, and gravel sediments laid down by glacial, fluvial, and lacustrine processes. A sheet of glacial till overlies the Utica Shale. Bedrock beneath the former AFB generally dips from the northeast to the southwest. **Hydrogeology:** • Depth to groundwater ranges from 11 to 16 ft bgs. • Unconfined conditions occur within the unconsolidated aquifer. • Groundwater flow is southwesterly towards the Mohawk River. • Hydraulic conductivity: 4.17×10^{-3} ft/minute. Hydraulic gradient: 0.008 ft/ft. Groundwater flow rate: 88 ft/year. **Meteorology:** • Average Annual Rainfall = 46 inches (in) per year. • Average rainfall per month is approximate 3.75 in with no distinct wet and dry season. • Continental climate characterized by warm, humid, moderately wet summers and cold winters with moderately heavy snowfalls. Average high temperature: 56°F. Average low temperature: 37°F.	**Contaminants of Potential Concern:** • PFCs are the contaminants of potential concern. • Fuel-related compounds and chlorinated solvents are historic site contaminants. **Media of Potential Concern:** • Soil, groundwater, surface water run-off and sediment. **Confirmed AFFF Releases:** • PFCs are present in soil, groundwater, and water in storm sewer at FT030P. **Primary Releases from FTA** • PFCs have been adsorbed in soil particles and remain close to the source. • PFCs have been released onto the ground and have leached through the soil into groundwater. **Secondary Releases:** • Surface runoff or infiltrating groundwater has transported PFCs to the storm sewer.	**Current Landowners:** • Griffiss International Airport is owned and operated by Oneida County, New York. **Current Land Use:** • FT030P site is currently part of the Griffiss International Airport. **Future Land Use:** • Land use is not expected to change in the future. • Current land use controls for site FT030P have been approved for removal as part of the Site Closeout Report/ Recommendation. **Potential Receptors:** • PFCs have been potentially released into the Mohawk River via the storm sewer. • Potential receptors associated with current and future land use include ground maintenance workers, utility workers, industrial workers, construction workers, trespasser and biota. However current trespasser receptor to FT030P would occur inside a	**Potential Ecological Receptors:** • Inland plant species, reptiles, birds, soil invertebrates, and mammals that inhabit or migrate through the site. • Fish in Mohawk River. **Threatened and Endangered Species:** • Though some plant species present at the base are protected in the state of New York, these species have not been found in this portion of the base. Therefore, threatened or endangered species are not considered to be a concern at FT030P.

Facility Profile	Physical Profile	Release Profile	Land Use and Exposure Profile	Ecological Profile
soil was then used as backfill across the installation; since these soils were excavated from the FTA, the soil may be impacted with PFCs. The final reuse of FTA soils was not documented. • Non-PFC site contaminants were addressed under a separate Record of Decision and included land use controls for soil vapor intrusion. The site has been closed out as of March 2015 with unrestricted use.			fenced area, controlled and monitored by the Griffiss Airport Authorities. • Groundwater flows west – southwest from the site towards the Mohawk Glen Golf Course and residential neighborhood west of FT030P. Municipal water serves the base and much of the surrounding residential properties. The presence/location of private wells in the vicinity of the base as a primary or secondary water supply is unknown. Groundwater is likely discharging to the Mohawk River potentially affecting human and biota receptors. • The storm sewer at FT030P flows southwest and discharges into the Mohawk River potentially affecting human and biota receptors.	

APPENDIX A

FIELD FORMS

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APPENDIX A-1

DAILY HEALTH AND SAFETY TAILGATE FORM

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AMEC Environment and Infrastructure
Tailgate Safety Meeting Report

Check One:

☑ Initial Kickoff Safety Meeting ☐ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: 11/17/14 Site: Griffis

Field Manager: Mike Lounsbury *(print)* Site Health and Safety Coordinator: Danielle Lerner *(print)*

Order of Business

Topics Discussed (check all that apply):

- ☑ Site History/Site Layout
- ☑ Scope of Work
- ☑ Personnel Responsibilities
- ☑ Medical Surveillance Requirements
- ☑ Training Requirements
- ☑ Safe Work Practices
- ☑ Logs, Reports, Recordkeeping
- ☑ Sanitation and Illumination
- ☑ Air Surveillance Type and Frequency
- ☑ Monitoring Instruments and Personal Monitoring
- ☑ Action Levels
- ☑ Accident Reporting Procedures
- ☑ Site Control (visitor access, buddy system, work zones, security, communications)
- ☑ Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- ☑ Engineering Controls
- ☑ PPE Required/PPE Used
- ☑ Define PPE Levels, Donning, Doffing Procedures
- ☑ Physical Hazards and Controls (e.g., overhead utility lines)
- ☑ Decontamination Procedures for Personnel and Equipment
- ☑ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☑ Site/Regional Emergency Procedures (e.g., earthquake response, typhoon response, etc.)
- ☑ Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- ☑ Hazardous Materials Spill Procedures
- ☑ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☑ Injury/Illness Reporting Procedures
- ☑ Route to Hospital and Medical Care Provider Visit Guidelines
- ☑ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: Slips, trips, falls - cold and wet weather. Be aware of your surroundings and be safe

Action taken on previous suggestions: N/A

Injuries/accidents/personnel changes since previous meeting: N/A

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report *(continued)*

Observations of unsafe work practices/conditions that have developed since previous meeting: N/A

Location of (or changes in the locations of) evacuation routes/safe refuge areas: N/A

Additional comments: None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Name (print)	Company	Signature
Stefan Tres	Aztec	
Ray Hrymoc	AZTech	
David Farnsworth	AFCEC	
Danielle Lerner	AMEC	

Meeting conducted by: Danielle Lerner *(print)* Title: Staff Scientist

Signature: Time: 0915

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report

Check One:

☐ Initial Kickoff Safety Meeting ☑ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: 11/18/14 Site: Griffis

Field Manager: Mike Lounsbury *(print)* Site Health and Safety Coordinator: Danielle Lerner *(print)*

Order of Business

Topics Discussed (check all that apply):

- ☐ Site History/Site Layout
- ☐ Scope of Work
- ☐ Personnel Responsibilities
- ☐ Medical Surveillance Requirements
- ☐ Training Requirements
- ☒ Safe Work Practices
- ☐ Logs, Reports, Recordkeeping
- ☐ Sanitation and Illumination
- ☐ Air Surveillance Type and Frequency
- ☐ Monitoring Instruments and Personal Monitoring
- ☐ Action Levels
- ☐ Accident Reporting Procedures
- ☐ Site Control (visitor access, buddy system, work zones, security, communications)
- ☐ Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- ☐ Engineering Controls
- ☒ PPE Required/PPE Used
- ☒ Define PPE Levels, Donning, Doffing Procedures
- ☐ Physical Hazards and Controls (e.g., overhead utility lines)
- ☐ Decontamination Procedures for Personnel and Equipment
- ☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☐ Site/Regional Emergency Procedures (e.g., earthquake response, typhoon response, etc.)
- ☐ Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- ☐ Hazardous Materials Spill Procedures
- ☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☐ Injury/Illness Reporting Procedures
- ☐ Route to Hospital and Medical Care Provider Visit Guidelines
- ☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: Slips, trips, falls – stay warm in freezing weather

Action taken on previous suggestions: none

Injuries/accidents/personnel changes since previous meeting: None

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report *(continued)*

Observations of unsafe work practices/conditions that have developed since previous meeting: None

Location of (or changes in the locations of) evacuation routes/safe refuge areas: N/A

Additional comments: None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Name (print)	Company	Signature
Greg Gangness	AFCEC/CIB	
Rob Sieg	AMEC	
	AFCEC	David Farnsworth
Danielle Lerner	AMEC	
Ray Hammond	AMEC	
Stefan Treu	Aztec	
Michael A. Lourey	AMEC	

Meeting conducted by: Danielle Lerner *(print)* Title: Staff Scientist

Signature: Time: 0725

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report

Check One:

☐ Initial Kickoff Safety Meeting ☑ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: 11/19/14 Site: Griffis

Field Manager: Mike Counsbury (print) Site Health and Safety Coordinator: Danielle Lerner (print)

Order of Business

Topics Discussed (check all that apply):

- ☐ Site History/Site Layout
- ☑ Scope of Work
- ☐ Personnel Responsibilities
- ☐ Medical Surveillance Requirements
- ☐ Training Requirements
- ☑ Safe Work Practices
- ☐ Logs, Reports, Recordkeeping
- ☐ Sanitation and Illumination
- ☐ Air Surveillance Type and Frequency
- ☐ Monitoring Instruments and Personal Monitoring
- ☐ Action Levels
- ☐ Accident Reporting Procedures
- ☐ Site Control (visitor access, buddy system, work zones, security, communications)
- ☐ Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- ☐ Engineering Controls
- ☑ PPE Required/PPE Used
- ☐ Define PPE Levels, Donning, Doffing Procedures
- ☐ Physical Hazards and Controls (e.g., overhead utility lines)
- ☐ Decontamination Procedures for Personnel and Equipment
- ☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☐ Site/Regional Emergency Procedures (e.g., earthquake response, typhoon response, etc.)
- ☐ Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- ☐ Hazardous Materials Spill Procedures
- ☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☐ Injury/Illness Reporting Procedures
- ☐ Route to Hospital and Medical Care Provider Visit Guidelines
- ☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: Slips, trips, falls, - safe work practices in cold weather.

Action taken on previous suggestions: none

Injuries/accidents/personnel changes since previous meeting: None

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report *(continued)*

Observations of unsafe work practices/conditions that have developed since previous meeting: None

Location of (or changes in the locations of) evacuation routes/safe refuge areas: N/A

Additional comments: None

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Name (print)	Company	Signature
Stefan Trvex	Aztec	
Raymond Hammond	Aztec	
Danielle Lerner	AMEC	
Greg Gugino	AFCEC/CIB	
David Farnsworth	AFCEC	
Michael H Lawley	AMEC	

Meeting conducted by: Danielle Lerner *(print)* Title: Staff Scientist

Signature: Time: 0120

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report

Check One:

☐ Initial Kickoff Safety Meeting ☑ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: 11/20/19 Site: Griffis

Field Manager: Michael Lounsbury (print) Site Health and Safety Coordinator: Danielle Lerner (print)

Order of Business

Topics Discussed (check all that apply):

- ☐ Site History/Site Layout
- ☑ Scope of Work
- ☑ Personnel Responsibilities
- ☐ Medical Surveillance Requirements
- ☐ Training Requirements
- ☑ Safe Work Practices
- ☐ Logs, Reports, Recordkeeping
- ☐ Sanitation and Illumination
- ☐ Air Surveillance Type and Frequency
- ☐ Monitoring Instruments and Personal Monitoring
- ☐ Action Levels
- ☐ Accident Reporting Procedures
- ☐ Site Control (visitor access, buddy system, work zones, security, communications)
- ☐ Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
- ☐ Engineering Controls
- ☐ PPE Required/PPE Used
- ☐ Define PPE Levels, Donning, Doffing Procedures
- ☐ Physical Hazards and Controls (e.g., overhead utility lines)
- ☐ Decontamination Procedures for Personnel and Equipment
- ☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
- ☐ Site/Regional Emergency Procedures (e.g., earthquake response, typhoon response, etc.)
- ☐ Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
- ☐ Hazardous Materials Spill Procedures
- ☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
- ☐ Injury/Illness Reporting Procedures
- ☐ Route to Hospital and Medical Care Provider Visit Guidelines
- ☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: Slips, trips, falls, cold weather safety

Action taken on previous suggestions: none

Injuries/accidents/personnel changes since previous meeting: none

AMEC Environment and Infrastructure
Tailgate Safety Meeting Report *(continued)*

Observations of unsafe work practices/conditions that have developed since previous meeting: none

Location of (or changes in the locations of) evacuation routes/safe refuge areas: N/A

Additional comments: none

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Name (print)	Company	Signature
Michael H. Lumsden	AMEC	
Danielle Lerner	AMEC	

Meeting conducted by: Danielle Lerner *(print)* Title: Staff Scientist

Signature: Time: 0705

APPENDIX A-2

DAILY PFC CHECKLIST

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Attachment 1 to SOP AMEC-01
Daily PFC Protocol Checklist

Date: 11/17/14 Installation Name: Griffis AFB

Weather (*temp./precipitation*): 33°F, mix of rain, sleet, snow Site Name: FT030P

Field Clothing and PPE:

- ☑ No clothing or boots containing Gore-Tex™
- ☑ All safety boots made from polyurethane and PVC
- ☑ No materials containing Tyvek®
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☑ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☑ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☑ No waterproof field books on-site
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-It Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☑ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- ☑ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☑ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- ☑ "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- ☑ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the site.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Field Manager Name: Michael Lounsbury

Field Manager Signature: [signature] Time: 0915

Attachment 1 to SOP AMEC-01
Daily PFC Protocol Checklist

Date: 11/18/14 Installation Name: Griffis AFB

Weather (*temp./precipitation*): 23°F, windy, snowing on and off Site Name: FT030P

Field Clothing and PPE:

- ☑ No clothing or boots containing Gore-Tex™
- ☑ All safety boots made from polyurethane and PVC
- ☑ No materials containing Tyvek®
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☑ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☑ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☑ No waterproof field books on-site
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-It Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☑ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- ☑ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☑ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- ☑ "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- ☑ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the site.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Field Manager Name: Michael Lounsbury

Field Manager Signature: [signature] Time: 0725

Attachment 1 to SOP AMEC-01
Daily PFC Protocol Checklist

Date: 11/19/14 Installation Name: Griffis AFB

Weather (*temp./precipitation*): 20°F, partly cloudy Site Name: FT030P

Field Clothing and PPE:

- ☑ No clothing or boots containing Gore-Tex™
- ☑ All safety boots made from polyurethane and PVC
- ☑ No materials containing Tyvek®
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☑ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☑ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☑ No waterproof field books on-site
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-It Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☑ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- ☑ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☑ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- ☑ "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- ☑ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the site.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Field Manager Name: Michael Lounsbury

Field Manager Signature: [signature] Time: 0720

Attachment 1 to SOP AMEC-01
Daily PFC Protocol Checklist

Date: 11/20/14 Installation Name: Griffis AFB

Weather (*temp./precipitation*): 28°F, snowing slightly on and off Site Name: FT030P

Field Clothing and PPE:

- ☑ No clothing or boots containing Gore-Tex™
- ☑ All safety boots made from polyurethane and PVC
- ☑ No materials containing Tyvek®
- ☑ Field crew has not used fabric softener on clothing
- ☑ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☑ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☑ No Teflon® containing materials on-site
- ☑ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☑ No waterproof field books on-site
- ☑ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☑ No adhesives (Post-It Notes) on-site
- ☑ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☑ All sample containers made of HDPE or polypropylene. Samples are not stored in containers made of LDPE
- ☑ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☑ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- ☑ "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- ☐ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☑ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Manager shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance. Repeated failure to comply with PFC sample protocols will result in the permanent removal of worker(s) from the site.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

Field Manager Name: Michael Lounsbury

Field Manager Signature: [signature] Time: 0705

APPENDIX A-3

WATER QUALITY METER CALIBRATION

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Calibration Form

PFCs Release Determination at Multiple BRAC Bases
Contract FA8903-08-8766 Task Order 0177

Project Number: 775290177.0009.0300B

Instrument: YSI 556
HACH 2100 Q

Installation/Site: Griffis AFB

		Before Calibration							After Calibration							
Date	Time (24hr)	pH (SU)	Conductivity (mS/m)	Turbidity (NTU)	Temp (C)	D.O. (mg/L)	Salinity (%)	ORP/Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	Temp (C)	D.O. (mg/L)	Salinity (%)	ORP/Eh (mV)	Initials of Person Calibrating
11/18/14	1300	7.00	1.00	9.64	8.76	9.64	NM	238	7.00	1.00	9.93	9.00	11.25	NM	238	MHL
		4.01				12.32		247.8	4.00							
11/19/14	—	6.72	1048	6.52	8.46	11.31	—	237.4	7.00	1.00	9.30	9.47	10.92	—	238.6	MHL
		4.21							4.00						2	

Calibration Form

PFCs Release Determination at Multiple BRAC Bases
Contract FA8903-08-8766 Task Order 0177

Project Number: 775290177.0009.0300B

Instrument: HACH 2100Q 13120C029987 YSI 556 MPS 09F100834

Installation/Site: Griffis AFB

		Before Calibration							After Calibration							
Date	Time (24hr)	pH (SU)	Conductivity (mS/m)	Turbidity (NTU)	Temp (C)	D.O. (mg/L)	Salinity (%)	ORP/Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	Temp (C)	D.O. (mg/L)	Salinity (%)	ORP/Eh (mV)	Initials of Person Calibrating
11/19/14	0745	7.00	1.070	10.0	6.5	~~11.60~~ 11.95	NA	261.6	7.00	1.000	10.3	6.87	12.07	NA	238.8	DL
		4.00							4.01		~~10~~ 09					

APPENDIX A-4

SAMPLE COLLECTION LOGS

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Groundwater Sample Collection Log
Rev. 1, Date: 07/21/2014

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/18/14
Sample Technician: M. Location Louisbury
Location ID (Well ID): ~~Griffis - FT030P-002~~ GRIFS-FT030P-002
GRIFS -

Measurements

Well Total Depth: ~~11.68~~ 12.75 ft below ~~TOC~~ BGS
Initial Water Level: 11.68 ft below ~~TOC~~ BGS
Final Water Level: 11.73 ft below ~~TOC~~ BGS
Calculated Well Volume: 0.24 Gallons
Well Diameter: 1 inches
Calculations: 1" diameter = 0.041 gal/ft 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geo pump
Flow rate (incl. units): 100 ml/min / min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1349	100	11.78	670	7.47	0.227	6.35	—	6.86	178.0	2	
1354	100	11.73	792	8.74	0.229	6.13	—	4.57	-90.5		
1359	100	11.95	555	8.66	0.223	6.11	—	4.49	-95.7		
1404	100	11.73	872	8.05	0.216	6.11	—	4.57	-85.5		
1409	100	11.73	139	8.03	0.206	6.11	—	4.83	-95.3		
1414	100	11.73	90.1	7.39	0.198	6.11	—	5.00	-65.9		
1419	100	11.73	64.1	7.32	0.191	6.11	—	6.12	-58.3		
1424	100	11.73	30.8	7.07	0.193	6.12	—	5.02	-53.4		
1429	100	11.73	19.4	7.07	0.191	6.13	—	5.14	-48.5		
1434	100	11.73	7.73	7.19	0.189	6.14	—	5.11	-46.6	4	
1439	100	11.73	6.95	7.64	0.187	6.14	—	4.99	-42.9	1.43	
										3.43	TOTAL Gallons purged
Final Readings			7.0	7.7	0.187	6.1	—	5.0	-43		

Results During Sample Collection:
Sample ID: ~~GRIFS-GW-002~~ GRIFS-GW-001
Sample Collection Time: 1445
Sample bottle type: 2x 125ml HDPE
Analysis/Method: PFC's (LLC/MS/MSD)
Preservative: 4°C
Water Quality (circle one): Clear Cloudy Turbid Other

COMMENTS: 1340 Begin Developing Well - purged five gallons and started up flow thru-cell. 1 MS/MSD/Dup

QAQC'd by: Jerry Ruff Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: M. Lounsbury
Location ID (Well ID): ~~GW~~ GRIFS- FT030P-003

Measurements

Well Total Depth: 17± ft below ~~TOC~~ BGS
Initial Water Level: 10.66 ft below ~~TOC~~ BGS
Final Water Level: 10.87 ft below ~~TOC~~ BGS
Calculated Well Volume: 0.25 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geopump
Flow rate (incl. units): 175 ml/mn

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
952	175	10.87	82.2	10.86	0.184	6.58	—	7.22	-10.3	2	
957	175	10.87	37.1	9.82	0.178	6.46	—	6.69	-74.0	2.33	
1002	175	10.87	14.7	9.44	0.177	6.41	—	6.70	-68.8	~~2.44~~	
1008	175	10.87	8.19	9.95	0.171	6.40	—	6.64	-65.0	2	
1013	175	10.87	3.79	9.76	0.171	6.38	—	6.73	-64.0		
1019	171	10.87	2.56	9.48	0.171	6.38	—	6.71	-60.1	1.336	
										~~3.33~~	
										3.33	Total Gallons pumped
Final	Readings		2.6	9.5	0.175	6.4	—	6.7	-60		

Results During Sample Collection:

Sample ID: GRIFS-GW-003
Sample Collection Time: 1021
Sample bottle type: 2x 125 ml HDPE
Analysis/Method: PFC's (LC/MS/MS)
Preservative: 4°
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: Purged 2 gallons to Develop well

QAQC'd by: Jerry Randolph Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: M. Lounsbury M. Lounsbury
Location ID (Well ID): GRIFS - FT030P - 0004

Measurements

Well Total Depth: 17.6 ft below TOC BGS
Initial Water Level: 10.61 ft below TOC BGS
Final Water Level: 11.65 ft below TOC BGS
Calculated Well Volume: 0.29 Gallons
Well Diameter: 1 inches
Calculations: 1" diameter = 0.041 gal/ft 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geopump
Flow rate (incl. units): 200 mls /min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
806	400	11.65	95.5	10.97	0.179	6.18	—	5.58	89	1.2	
812	400	11.65	35.5	10.86	0.154	6.23	—	5.91	-22.2	-22.2	
817	200	11.65	58.5	10.35	0.161	6.22	—	5.67	-26.1		
822	200	11.65	48.6	9.97	0.162	6.24	—	5.71	-31.5		
827	200	11.65	28.5	10.12	0.154	6.24	—	5.89	-33.9		
832	200	11.65	18.9	10.05	0.151	6.25	—	6.01	-32.7		
837	200	11.65	11.3	10.05	0.147	6.21		6.03	-33.2		
842	200	11.65	7.16	10.07	0.149	6.21		6.02	-34.9		
850	200	11.61	4.62	10.15	0.149	6.21	—	6.05	-36.2	2.34	
										3.54	Total Gallons Purged
Final Readings			4.7	10.2	0.149	6.3	—	6.11	-37		

Results During Sample Collection:

Sample ID: GRIFS-GW-0004
Sample Collection Time: 0855
Sample bottle type: 8x 125 ml HDPE
Analysis/Method: PFCs (LLC/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other Odor/sheen see comments

COMMENTS: Poiible Skim of Product (Fuel) on water
Purged 1 gallon to Develop - Strong Fuel-odor- Sheen on purge water - Replicate Collected for VISTA Labs

QAQC'd by: Jerry Ruff Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: D. Lerner
Location ID (Well ID): GRIFS-FT030P-005

Measurements

Well Total Depth: ~17± ft below ~~TOC~~ BGS
Initial Water Level: 11.36 ft below ~~TOC~~ GS (DM)
Final Water Level: 11.37 ft below ~~TOC~~ GS (DM)
Calculated Well Volume: ~0.23 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): perastaltic
Flow rate (incl. units): 200 mL/min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
0832	Begin purging - tubing not long enough - recut and started again.										
0853	Begin purging again. Purged ~2 gallons										
0902	300	11.37	89.0	11.37	0.243	6.57	NA	3.68	136.2		
0907	200	11.37	171.0	11.15	0.260	6.57	NA	3.20	25.5		
0912	200	11.37	201.0	11.25	0.255	6.54	NA	3.19	4.4		
0917	200	11.37	118.0	10.88	0.238	6.49	NA	3.37	18.6		
0924	200	11.37	63.9	11.05	0.234	6.50	NA	3.40	23.0		
0929	200	11.37	39.2	11.05	0.231	6.50	NA	3.43	29.5		
0934	200	11.37	21.8	11.10	0.229	6.47	NA	3.43	33.5		
0939	200	11.37	13.1	11.20	0.228	6.47	NA	3.42	40.4		
0944	200	11.37	8.10	11.16	0.227	6.45	NA	3.43	48.4		
0949	200	11.37	5.36	11.03	0.226	6.45	NA	3.44	50.0		
0955	Collect samples										
	Final Readings		5.4	11.0	0.226 (DM)	6.5	—	3.4	50		

Results During Sample Collection:

Sample ID: GRIFS-GW-005
Sample Collection Time: 0955
Sample bottle type: 2 x 125mL HDPE
Analysis/Method: PFCs (LC/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: Purged ~ 2 gallons before taking readings

QAQC'd by: Jerry Ruffin Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: D. Lerner
Location ID (Well ID): GRIFS-FT030P-006

Measurements

Well Total Depth: ~17± ft below ~~TOC~~ BGS
Initial Water Level: 11.25 ft below ~~TOC~~ GS (DM)
Final Water Level: 11.29 ft below ~~TOC~~ GS (DM)
Calculated Well Volume: ~0.24 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): perastaltic
Flow rate (incl. units): 200 mL/min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1104	Begin purging										
1115	200	11.29	28.5	10.67	0.284	6.64	NA	1.62	55.4		
1120	200	11.29	9.88	10.52	0.282	6.63	NA	1.37	32.8		
1125	200	11.29	8.38	10.87	0.280	6.62	NA	1.35	32.0		
1130	200	11.29	3.16	10.80	0.279	6.61	NA	1.34	32.7		
1135	200	11.29	2.58	10.84	0.279	6.60	NA	1.33	33.8		
1138	Collect samples										
	Final Readings		2.6	10.8	0.279	6.6	—	1.3	34		

Results During Sample Collection:

Sample ID: GRIFS-GW-~~007~~ 006 (DM)
Sample Collection Time: 1138
Sample bottle type: 2 x 125mL HDPE
Analysis/Method: PFCs (LC/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS:
purged ~1 gallon before taking readings

QAQC'd by: Jerry Rudloff
Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: M. Lounsbury
Location ID (Well ID): GRIFS-FT030P-007

Measurements

Well Total Depth: 17.2 ft below ~~TOC~~ BGS
Initial Water Level: 10.61 ft below ~~TOC~~ BGS
Final Water Level: 10.79 ft below ~~TOC~~ BGS
Calculated Well Volume: 0.27 Gallons
Well Diameter: 1 inches

Calculations: 1" diameter = 0.041 gal/ft 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geo pump
Flow rate (incl. units): 150 ml's / min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1109	150	10.79	320	10.21	0.160	6.50	—	8.98	72.1	2	
1113	150	10.79	185	9.40	0.157	6.41	—	7.34	-31.6		
1117	150	10.79	69.7	9.20	0.156	6.40	—	7.35	-33.3		
1122	150	10.79	36.5	9.56	0.151	6.37	—	7.09	-37.0		
1127	150	10.79	21.4	9.54	0.155	6.36	—	7.08	-36.9		
1133	150	10.79	9.27	9.62	0.151	6.35	—	6.98	-36.0		
1138	150	10.97	5.26	9.43	0.156	6.34	—	7.23	-35.2	⌀	
1143	150	10.79	3.74	9.68	0.156	6.37	—	7.11	-34.2	1.56	
										3.56	Total Volume Purged
Final Readings			3.7	9.7	0.156	6.3	—	7.1	-34		

Results During Sample Collection:

Sample ID: GRIFS-GW-007
Sample Collection Time: 1145
Sample bottle type: 2x 125 ml HDPE
Analysis/Method: PFC's (MS/LC/LC)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: purge 2 gallons to Develope~ then start with flow thru cell.

QAQC'd by: J Rainwater Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: D. Lerner
Location ID (Well ID): GRIFS - FT030P - 008

Measurements

Well Total Depth: ~17± ft below ~~TOC~~ BGS
Initial Water Level: 14.80 ft below ~~TOC~~ BGS
Final Water Level: 14.89 ft below ~~TOC~~ BGS
Calculated Well Volume: ~0.1 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): perastaltic
Flow rate (incl. units): 200mL/min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1223	Begin purging										
1241	200	14.89	280.0	10.75	0.135	6.48	NA	7.29	5.5		
1246	200	14.89	128.0	10.83	0.134	6.42	NA	7.29	17.3		
1251	200	14.89	95.8	10.92	0.134	6.42	NA	7.30	20.2		
1256	200	14.89	83.8	10.89	0.134	6.40	NA	7.33	25.9		
1301	200	14.89	48.1	10.90	0.134	6.41	NA	7.35	28.5		
1306	200	14.89	38.4	10.88	0.134	6.40	NA	7.35	33.8		
1311	200	14.89	30.0	10.70	0.134	6.39	NA	7.37	36.2		
1316	200	14.89	19.8	10.81	0.134	6.37	NA	7.38	39.0		
1321	200	14.89	20.3	10.89	0.133	6.38	NA	7.38	42.1		
1326	200	14.89	16.4	10.86	0.133	6.34	NA	7.40	51.0		
1331	200	14.89	15.8	10.95	0.133	6.30	NA	7.41	51.6		
1336	200	14.89	14.4	11.08	0.133	6.30	NA	7.42	53.8		
1341	200	14.89	15.1	10.96	0.133	6.30	NA	7.43	55.7		
1347	Collect samples										
	Final Readings			DF							
Results During Sample Collection:			15.1	11.0	0.133	6.3	-	7.4	56		

Sample ID: GRIFS-GW-008
Sample Collection Time: 1347
Sample bottle type: 2x 125mL HDPE
Analysis/Method: PFCs (LC/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: purged ~1.5 gallons before taking readings

QAQC'd by: Jerry Rowell Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: M. Lounsbury
Location ID (Well ID): GRIFFS - FT030P - 009

Measurements

Well Total Depth: 18 ft below ~~TOC~~BGS
Initial Water Level: 14.61 ft below ~~TOC~~ BGS
Final Water Level: 14.65 ft below ~~TOC~~ BGS
Calculated Well Volume: 0.14 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geo pump
Flow rate (incl. units): 200 ml's/min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1225	200	14.65	97.5	9.98	0.154	6.73	—	7.89	-6.1	2	
1230	200	14.65	28.5	9.87	0.154	6.55	—	7.34	-44.9	|	
1235	200	14.65	13.1	9.59	0.154	6.50	—	7.26	-51.4	|	
1240	200	14.65	6.45	9.61	0.153	6.46	—	7.47	-50.0	|	
1245	200	14.65	3.82	9.45	0.153	6.44	—	7.37	-50.6	|	
1250	200	14.65	2.01	9.56	0.153	6.47	—	7.43	-50.2	1.56	
										3.58	Total Gallons Purged
Final Readings											
			2.0	9.6	0.155	6.4	—	7.4	-50		

Results During Sample Collection:

Sample ID: GRIFFS-GW-009
Sample Collection Time: 1251
Sample bottle type: 2x125ml HDPE
Analysis/Method: PFC's (LC/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: purge 2 gallons to Develope

QAQC'd by: Jerry Renuff
Date: 12/3/14

GROUNDWATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation/Site: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician: M. Lounsbury M. Lounsbury
Location ID (Well ID): GRIFFS-FT030P-010

Measurements

Well Total Depth: 17.9 ft below ~~TOC~~ BGS
Initial Water Level: 14.49 ft below ~~TOC~~ BGS
Final Water Level: 14.64 ft below ~~TOC~~ BGS
Calculated Well Volume: 0.14 Gallons
Well Diameter: 1 inches
Calculations: (1" diameter = 0.041 gal/ft) 2" diameter = 0.163 gal/ft 4" diameter = 0.653 gal/ft

Well Purging Activites

Sampling Method (pump type): Geopump
Flow rate (incl. units): 150 ml/min

Time	Flow Rate (ml/min)	Depth to Water (ft, TOC)	Turbidity (NTUs)	Temp (°C)	Cond. (mS/Cm)	pH	Salinity (%)	DO (mg/l)	ORP	Total Gal Pumped	Comments
1318	150	14.69	39.4	9.20	0.137	6.57	—	8.91	-4.3	2	
1323	150	14.64	75.0	6.76	0.137	6.41	—	7.84	-64.4		
1328	150	14.64	50.2	7.00	0.136	6.41	—	6.93	-65.4		
1333	150	14.64	48.9	6.11	0.137	6.40	—	7.08	-65.7		
1338	150	14.64	24.6	7.32	0.136	6.39	—	6.95	-64.4		
1343	150	14.64	14.3	6.40	0.136	6.38	—	6.92	-63.8		
1348	150	14.64	10.3	7.23	0.135	6.36	—	7.14	-63.0		
1353	150	14.64	7.65	7.77	0.135	6.36	—	7.11	-61.7		
1358	150	14.64	6.35	8.41	0.136	6.36	—	6.96	-60.1	1.78	
										3.78	Total Gallons purged
Final Readings			6.4	8.5	0.136	6.4	—	7.0	-60		

Results During Sample Collection:

Sample ID: GRIFFS-GW-010
Sample Collection Time: 1400
Sample bottle type: 2x 125 ml HDPE
Analysis/Method: PFCs (LS/MS/MS)
Preservative: 4°C
Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: Purged 2 Gallons to Develope

QAQC'd by: Jeff Rawlings Date: 12/3/14

Sediment and Surface Water Sample Collection Log

Rev. 1, Date: 07/21/2014

SEDIMENT AND SURFACE WATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177

AMEC Proj No: 775290177.0009.0300B

Installation/Site: Griffis AFB/ FT030P

Date: 11/19/14

Sample Technician(s): Danielle Lerner, Michael Lounsbury

Location ID: GRIFS-FT030P-011

Type(s) of Sample (circle all that apply): Sediment (Surface Water)

SEDIMENT SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Sediment Description: _____

Collection Method: _____ Analysis/Method: _____

Sample Container: _____ Preservative: _____

SURFACE WATER SAMPLE

Sample ID: GRIFS-SW-001 Sample Collection Time: 1505

Sample Depth: ~0.4' Collection Method: SS Dipper

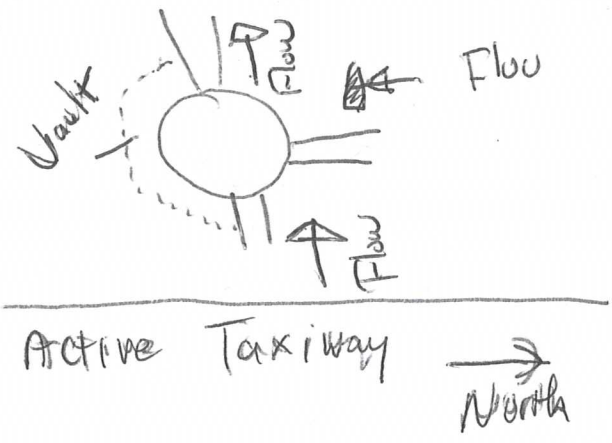
Analysis/Method: PFCs (LC/MS/MS) Sample Container: 2x 125mL HDPE

Preservative: 4°C Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: No sediment

Temp: 11.51°C
cond: 0.210 mS/cm
DO: 6.82 mg/L
pH: 6.42
ORP: 201.1 mV
Turb: 3.99 NTU

9.7 Fac Dcp



QAQC'd by: Jerry Ranliff Date: 12/3/14

SEDIMENT AND SURFACE WATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177

AMEC Proj No: 775290177.0009.0300B

Installation/Site: Griffis AFB/ FT030P

Date: 11/19/14

Sample Technician(s): Danielle Lerner, Michael Lounsbury

Location ID: GRIFS-FT030P-012

Type(s) of Sample (circle all that apply): Sediment (Surface Water)

SEDIMENT SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Sediment Description: _____

Collection Method: _____ Analysis/Method: _____

Sample Container: _____ Preservative: _____

SURFACE WATER SAMPLE

Sample ID: GRIFS-SW-003 / GRIFS-SW-002 Sample Collection Time: 1436

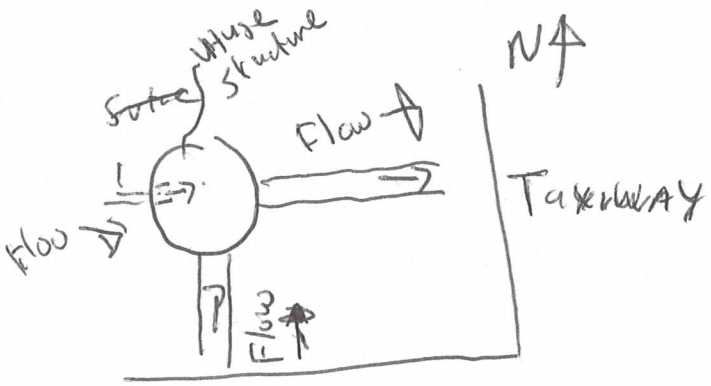
Sample Depth: ~0.4' Collection Method: SS dipper

Analysis/Method: PFCs (LC/MS/MS) Sample Container: 2x 125mL HDPE

Preservative: 4°C Water Quality (circle one): (Clear) Cloudy Turbid Other

COMMENTS: No sediment.
~16' deep from ground surface

Temp: 12.35°C
cond: 0.224mS/cm
DO: 7.70mg/L
pH: 7.73
ORP: 183.8mV
Turb: 4.07 NTU



GRIFS-SW-003: Field duplicate and MS/MSD.

QAQC'd by: Jerry Ruff Date: 12/3/14

Sediment and Surface Water Sample Collection Log

Rev. 1, Date: 07/21/2014

SEDIMENT AND SURFACE WATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177

AMEC Proj No: 775290177.0009.0300B

Installation/Site: Griffis AFB/ FT030P

Date: 11/19/14

Sample Technician(s): Danielle Lerner, Michael Lounsbury

Location ID: GRIFS-FT030P-BLK

Type(s) of Sample (circle all that apply): Sediment Surface Water

SEDIMENT SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Sediment Description: _____

Collection Method: _____ Analysis/Method: _____

Sample Container: _____ Preservative: _____

SURFACE WATER SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Collection Method: _____

Analysis/Method: _____ Sample Container: _____

Preservative: _____ Water Quality (circle one): Clear Cloudy Turbid Other

COMMENTS:

GRIFS-FT030P-BLK03 at 1520

Blank on SS Dipper

QAQC'd by: J Rawlings Date: 12/3/14

SEDIMENT AND SURFACE WATER SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177

AMEC Proj No: 775290177.0009.0300B

Installation/Site: Griffis AFB/ FT030P

Date: 11/19/14

Sample Technician(s): Danielle Lerner, Michael Lounsbury

Location ID: GRIFS-FT030P-BLK

Type(s) of Sample (circle all that apply): Sediment Surface Water

SEDIMENT SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Sediment Description: _____

Collection Method: _____ Analysis/Method: _____

Sample Container: _____ Preservative: _____

SURFACE WATER SAMPLE

Sample ID: _____ Sample Collection Time: _____

Sample Depth: _____ Collection Method: _____

Analysis/Method: _____ Sample Container: _____

Preservative: _____ Water Quality (circle one): Clear Cloudy Turbid Other

COMMENTS:

GRIFS-FT030P-BLK04 at 1520

Field blank of PFC-free water

QAQC'd by: _____ Date: 12/3/14

SOIL SAMPLE COLLECTION LOG

amec

Project Name:	PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No:	775290177.0009.0300B
Installation:	Griffiss AFB/FT030P
Date:	10/17/14
Sample Technician(s):	Danielle Lerner, Michael Lounsbury
Location ID:	GAPFS - FT030P - 001

SOIL SAMPLE

Sample ID:	GAPFS - SO - 001	Sample Collection Time:	1141
Sample Depth:	0-1	UCSC Description:	FII
Munsell Description:	10 YR 4/3	Plasticity:	None
Collection Method:	Hand Corer	Analysis/Method:	PFCs (LC/MS/MS)
Sample Container:	2 x 250 ml HDPE	Preservative:	4°C

COMMENTS:

QAQC'd by:	Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name:	PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No:	775290177.0009.0300B
Installation:	Griffiss AFB/FT030P
Date:	1/17/14
Sample Technician(s):	Danielle Lerner, Michael Lounsbury
Location ID:	GRIFS-FT030P-001

SOIL SAMPLE

Sample ID:	GRIFS-SO-002	Sample Collection Time:	1220
Sample Depth:	3-5'	UCSC Description:	Fill
Munsell Description:	10 YR 3/2	Plasticity:	None
Collection Method:	Direct Push	Analysis/Method:	PFCs (LLC/MS/MS)
Sample Container:	250 ml HDPE	Preservative:	4°C

COMMENTS:

QAQC'd by:	Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name:	PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No:	775290177.0009.0300B
Installation:	Griffiss AFB/FT030P
Date:	1/17/14
Sample Technician(s):	Danielle Lerner, Michael Lounsbury
Location ID:	GRIFFS - FTO 30P - 003

SOIL SAMPLE

Sample ID:	GRIFFS - SO-003-001-(FD)	Sample Collection Time:	1245
Sample Depth:	8-10'	UCSC Description:	GP
Munsell Description:	10YR 2/2	Plasticity:	None
Collection Method:	Direct Push	Analysis/Method:	PFCs (LC/MS/MS)
Sample Container:	2 250ml HDPE	Preservative:	4°C

COMMENTS:

QAQC'd by:	Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B

Installation: Griffis AFB/ FT030P

Date: 11/17/14

Sample Technician(s): Danielle Lerner, Michael Lounsbury

Location ID: GRIFS-FT030P-007

SOIL SAMPLE

Sample ID: GRIFS-SO-004
Sample Collection Time: 1305
Sample Depth: 0-1
UCSC Description: Fill
Munsell Description: 10YR 4/4
Plasticity: None
Collection Method: Hand Probe
Analysis/Method: PFC's (LC/MS/MS)
Sample Container: 250ml HDPE
Preservative: Ice

COMMENTS:

QAQC'd by:
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/17/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS - FT030P ~~003~~ 002

SOIL SAMPLE

Sample ID: GRIFS-SO-005
Sample Collection Time: 1322
Sample Depth: 3-5
UCSC Description: Fill
Munsell Description: 10YR 4/3
Plasticity: none
Collection Method: Direct Push
Analysis/Method: PFCs (CE/ms/ms)
Sample Container: 250ml HDPE
Preservative: 4°C.

COMMENTS:

QAQC'd by: [signature]
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name:	PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No:	775290177.0009.0300B
Installation:	Griffiss AFB/FT030P
Date:	11/17/14
Sample Technician(s):	Danielle Lerner, Michael Lounsbury
Location ID:	GRIFS-FT030P-002

SOIL SAMPLE

Sample ID:	GRIFS-SO-006	Sample Collection Time:	1340
Sample Depth:	8-10'	UCSC Description:	SP
Munsell Description:	10 YR 3/4	Plasticity:	None
Collection Method:	Direct Push	Analysis/Method:	PFCV (LC/MS/MS)
Sample Container:	2 from 1 HDPE	Preservative:	4°C

COMMENTS:

QAQC'd by:	Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/17/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS- FT030P- 603

SOIL SAMPLE

Sample ID: GRIFS-SO-007
Sample Depth: 0-1
Munsell Description: 10YR 4/4
Collection Method: Hand Probe
Sample Container: 250 ml HDPE
Sample Collection Time: 1440
UCSC Description: FSI
Plasticity: None
Analysis/Method: PFC's LC/MS/MS
Preservative: 4°C

COMMENTS:

QAQC'd by: [signature]
Date: 1/21/15

SOIL SAMPLE COLLECTION LOG

amec

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/17/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS- FT030P- 003

SOIL SAMPLE

Sample ID: GRIFS- FT030 SO- 008 (BP)
Sample Depth: 3-5"
Munsell Description: 10YR 4/4
Collection Method: Direct Push
Sample Container: 250 ml HDPE
Sample Collection Time: 1450
UCSC Description: FII
Plasticity: None
Analysis/Method: PFC's (LC/MS/MS)
Preservative: 4°C

COMMENTS:

QAQC'd by:
Date: 1/21/15

SOIL SAMPLE COLLECTION LOG

amec

Project Name:	PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No:	775290177.0009.0300B
Installation:	Griffiss AFB/FT030P
Date:	11/17/14
Sample Technician(s):	Danielle Lerner, Michael Lounsbury
Location ID:	GRIFS-FT030P-003

SOIL SAMPLE

Sample ID:	GRIFS-SO-009	Sample Collection Time:	1510
Sample Depth:	8-10'	UCSC Description:	SP
Munsell Description:	10 YR 3/6	Plasticity:	None
Collection Method:	Direct Push	Analysis/Method:	PFC's (LC/MS/MS)
Sample Container:	250ml HDPE	Preservative:	4°C

COMMENTS:

QAQC'd by:	Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 1/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS - FT030P-004

SOIL SAMPLE

Sample ID: GRFS-SO-010 / GRFS-SO-011
Sample Collection Time: 740
Sample Depth: 0-1
UCSC Description: Fill
Munsell Description: 10 YR 3/3
Plasticity: None
Collection Method: Hand Probe
Analysis/Method: PFCs (LL/MS/MS)
Sample Container: 4oz HDPE
Preservative: 4°C

COMMENTS: Duplicate Collected

QAQC'd by: [signature]
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRFFS - FT030P - 004

SOIL SAMPLE

Sample ID: GRFF-SO-012
Sample Collection Time: 910
Sample Depth: 3-5'
UCSC Description: GP
Munsell Description: 10 YR 3/3
Plasticity: None - Fine Plastic
Collection Method: Direct Push
Analysis/Method: PFCs (LC/MS/MS)
Sample Container: 250 ml HDPE
Preservative: 4°C

COMMENTS: Fuel odor NT 5'

QAQC'd by: Danielle L
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 1/19/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS- FT030P- 004

SOIL SAMPLE

Sample ID: GRFFS-~~030~~1SU-013 (MS)
Sample Collection Time: 820
Sample Depth: 8-10'
UCSC Description: GP
Munsell Description: 10 YR 3/3
Plasticity: None
Collection Method: Direct Push
Analysis/Method: PFC's (LC /MS/MS)
Sample Container: 2 from 1 HDPE
Preservative: 4°c

COMMENTS: Very Poor Recovery - Sample Collected from 8-10 and 10-15 Zones

QAQC'd by: Jennifer
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

amec

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: GP 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRFFS - FT030P-005

SOIL SAMPLE

Sample ID: GrFS-SO-014
Sample Collection Time: 900
Sample Depth: 0-1
UCSC Description: Fill
Munsell Description: 10 YR 4/4
Plasticity: None
Collection Method: Hand Probe
Analysis/Method: PFCs - (CC/MS/MS)
Sample Container: 250 ml HDPE
Preservative: 4oC

COMMENTS:

QAQC'd by: Danielle L
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS - FT030P - 005

SOIL SAMPLE

Sample ID: GRIFS-SO-015 Sample Collection Time: 914
Sample Depth: 3-5' UCSC Description: SM
Munsell Description: 10 YR 4/4 Plasticity: None
Collection Method: Direct Push Analysis/Method: PFC'S LC/MS/MS
Sample Container: 250 ml HDPE Preservative: 4°C

COMMENTS:

QAQC'd by: Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRFFS-FT030P-~~016~~ 005

SOIL SAMPLE

Sample ID: GRDFS-SO-016
Sample Collection Time: 920
Sample Depth: 8-10
UCSC Description: SM
Munsell Description: 10 YR 3/4
Plasticity: none
Collection Method: Direct Push
Analysis/Method: PFCs (LC/MS/MS)
Sample Container: 250ml- HDPE
Preservative: 4°C

COMMENTS:

QAQC'd by: Danielle L
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 1/15/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GAFB - FT030P - BLK

SOIL SAMPLE

Sample ID: GAFB - FT030P - BLK1 Sample Collection Time: 751
Sample Depth: — UCSC Description: NA
Munsell Description: — Plasticity: NA
Collection Method: S Stainless Steel Bowl / Spoon Analysis/Method: PFCs (LC/MS/MS)
Sample Container: 2x 125ml HDPE Preservative: 4°C

COMMENTS:

QAQC'd by: [signature] Date: 1/21/15

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/FT030P
Date: 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS-FT030P-006

SOIL SAMPLE

Sample ID: GRIFS-SO-017
Sample Collection Time: 1003
Sample Depth: 0-1'
UCSC Description: Fill
Munsell Description: 10 YR 3/4
Plasticity: none
Collection Method: Hand Probe
Analysis/Method: PFCs (LC/MS/MS)
Sample Container: 250mL HDPE
Preservative: 4°C

COMMENTS: ⊛ Original misplaced - recreated log from notes

QAQC'd by:
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/19/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS - FT030P - UCK

SOIL SAMPLE

Sample ID: GRIFS - SO - 018
Sample Collection Time: 1010
Sample Depth: 3-5'
UCSC Description: FILL
Munsell Description: 10YR 3/4
Plasticity: None
Collection Method: Direct Push
Analysis/Method: PFCs (LC/MS/MS)
Sample Container: 1 Qt HDPE
Preservative: 4°C

COMMENTS:

QAQC'd by:
Date: 1/21/15

Soil Sample Collection Log
Rev. 1, Date: 07/21/2014

SOIL SAMPLE COLLECTION LOG

Project Name: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177
AMEC Proj No: 775290177.0009.0300B
Installation: Griffis AFB/ FT030P
Date: 11/18/14
Sample Technician(s): Danielle Lerner, Michael Lounsbury
Location ID: GRIFS - FT030P - 006

SOIL SAMPLE

Sample ID: GRIFS-SO-019 GRIFS-SO-020
Sample Depth: 8-10
Munsell Description: 10 YR 3/4
Collection Method: Direct Push
Sample Container: 250ml HDPE
Sample Collection Time: 1020
UCSC Description: SM/GM
Plasticity: None
Analysis/Method: PFC's (LS/MS/MS)
Preservative: 4°C

COMMENTS: Dup/MS/MSD

Collect Sample Blank
GRFS-FT030P-BLK02
1030

QAQC'd by: [signature] Date: 1/21/15

APPENDIX A-5

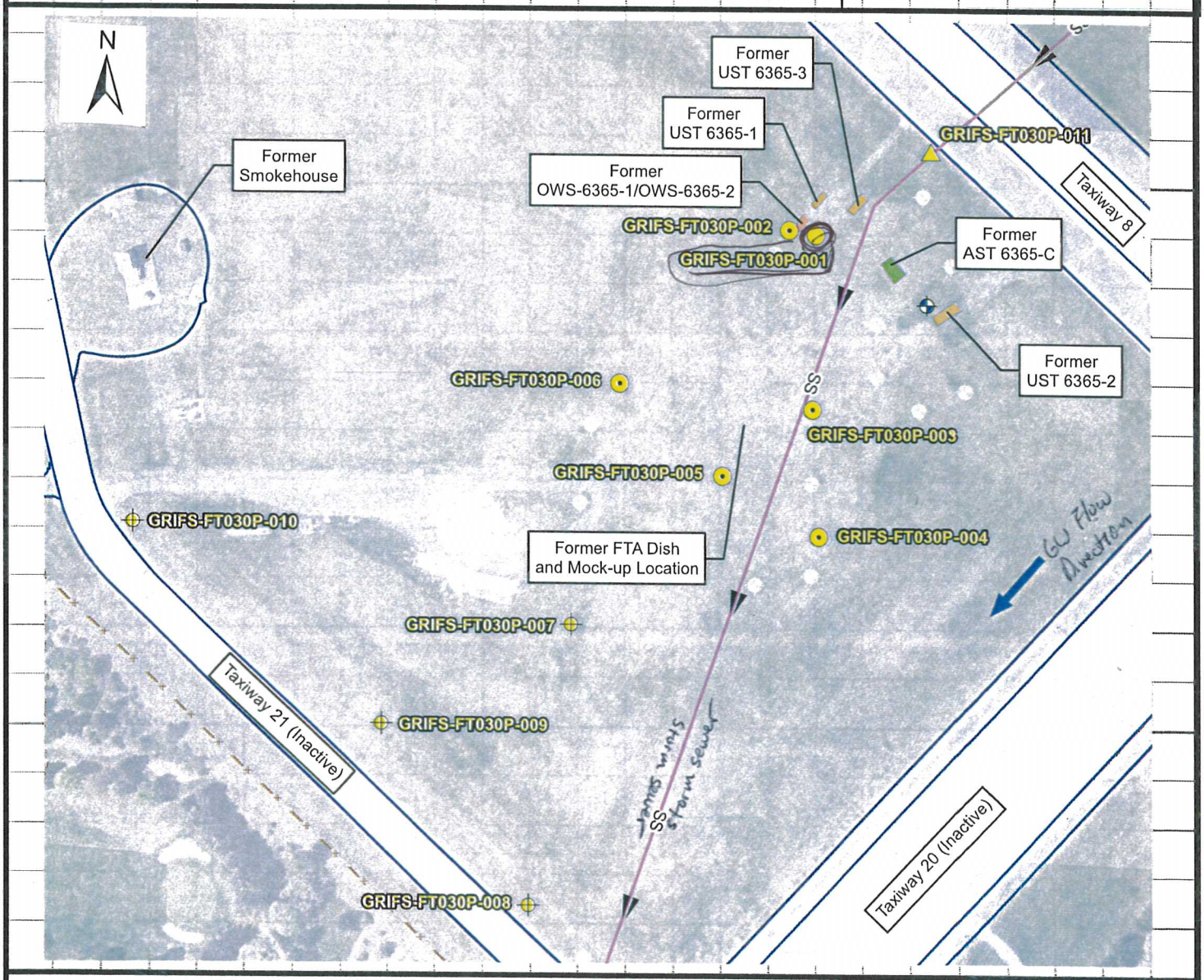
DRILLING LOGS

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Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-001	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 2
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/17/14 / DATE COMPLETED: 11/17/14
NAME OF DRILLER(S): Ray Hammond and Stefan Truex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: 15' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ~12' BGS
	OVERBURDEN THICKNESS: >15' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: natural cave / MONITORING WELL: NA / OTHER (SPECIFY):	
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/17/14

QAQC'd by: [signature] Date: 12/2/14

Drilling Log (Page 2)
Rev. 1, Date: 07/21/2014

amec

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-001

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of SHEETS 2

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-1'	Brown to dark brown silty sand with organics and gravel, loose, well-graded, damp 10 YR 4/3	NM	0-1'	GRIFS-SO-001 hand auger	FILL	fill - surface sample
	3-5'	very dark grayish brown silty ~~sand~~ (OF) sand, plastic fines, gravel, dense, well-graded, wet 10 YR 3/2	0.0ppm	3-5'	GRIFS-SO-002	SM	Rec: 1.1/3'
5'							
	8-10'	8-9.2': very dark brown, silty sand w/ plastic silts and gravel, dense, well-graded, wet 10 YR 3/2	0.0 ppm	5-10'		SM/GM	Rec: 1.8/5'
		9.2-10': same as above but dark gray 10 YR 4/1				SM/GM	
10'							
	10-15'	very dark brown silty sand w/ gravel, mdm dense, well-graded, wet to saturated 10 YR 2/2	0.0 ppm	10-15'	GRIFS-SO-003	GM	Rec: 1.3/5' DTW: ~12' bgs
15'							
		Bottom of boring = 15' BGS					

NAME/SIGNATURE: D. Lerner / [signature] DATE: 11/17/14

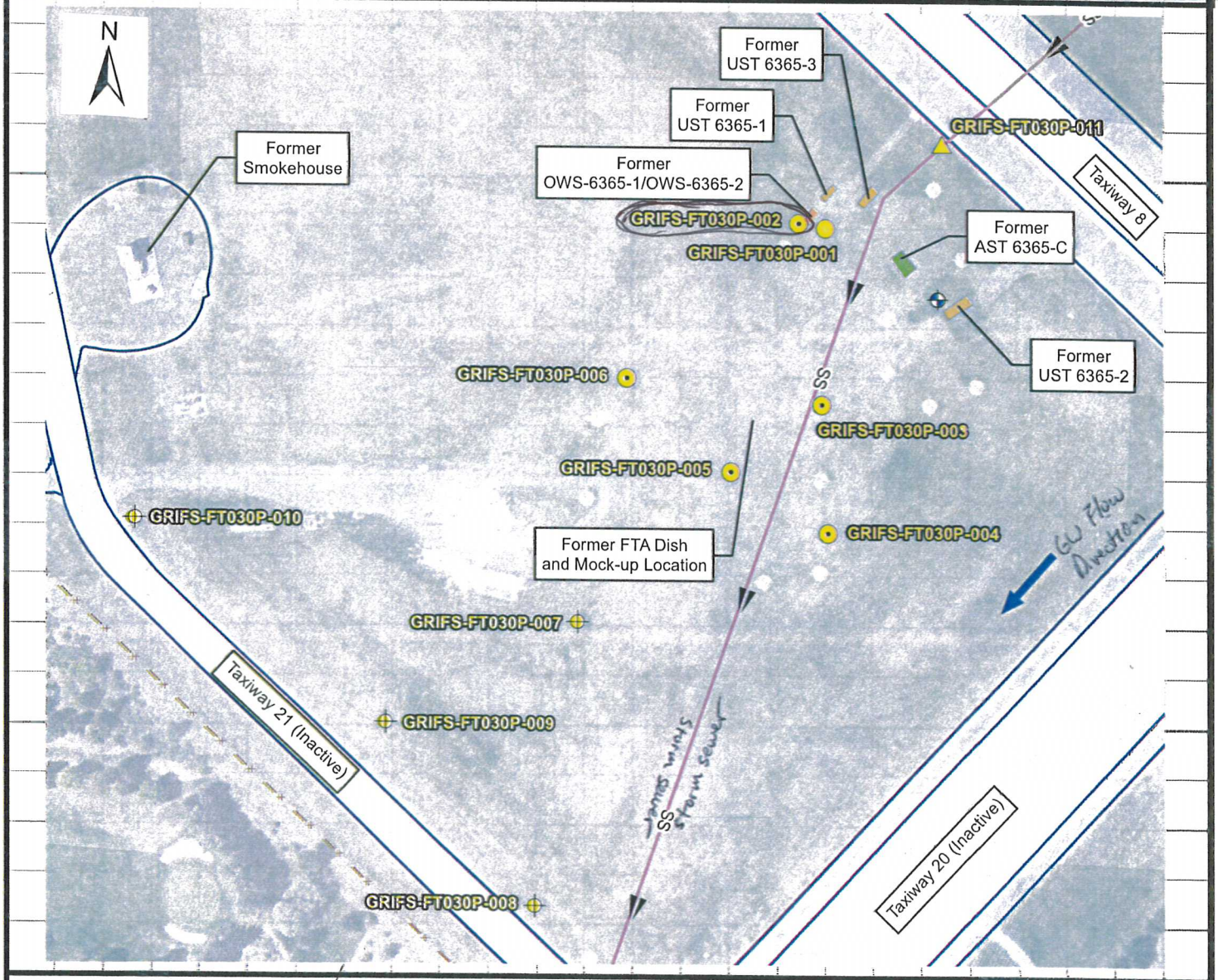
QAQC'd by: J Rawcliffe DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

amec

DRILLING LOG

LOCATION ID: GRIFS-FT030P-002	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/17/14 / DATE COMPLETED: 11/17/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18'BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ~12'BGS
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed	BACKFILLED: natural cave-in / MONITORING WELL: temporary / OTHER (SPECIFY):
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/17/14

QAQC'd by: J Randall Date: 12/2/14

amec DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-002

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET: 2 of 3 (2)

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	~~0~~ (2) 0-1'	Dark yellowish brown silty sand w/ organics and trace gravel, loose, damp, well-graded 10YR 4/4	0.0 ppm	hand auger 0-1'	GRIFS-SO-004 1305	Fill	Fill - surface sample
	3-5'	Brown silty sand w/ some organics and gravel, damp, loose, well-graded 10 YR 4/3	0.0 ppm	3-5'	GRIFS-SO-005 3-5 1322	sm	Rec: 1.7/5'
5'	5-10'	5-5.5': dark yellowish brown, silty sand, loose to mdm dense, damp to moist, well-graded 10YR 4/4 cobble layer at 5.5' 5.5-7.5': same as above but damp to wet	0.0 ppm	5-10'	8-10' (10-12') GRIFS-SO-006 1340	sm GM/GP sm	Rec: 2.5/5'
10'	10-15'	dark yellowish brown silty sand w/ gravel, mdm dense to dense, wet to saturated, well-graded 10YR 3/4	0.0ppm	10-15'		SM/GM	GW ≈ 12' BGS Rec: 1.5/5'
15'							

NAME/SIGNATURE: D. Lerner / DL — DATE: 11/17/14

QAQC'd by: J Ramlall — DATE: 12/2/14

Drilling Log (~~Page 2~~)
Rev. 1, Date: 07/21/2014

amec DRILLING LOG (Page 2 of 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GR1FS-FT030P-002

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	Dark yellowish brown, sandy gravel with some silt) well-graded, saturated, loose to mdm dense 10YR 3/4	0.0ppm	15-18'		GP	~~1.8/3~~ (A1) Rec: 1.8/3'
20'		Bottom of boring = 18' BGS					

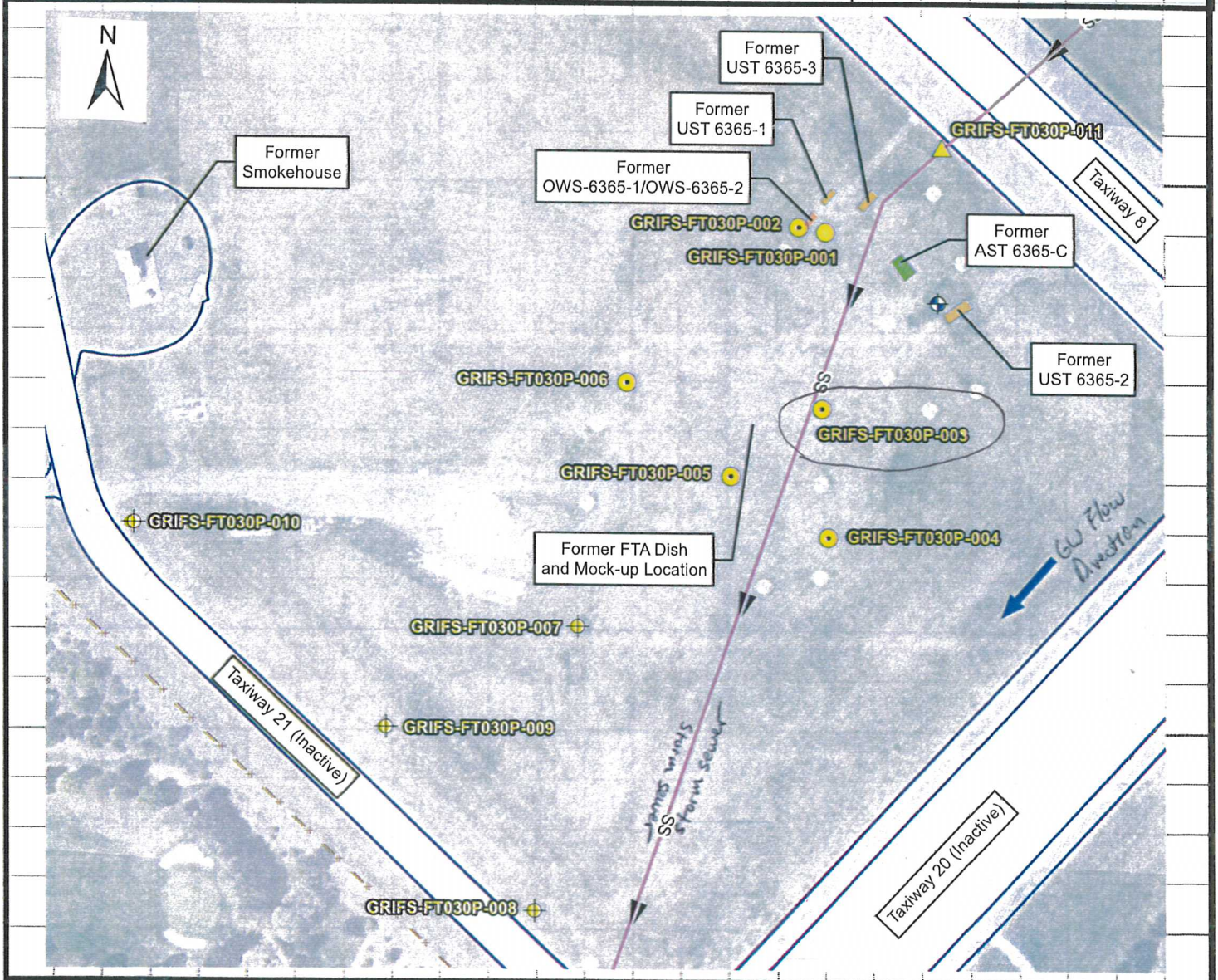
NAME/SIGNATURE: D. Lerner/AL DATE: 11/17/14

QAQC'd by: J Ruthoff DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-003	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/17/14 — DATE COMPLETED: 11/17/14
NAME OF DRILLER(S): Ray Hammond and Stefan Truex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS — DEPTH OF GROUNDWATER ENCOUNTERED: ≃ 10 - 11.5' Based on soils
	OVERBURDEN THICKNESS: >18' — DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): (See page 2).
DISPOSITION OF BORE HOLE: backfilled and sealed — BACKFILLED: natural cave in. — MONITORING WELL: temporary — OTHER (SPECIFY):	
LOCATION SKETCH/COMMENTS	SCALE: ≈ 1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/17/14

QAQC'd by: J Ranlett Date: 12/2/14

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-003

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of 3

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	15-15.3': gravel layer. 15.3-15.7': coarse gravel; browns, tans, reds, whites; wet. 15.7-16.1': fine to coarse grained gravel, saturated, same gravel colors as above; dark brown sand mixed in, fine to coarse grained 10 YR 3/3	0.0 ppm	15-18'		GP GP	Rec: 1.1/3'
20'		Bottom of boring = 18' BGS					

NAME/SIGNATURE: D. Lerner / [signature] DATE: 11/17/14

QAQC'd by: J Ramloff DATE: 12/2/14

Drilling Log (~~Page 2~~)
Rev. 1, Date: 07/21/2014

amec DRILLING LOG (Page 2 of 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-008

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-1'	Dark yellowish brown silty sand with organics, trace gravel, (FILL) loose, damp, ~~well~~ poorly graded 10 YR 4/4	0.0ppm	0-1' hand auger	GRIFS-SO-007 1440	FILL	fill - surface sample
	3-5'	Dark yellowish brown silty sand with fill layer at ~5'. loose, damp, poorly graded 10 YR 4/4	0.0ppm	3-5'	GRIFS-SO-008 1450	FILL / SW/SP	Rec: 1.3/5'
5'							
	5-10'	Brown, silty sand with gravel, mdm dense to dense, well-graded, wet (5-6') 10 YR 4/3 6-8': same as above but coarser grained and dark yellowish brown 10 YR 3/6	0.0ppm	5-10'	(8-10')	SW/GM / GM	Rec: 3/5' DTW: ~11.5' slight fuel odor at ~6'
10'							
	10-12'	Dark yellowish brown silty sand with gravel layer at ~11'. Fine to coarse grained, mdm dense, poorly graded, saturated 10 YR 3/4	0.0ppm	10-15'	(~~10~~-12') GRIFS-SO-009 1510	GM	Rec: 1.5/10'
15'							

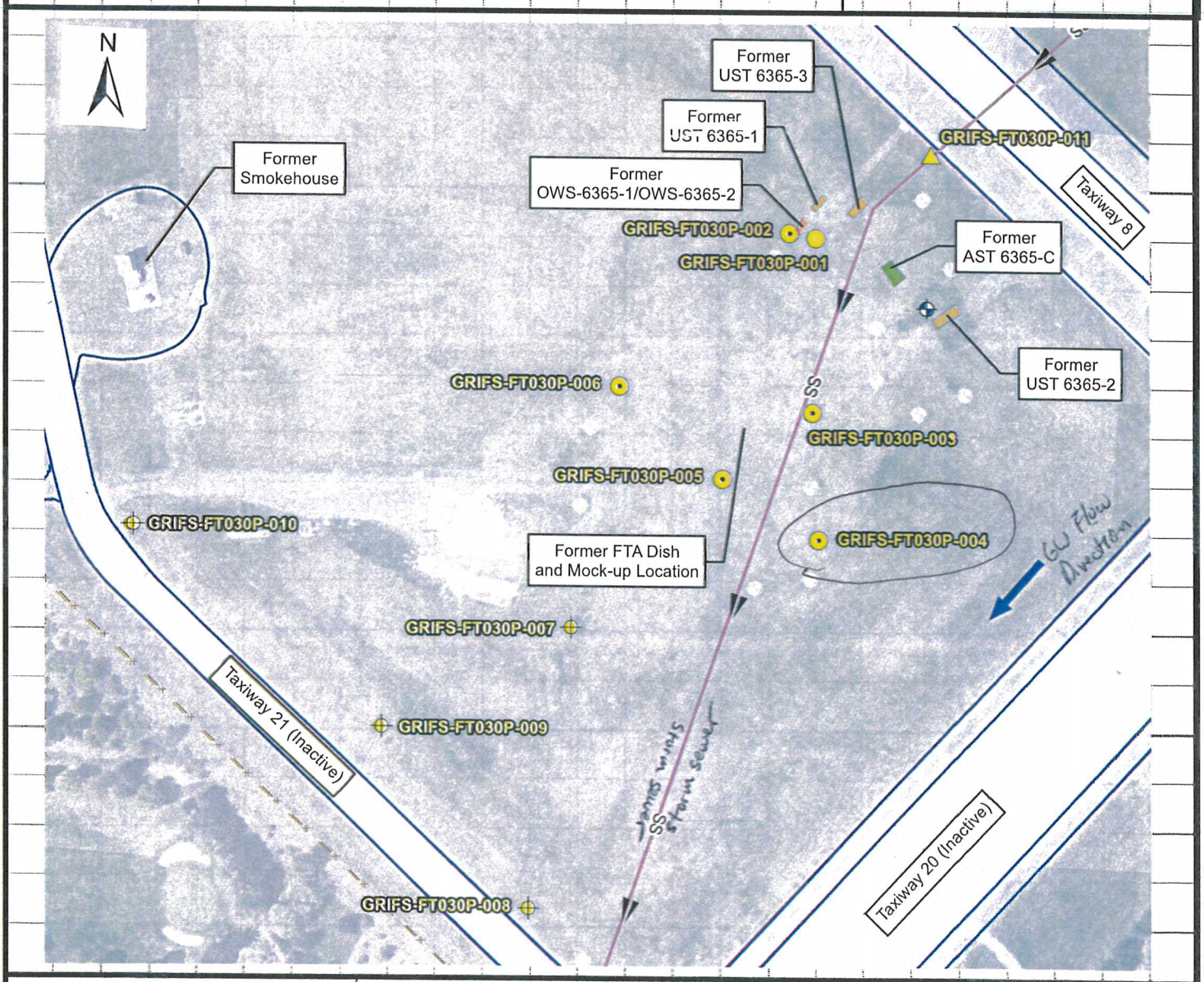
NAME/SIGNATURE: D. Lerner / DL DATE: 11/17/14

QAQC'd by: J Rawlffe DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-004	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: 18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ≈10' BGS
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:	OTHER WATER LEVEL MEASUREMENTS (SPECIFY):
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: natural cave / MONITORING WELL: Temporary / OTHER (SPECIFY):	
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/18/14

QAQC'd by: J Rawlff Date: 12/2/14

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-004

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET: 2 + DA of SHEETS: 2 = 3 DA

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-1'	Dark brown fill- silty sand with organics, loose, moist, poorly sorted 10 YR 3/3	0.0 ppm	0-1'	GRIFS-SO-010 GRIFS-SO-011 (DUP)	FILL	Fill - surface sample
	3-5'	3-3.2' = black gravelly silt mixture. 3.2-5 = Dark brown silt and gravel, plastic fines, mdm dense, well sorted, damp 10 YR 3/3	15.6 ppm	3-5'	GRIFS-SO-012	GM	Rec: 1.8/3' Fuel odor present
5'							
	5-10	No recovery		5-10			Rec: 0/5' *mostly water DTW: ~10'
10'							
	10-15'	Dark brown gravelly silt mixture, loose, poorly graded, saturated 10 YR 3/3	5.6 ppm	10-15	(10-10.5') GRIFS-SO-013	GM	Rec: 0.5/5 *mostly water product visible= oily sheen
15'							

NAME/SIGNATURE: D. Lerner / DL — DATE: 11/18/14

QAQC'd by: JRawliff — DATE: 12/2/14

amec DRILLING LOG (Page 2 of 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-004

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	15-15.3': Dark yellowish brown silt w/ plastic fines, dense, saturated, poorly graded 10YR 4/4	0.0 ppm	15-18'		ML	Rec: 0.8/3'
		15.3-15.8: same as above but gravelly				Gw/Gm	
20'		Bottom of boring = 18' BGS					

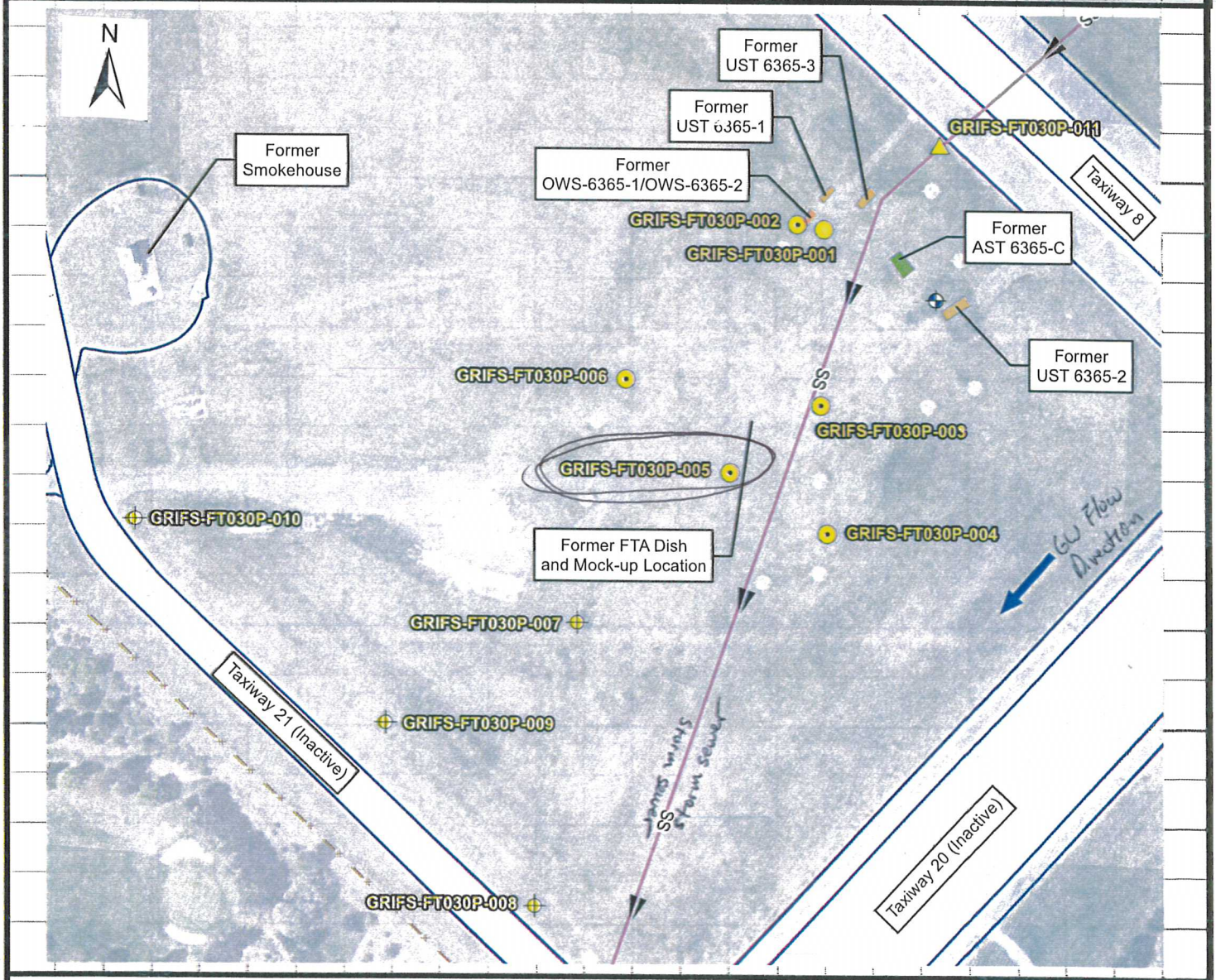
NAME/SIGNATURE: D. Lerner / DL DATE: 11/18/14

QAQC'd by: J Ramliff DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-005	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ≈14' BGS based on soils
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
DISPOSITION OF BORE HOLE: backfilled and sealed. / BACKFILLED: natural cave / MONITORING WELL: temporary / OTHER (SPECIFY): —	
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/18/14

QAQC'd by: J Rawdoff Date: 12/2/14

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-005

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 83 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-1	Dark yellowish brown fill - silty sand w/ organics and trace gravel, loose, moist, poorly graded 10YR 4/4	0.0 ppm	hand auger 0-1'	GRIFS-SO-014	FILL	Fill - surface sample
	3-5'	same as above but sand w/ trace silts.	0.0 ppm	3-5'	GRIFS-SO-015		Rec: 2.5/3' Fill
5'							
	~~8-10~~ 5-10'	Dark yellowish brown sand, loose to mdm dense, wet from 5-6', moist 6-10', poorly graded 10YR 3/4 fine-grained	0.0ppm	~~5-10~~ 8-10'	GRIFS-SO-016	SP	Rec: 4/5'
10'							
	10-15'	same as above until ~14'- color changes to dark gray- saturated at ~14' 10YR 4/1	0.0 ppm	10-15'		SP	Rec: 2/5'
15'							

NAME/SIGNATURE: D. Lerner / DL — DATE: 11/18/14

QAQC'd by: D Rawlffe — DATE: 12/2/14

amec DRILLING LOG (Page 2)3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-005

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of (24) 3

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	Gravel w/ Dark yellowish sand/gravel mixture from 15-15.8, loose, saturated, w/ well graded gravel from 15.8-16.4'. 10YR 3/4	60.0 ppm	15-18'		GP	Rec: 1.4/3'
20'		Bottom of boring = 18' BGS.					

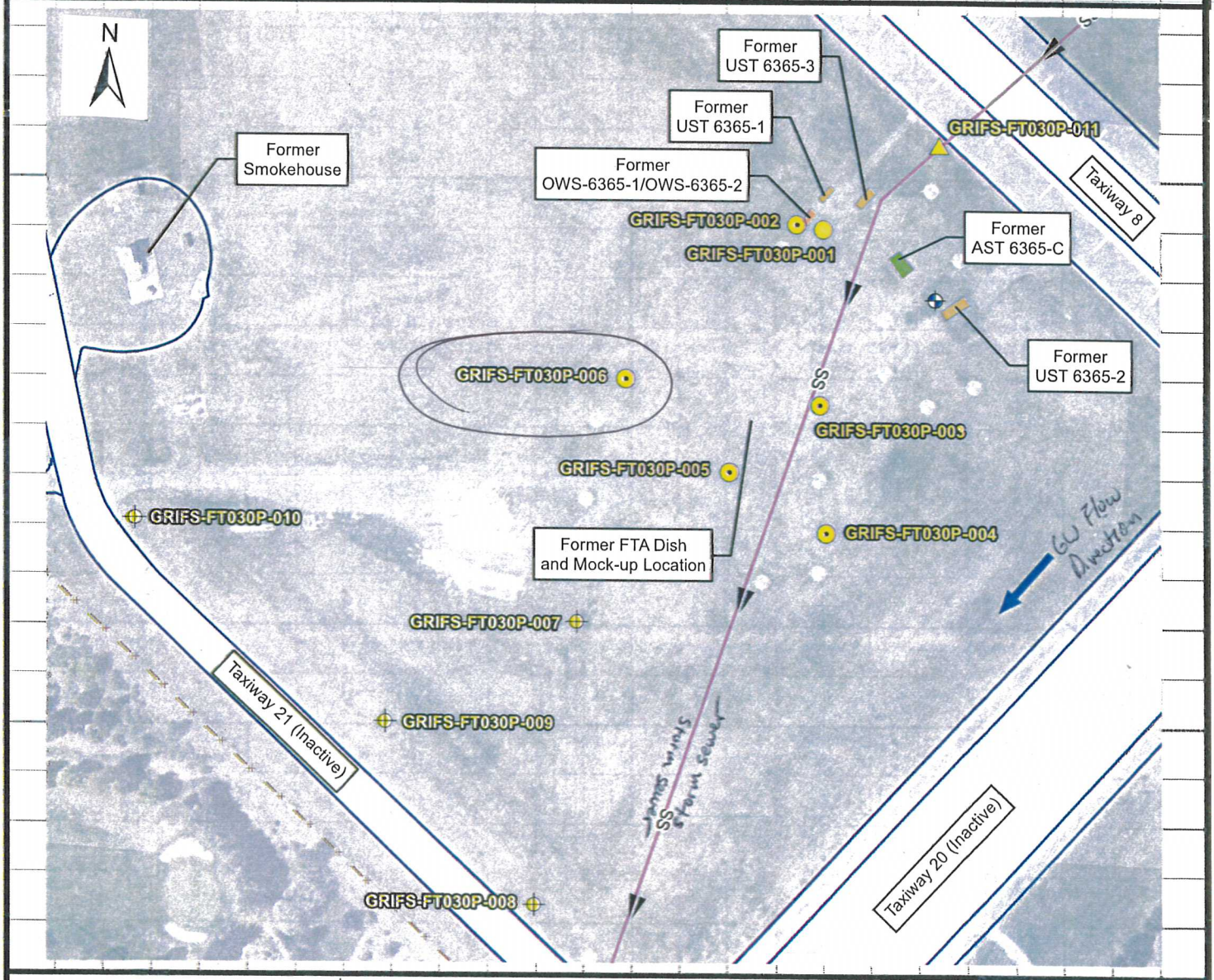
NAME/SIGNATURE: D. Lerner / DL DATE: 11/18/14

QAQC'd by: J Ramlff DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-006	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ≈18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ~10' BGS based on soils
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: natural cave / MONITORING WELL: temporary	OTHER (SPECIFY):
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/18/14

QAQC'd by: [signature] Date: 12/2/14

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-006

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of SHEETS 3 (DA)

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-1'	Fill - silty sand w/ some gravel at 0-1', trace gravel 1-5'. Dark yellowish brown, loose, damp, poorly graded. 10 YR 3/4	0.0 ppm	~~hand~~ DA ~~auger~~ 0-1'	GRIFS-SO-017	Fill	surface sample
	3-5'			3-5'	GRIFS-SO-018	SM/GM	Rec: 3.5/5'
5'							
	5-10'	same as above.	0.0 ppm	5-10'	GRIFS-SO-019 GRIFS-SO-020 Dup and MS/MSD	SM/GM	Rec: 3/5'
10'							
	10-15'	10-10.1: same as above. 10.1-10.6: same as above but saturated. 10.6-11.6: Dark grayish brown gravelly sand, saturated, well-graded, loose.	0.0 ppm	10-15'		SM/GM GP/SP	GW ≈ 10' BGS Rec: 1.6/5'
15'							

NAME/SIGNATURE: D. Lerner / DA — DATE: 11/18/14

QAQC'd by: J Rawlffs — DATE: 12/2/14

amec DRILLING LOG (Page 2~~3~~)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRLFS-FT030f-006

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of SHEETS 3 (4)

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18	Bottom of boring = 18' BGS					No recovery
	20						

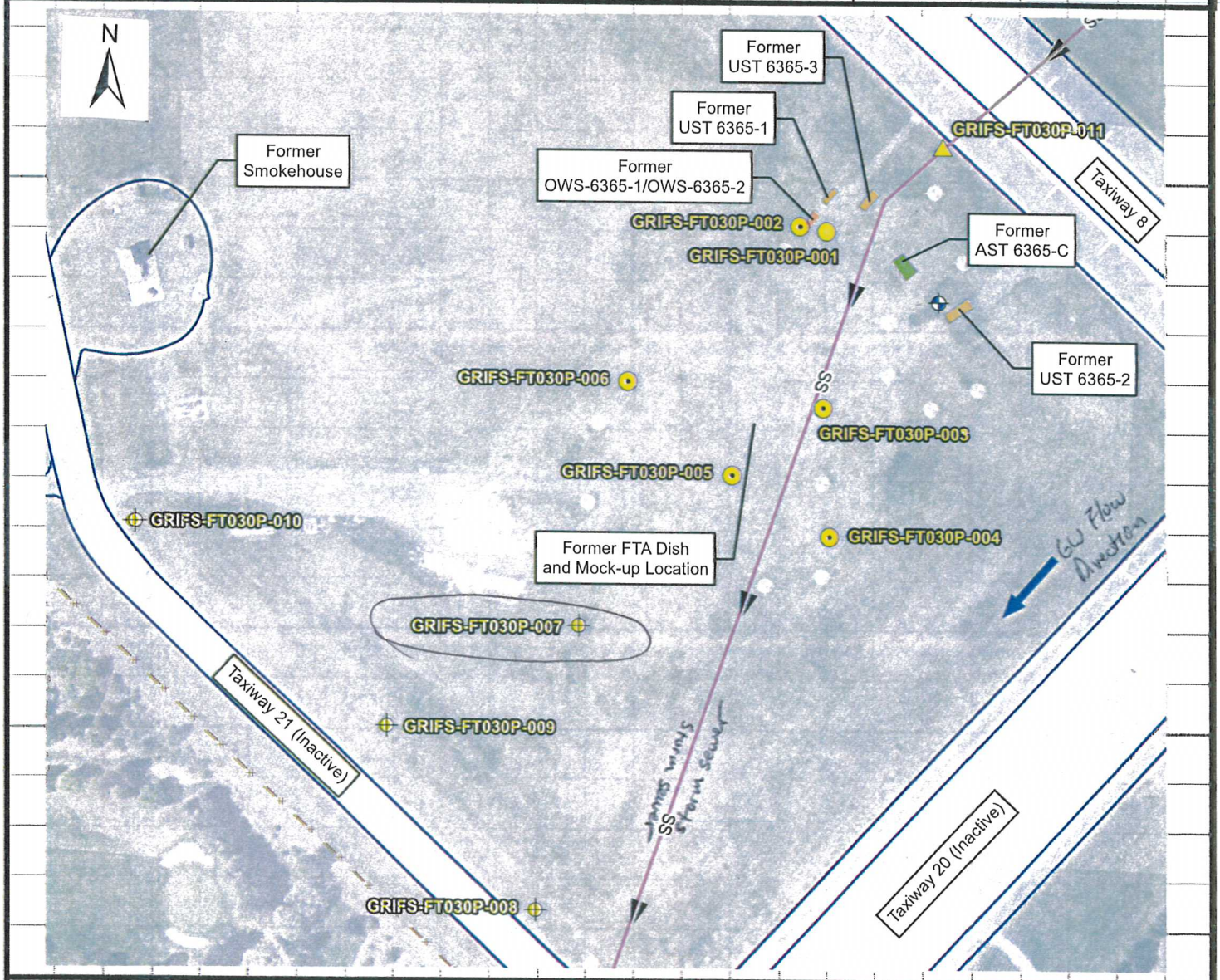
NAME/SIGNATURE: D. Lerner / DL DATE: 11/18/14

QAQC'd by: J Rawl DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-007	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ≥10.6' BGS based on soils
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: Natural cave / MONITORING WELL: temporary	OTHER (SPECIFY):
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner — Date: 11/18/14

QAQC'd by: J Raulff — Date: 12/2/14

Drilling Log (~~Page 2~~)
Rev. 1, Date: 07/21/2014

amec DRILLING LOG (Page ~~2~~ 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-007

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-5'	Dark brown fill- loose, damp, gravelly sand-silt mixture, well graded; moist	0.0 ppm	0-5'	—	FILL	Rec: 2.1/5'
5	5-10'	Dark yellowish brown silty sand w/ gravel, moist, well graded, mdm dense w/ gray gravel layer ~9.4'	0.0 ppm	5-10'	—	SM/GM	Rec: 2.8/5'
10	10-15'	Dark yellowish brown silty sand w/ gravel, saturated, loose, well graded	0.0 ppm	10-15'	—	SM/GM	DTW = 10.6' fbground ~~grd~~ (DF) Rec: 2/5'
15							

NAME/SIGNATURE: [signature] / D. Lerner — DATE: 11/18/14

QAQC'd by: J Ruliffs. — DATE: 12/2/14

amec DRILLING LOG (Page 2)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-007

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 of 3

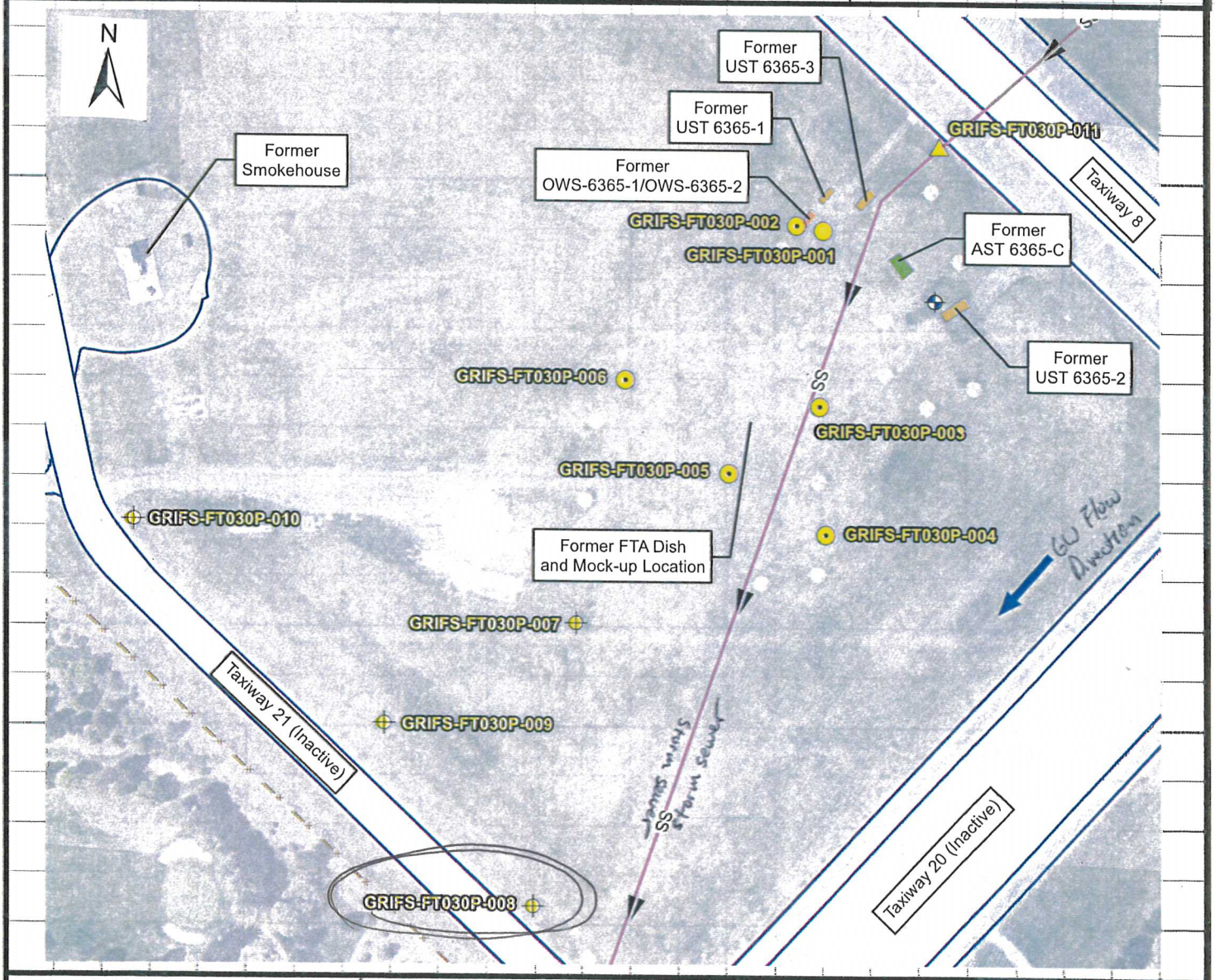
ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18	Dark yellowish brown silty sand-fine grained, saturated, loose, poorly graded - gravel mixture at 17.7'		15-18'		SM	Rec: 3.4/5'
		10 YR 3/4				GM	
		Bottom of boring = 18' BGS					
20'							

NAME/SIGNATURE: D. Lerner /AJ DATE: 11/18/14

QAQC'd by: J. Ratcliff DATE: 12/2/14

DRILLING LOG

LOCATION ID: GRIFS-FT030P-008	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Trvex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ~14' BGS
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed. / BACKFILLED: natural cave / MONITORING WELL: temporary / OTHER (SPECIFY):	
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner — Date: 11/18/14

QAQC'd by: J Rawlff — Date: 12/2/14

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-008

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 83 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-5'	~~Top soil~~ (02) Fill - Dark yellowish brown silty sand w/ gravel, damp, loose, poorly graded 10YR 3/4	0.0 ppm	0-5		Fill	Rec: 1.1/5'
5'	5-10'	Dark yellowish brown silty sand w/ some gravel, damp to wet (at ~9.8'), loose to mdm dense, poorly graded 10 YR 3/6	0.0 ppm	5-10		SM	Rec: 0.9/5'
10'	10-15'	Same as above but more gravelly. Gray gravel layer at ~14.7'. 14.8-15': same as 5-10' but coarser grained sand.	0.0 ppm	10-15		SM/GM GM	Rec: 0.8/5' DTW: ~14' bgs
15'							

NAME/SIGNATURE: D. Lerner / [signature] DATE: 11/18/14

QAQC'd by: J Rawlff / [signature] DATE: 12/2/14

amec DRILLING LOG (Page 2 of 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-008

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 (DJ) of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	Dark yellowish brown coarse grained silty sand, ~~and~~ (DJ) ~~gra~~ saturated, loose to mdm dense, poorly graded (DJ) 10 YR 3/4 Bottom of boring = 18' BGS	0.0 ppm	15-18		SM	Rec: 2.4/3'

20'

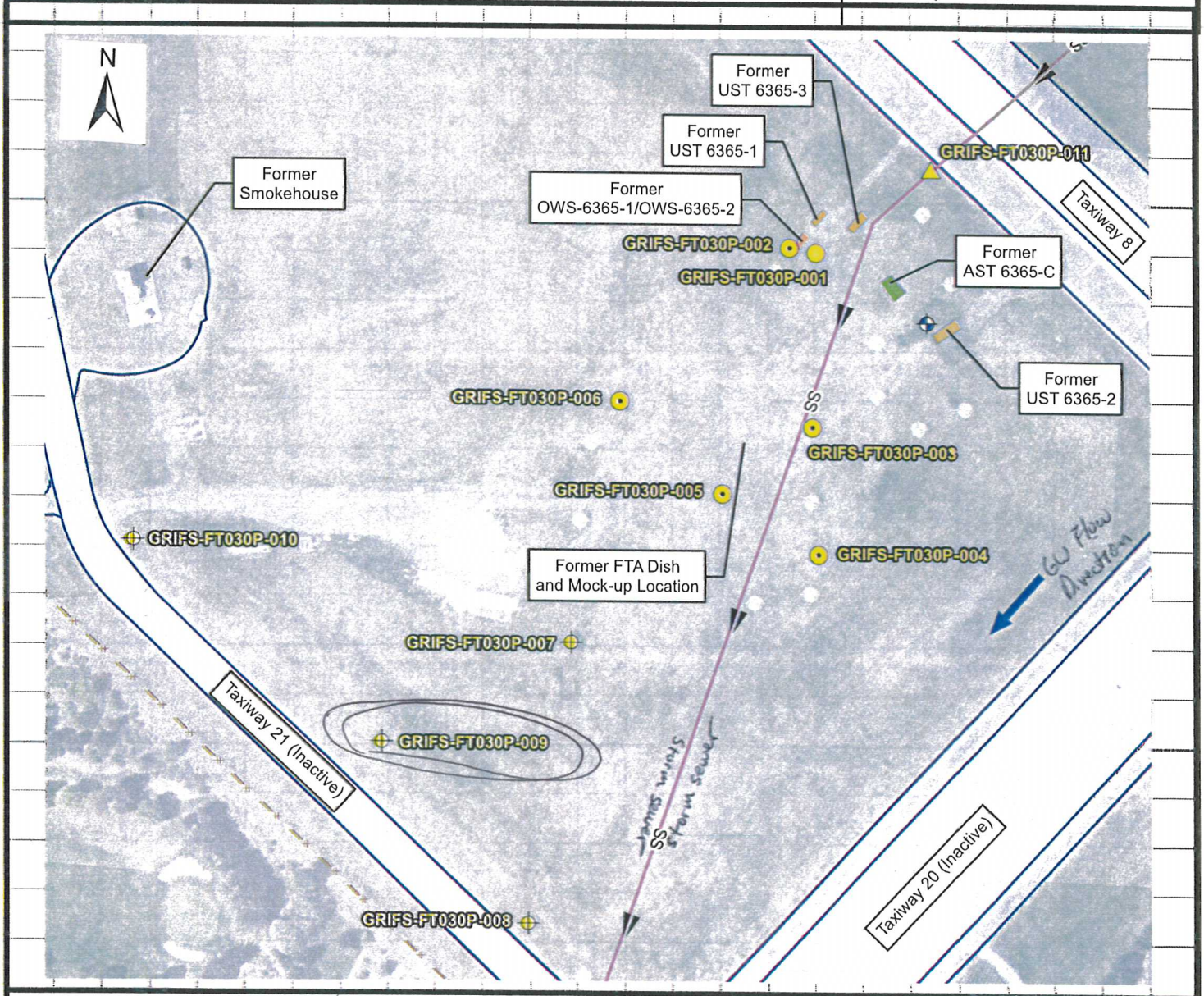
NAME/SIGNATURE: D. Lerner / DJ — DATE: 11/18/14

QAQC'd by: J Ruffin — DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-009	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Truex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ≈14' BGS
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: natural cave / MONITORING WELL: temporary / OTHER (SPECIFY):	
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner / [signature] Date: 11/18/14

QAQC'd by: J Ravelli Date: 12/2/14

amec DRILLING LOG (Page 2)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-009

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 OF 83 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-5'	0-0.9': fill: Dark yellowish brown silty sand w/ organics and some gravel, damp, loose, poorly graded. 10 YR 3/4 Gravel layer 0.9-1.1'. 1.1-1.9': dark yellowish brown silty sand w/ trace gravel, damp, loose, poorly graded 10 YR 3/6	0.0 ppm	0-5		FILL SM	Rec: 1.9/5'
5'	5-10'	same as above w/ black layer from 9.8-9.9' 10 YR 2/1 gravel ranges from 0.01 to 0.1'.	0.0 ppm	5-10		SM SW/GM	Rec: 1.2/5'
10'	10-15'	Very dark brown coarse-grained silty sand, moist, loose to mdm dense, poorly graded 10 YR 2/2	0.0 ppm	10-15		SM	DTW: ~14' bgs
15'							

NAME/SIGNATURE: D. Lerner DATE: 11/18/14

QAQC'd by: J Ramsey DATE: 12/2/14

Drilling Log (~~Page 2~~)
Rev. 1, Date: 07/21/2014

amec DRILLING LOG (Page 2 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-009

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 3 (2) OF SHEETS 3

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	same as above but becomes more gravelly and saturated at ~17.7' Bottom of boring = 18' BGS	0.0 ppm	15-18'		GM	Rec: 1.1/3'

20'

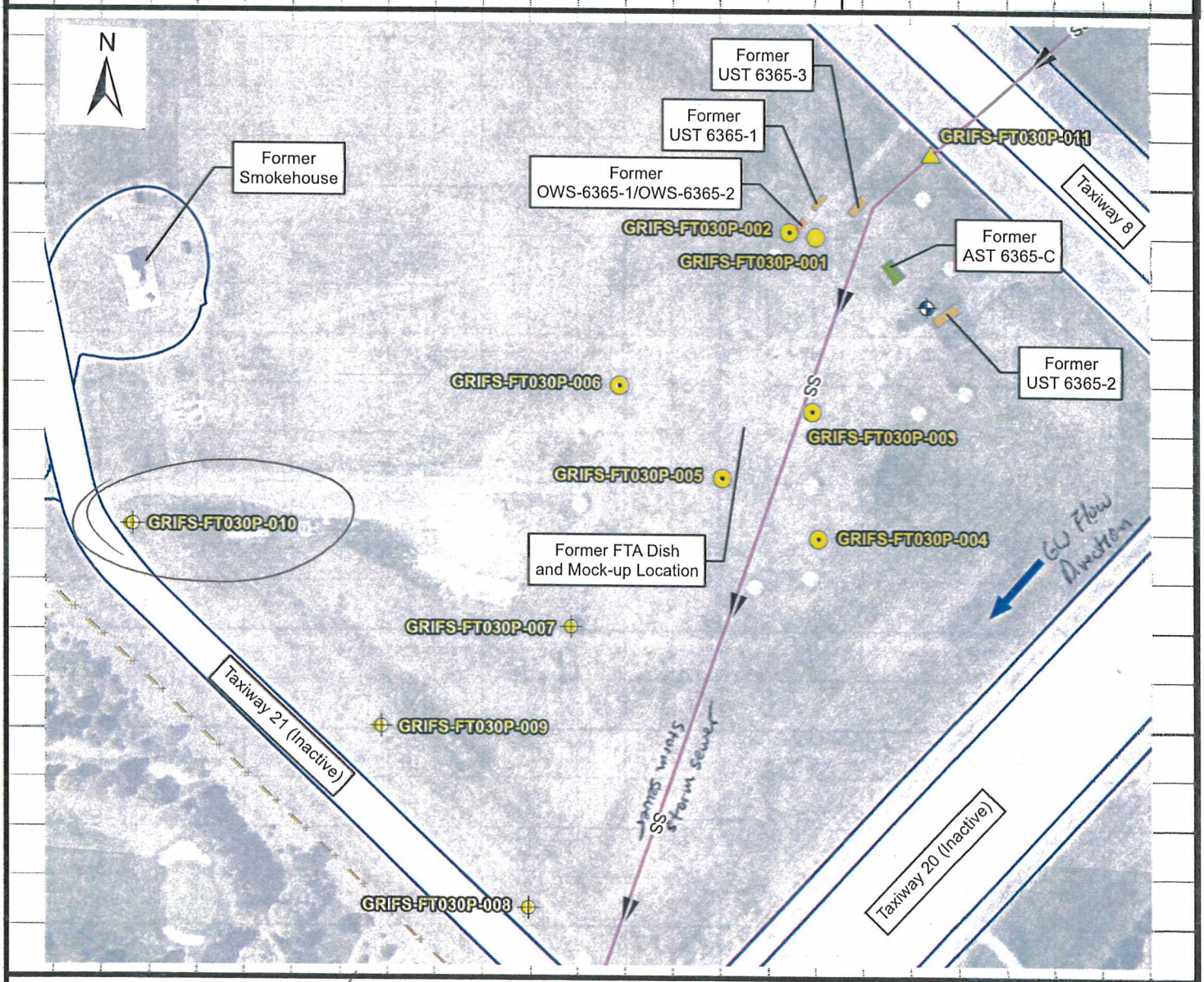
NAME/SIGNATURE: D. Lerner / DL DATE: 11/18/14

QAQC'd by: J Ramsey DATE: 12/2/14

Drilling Log (Page 1)
Rev. 1. Date: 07/21/2014

DRILLING LOG

LOCATION ID: GRIFS-FT030P-010	INSTALLATION/SITE: Griffis/FT030P
DRILL SUBCONTRACTOR: AZTECH	SHEET: 1 of SHEETS: 3
PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766 Task Order 0177 775290177.0009.0300B	DATE STARTED: 11/18/14 / DATE COMPLETED: 11/18/14
NAME OF DRILLER(S): Ray Hammond and Stefan Truex	SURFACE ELEVATION: NA
SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: Geoprobe 6610 DT with macro core sampler x 2½" OD x 5' with acetate sleeve	SURFACE ELEVATION: NA
	TOTAL DEPTH OF BOREHOLE: ~18' BGS / DEPTH OF GROUNDWATER ENCOUNTERED: ~14' BGS
	OVERBURDEN THICKNESS: >18' / DEPTH DRILLED INTO ROCK: NA
DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —	OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —
DISPOSITION OF BORE HOLE: backfilled and sealed / BACKFILLED: natural cave / MONITORING WELL: temporary	OTHER (SPECIFY):
LOCATION SKETCH/COMMENTS	SCALE: ≈1" = 200'



Name/Signature: D. Lerner — Date: 11/18/14

QAQC'd by: J Rawlffs — Date: 12/2/14

amec

DRILLING LOG (Page 2)

INSTALLATION/SITE: Griffis AFB/ FT030P

LOCATION ID: GRIFS-FT030P-010

PROJECT / PROJECT NUMBER: PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	0-5'	Brown fill-gravelly sand w/ silt, loose to mdm dense, well graded, damp, moist at ~4' 10YR 4/3	0.0 ppm	0-5		Fill GM	Rec: 2.9/5'
5'							
	5-10'	7.4 to 8': Dark grayish brown silty sand, mdm dense, poorly graded, moist. 10YR 4/2 8-8.8': gravel layers mixed w/ dark gray silty sands, same as above 10YR 4/1 8.8-9': gravel layer 9-10': very dark brown silty sand w/ gravel at 9.4-9.6' same as above 10YR 2/2.		5-10		SM SM/GM GM	Rec: 2.6/5'
10'							
	10-15'	Very dark grayish brown silty sand w/ gravel, moist, mdm dense, well graded 10 YR 3/2		10-15		GM	Rec: 1.2/5' DTW = ~14' bgs
15'							

NAME/SIGNATURE: D-Lerner / DATE: 11/18/14

QAQC'd by: J Ruelffi DATE: 12/2/14

Drilling Log (Page 2)
Rev. 1, Date: 07/21/2014

amec DRILLING LOG (Page 2 of 3)

INSTALLATION/SITE Griffis AFB/ FT030P

LOCATION ID GRIFS-FT030P-010

PROJECT / PROJECT NUMBER PFCs Release Determination at Multiple BRAC Bases, Contract FA8903-08-8766
Task Order 0177 / 775290177.0009.0300B

SHEET 2 of 3 SHEETS

ELEV (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	HNU SCREENING RESULTS (PPM) (d)	PUSH / SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO (f)	USCS (g)	REMARKS (h)
	15-18'	Dark yellowish brown silty sand w/ gravel, saturated, loose, well graded 10 YR 3/6 Bottom of boring = 18' BGS				SM/GM	Rec: 0.5/5'
20'							

NAME/SIGNATURE: D. Lerner / DL DATE: 11/18/14

QAQC'd by: JRanliff DATE: 12/2/14

APPENDIX B

LABORATORY CASE NARRATIVE AND DATA VALIDATION REPORT

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DATA VALIDATION REPORT
PERFLUORINATED COMPOUNDS (PFCs) RELEASE DETERMINATION
AT MULTIPLE BRAC BASES
GRIFFISS AIR FORCE BASE
ROME, NEW YORK

SAMPLES COLLECTED 17 AND 19 NOVEMBER, 2014

Prepared for:
Air Force Civil Engineer Center
Joint Base San Antonio – Lackland, Texas

Prepared by:

amec
foster
wheeler

Contract FA8903-08-D-8766
Task Order 0177

May 2015

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Table 3 Laboratory Split Sample Results
Table 4 Qualifiers Added During Validation

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ACRONYMS AND ABBREVIATION

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
Accutest	Accutest Laboratories
AMEC	Amec Foster Wheeler Environment & Infrastructure, Inc.
CCV	Continuing Calibration Verification
CLP	Contract Laboratory Program
COC	chain of custody
DoD	Department of Defense
EPA	United States Environmental Protection Agency
ICV	initial calibration verification
ID	identification
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantification
MS	matrix spike
MSD	matrix spike duplicate
PFBS	Perfluorobutane sulfonic acid
PFCs	Perfluorinated Compounds
PFHpA	Perfluoroheptanoic acid
PFHxS	Perfluorohexane sulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluoronoctanoic acid
PFOS	Perfluorooctane sulfonic acid
QC	quality control
QPP	Quality Program Plan
RPD	relative percent difference
SDG	Sample Delivery Group
Vista	Vista Analytical Laboratory

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1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (AMEC) collected seventeen water samples, including two field blanks, two rinsate blanks, and two field duplicates, and twenty soil samples, including two field duplicates, between 17 and 19 November, 2014, from Griffiss Air Force Base, located in Rome, New York. AMEC submitted the samples to Accutest Laboratories (Accutest), located in Orlando, Florida on 19 and 20 November, 2014, where they were assigned to sample delivery groups (SDGs) FA20060 and FA20140. One groundwater sample, GRIFS-GW-004, was also submitted to Vista Analytical Laboratory (Vista), located in El Dorado Hills, California on 20 November, 2014, where it was assigned to SDG 1400885. Accutest and Vista analyzed the samples for perfluorinated compounds (PFCs) by United States Environmental Protection Agency (EPA) Method 537. A list of these samples by field sample identification (ID), sample collection date, sample matrix, Accutest sample ID, and Vista sample ID is presented in Table 1.

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2.0 DATA VALIDATION METHODOLOGY

AMEC performed EPA Stage IV validation on 10% of the samples and EPA Stage 2B validation on the remaining samples associated with this sampling event as indicated on Table 1. The Stage IV validation includes review of the quality control (QC) results in the laboratory's analytical report and reported on QC summary forms as well as recalculation checks and review of the instrument raw data outputs. The Stage 2B validation includes review of the QC results in the laboratory's analytical report and reported on QC summary forms with no review of the associated raw data. Data from equipment and field blanks did not undergo validation because results from these samples are only used to assess data usability for field samples. This data validation has been performed in general accordance with:

- AMEC, 2014. Final (Revision 1), PFCs Release Determination at Multiple BRAC Bases, Quality Program Plan (QPP), Contract FA8903-08-D-8766, Task Order 0177, July 2014.
- Department of Defense (DoD), 2010. DoD Quality Systems Manual for Environmental Laboratories, Version 4.2. 25 October, 2010.
- EPA, 2009. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1, September 2009. EPA Document #: EPA/600/R-08/092.
- EPA, 2014. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, EPA/540-R-014-002.

The CLP guideline was written specifically for the CLP, and has been modified for the purposes of this data review where it differs from method-specific, QPP-specified, and laboratory-specified QC requirements.

The laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Laboratory case narrative review;
- Chain of custody (COC) compliance;
- Holding time compliance;
- QC sample frequency;
- Initial calibration, initial calibration verification (ICV), and continuing calibration verification (CCV) compliance with method-specified criteria;
- Presence or absence of laboratory contamination as demonstrated by laboratory blanks;
- Accuracy and bias as demonstrated by recovery of surrogate spikes, laboratory control sample (LCS), and matrix spike (MS) samples;

- Internal standard recoveries;
- Analytical precision as relative percent difference (RPD) of analyte concentration between laboratory duplicates or MS/MS duplicate (MSD);
- Sampling and analytical precision as RPD of analyte concentration between field duplicates;
- Assessment of field contamination as demonstrated by field and trip blanks;
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices.

In general, it is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but any reported value may potentially contain error.

3.0 EXPLANATION OF DATA QUALITY INDICATORS

Summary explanations of the specific data quality indicators reviewed during this data quality review are presented below.

3.1 LABORATORY CONTROL SAMPLE RECOVERIES

LCSs and LCS duplicates are aliquots of analyte-free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples they accompany. LCS recovery is an indication of a laboratory's ability to successfully perform an analytical method in an interference-free matrix.

3.2 MATRIX SPIKE RECOVERIES

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 SURROGATE SPIKE RECOVERIES

Surrogate spikes are used to evaluate accuracy, method performance, and extraction efficiency in each individual sample. Surrogate compounds are compounds not normally found in environmental samples, but which are similar to target analytes in chemical composition and behavior in the analytical process.

3.4 BLANK CONCENTRATIONS

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Equipment blanks are prepared by passing analyte-free water through or over sample collection equipment and collecting the water in sample containers. Equipment blanks are analyzed for the analytical suite required for the project. Equipment blanks are used to monitor for possible sample contamination during the sample collection process and serve as a check on the effectiveness of field decontamination procedures.

Field blanks are prepared by pouring an aliquot of analyte-free water into a sample container in the field. Field blanks are analyzed for the analytical suite required for the project. Field blanks are used to monitor for possible sample contamination originating from the water used for equipment decontamination.

Laboratory, equipment, and field blanks are processed by the laboratory using exactly the same procedures as the field samples. Target analytes should not be found in laboratory blanks.

When target analytes are detected in blanks, analyte concentrations in the associated samples less than 10 times the concentration detected in the blank will be B qualified.

3.5 LABORATORY AND FIELD DUPLICATES

Laboratory and field duplicate analysis verifies acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 DEFINITIONS OF QUALIFIERS THAT MAY BE USED DURING DATA VALIDATION

B The analyte was detected in the sample and an associated blank and the concentration detected in the sample was less than 10 times the concentration detected in the blank.

U The analyte was analyzed for, but was not detected above the reported limit of detection (LOD).

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

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5.0 QUALIFICATION REASON CODES

AMEC applied the following reason code to the data during validation:

ICR2	Initial calibration exceeded the regression factor for the first order regression.
ISL	Low internal standard recovery. Analytical result may be biased high.
FDD	Field duplicate imprecision.
TR	Detected concentration is less than the limit of quantification (LOQ).

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6.0 CHAIN OF CUSTODY AND SAMPLE RECEIPT CONDITION DOCUMENTATION

The samples were received at the laboratory under proper COC, intact, properly preserved, and at temperatures less than the QPP-specified maximum of 10 degrees Celsius.

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7.0 SPECIFIC DATA VALIDATION FINDINGS

Results from these samples may be considered usable with the limitations and exceptions described Sections 7.1 through 8.0.

7.1 PERFLUORINATED COMPOUNDS BY EPA METHOD 537

PFCs results generated by Accutest are usable with the limitations described in Sections 7.1.1 through 7.1.11.

7.1.1 Holding Times

The samples were extracted for PFCs within the QPP-specified maximum holding time of 14 days from sample collection and the extracts were analyzed within the QPP-specified maximum hold time of 28 days from extraction.

7.1.2 Initial Calibrations

The initial calibrations associated with the analysis of these samples met the QPP-specified criteria of regression factors greater than 0.995 or relative standard deviations less than or equal to 20% with the following exceptions

- Initial calibration regression factors for perfluoroheptanoic acid (PFHpA) (0.9903), perfluorononanoic acid (PFNA) (0.9905), perfluoro-n-octanoic acid (PFOA) (0.9921), and perfluorooctane sulfonic acid (PFOS) (0.9924) were low in the initial calibration associated with samples GRIFS-SO-007, GRIFS-GW-001, GRIFS-GW-002, GRIFS-SO-012, GRIFS-SO-015, GRIFS-SO-016, GRIFS-SO-018, GRIFS-SO-019, and GRIFS-SO-020. Data limitations are summarized below.
  - The PFHpA, PFNA, and PFOA results from samples GRIFS-SO-015, GRIFS-SO-018, GRIFS-SO-019, and GRIFS-SO-020 were reported from an analysis performed under a different initial calibration and data usability is not adversely affected for these analytes.
  - AMEC J qualified the detected and UJ qualified the non-detected PFHpA, PFNA, and PFOA results from the remaining samples because the curves did not meet the QPP-specified criteria. (Qualifiers and reason code: J/UJ-ICR2)
  - AMEC J qualified the detected and UJ qualified the non-detected PFOS results from these samples because the curve did not meet the QPP-specified criteria. (Qualifiers and reason code: J/UJ-ICR2)

7.1.3 Initial Calibration Verification

ICV recoveries were within the QPP specified 75% to 125% limits.

7.1.4 Continuing Calibration Verification

CCV recoveries were within the QPP specified 75% to 125% limits.

7.1.5 Laboratory Blanks

PFCs were not detected in the laboratory blanks associated with these samples.

7.1.6 Field and Equipment Blanks

Target analytes were not detected in the field and equipment blanks associated with these samples.

7.1.7 Laboratory Control Sample Accuracy

LCS recoveries were within QPP-specified 70 to 130% limits.

7.1.8 Matrix Spikes/ Matrix Spike Duplicates

Accutest performed MS and MSD analyses on samples GRIFS-SO-006, GRIFS-SO-020, and GRIFS-SW-003. Recoveries were within the QPP-specified 70 to 130% limits and precision values were less than the QPP-specified maximum of 30% with the following exception.

- PFOS recoveries were outside specified limits at 67% and 425% in the MS and MSD, respectively, performed on sample GRIFS-SO-020. Additionally, the RPDs between MS and MSD results were high for PFHpA (33%), PFOA (33%), PFNA (37%), and perfluorobutane sulfonic acid (PFBS) (32%). Data limitations are summarized below.
  - The detected PFOS result from the native, unspiked sample, at 1,390 micrograms per kilogram (µg/kg), was greater than four times the spike concentration of 89.2 µg/kg and it is not possible to evaluate data usability based on spike recovery for this analyte.
  - PFHpA, PFOA, PFNA, and PFBS were not detected in this sample and data usability is not adversely affected by the potential analytical imprecision.

7.1.9 Surrogate Recoveries

Surrogate recoveries were within the QPP-specified 70 to 130% limits with the following exception.

- Surrogate compounds were not recovered in the diluted analysis of samples GRIFS-GW-003, GRIFS-GW-004, GRIFS-GW-005, GRIFS-GW-006, GRIFS-GW-008, GRIFS-GW-009, and GRIFS-GW-010. These samples were analyzed at a 20-fold or higher dilution factor and it is not possible to evaluate data usability based on surrogate recoveries for these diluted analyses.

7.1.10 Internal Standard Recoveries

Internal standard areas were within the QPP-specified limits of 50 to 150% of the average area counts measured during the initial calibration and recoveries were within the QPP-specified 70 to 130% limits for aqueous samples and 60 to 130% limits for soil/sediment samples with the following exception:

- Recovery of the internal standard ^{13}C-PFOS was low at 49.3% in the analysis of split sample GRIFS-GW-004 by Vista. AMEC J qualified the detected PFOS result from this sample because of the potential high analytical bias. (Qualifier and reason code: J-ISL)

7.1.11 Data Reporting and Analytical Procedures

Accutest J qualified analytes with concentrations between the MDL and the LOQ. AMEC agrees that these results are quantitatively uncertain and has maintained the laboratory's J qualifiers. (Qualifier and reason code: J-TR)

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8.0 FIELD DUPLICATE RESULTS

Samples GRIFS-SO-010 (GRIFS-SO-011), GRIFS-GW-001 (GRIFS-GW-002), GRIFS-SO-019 (GRIFS-SO-020), and GRIFS-SW-002(GRIFS-SW-003) were collected as field duplicates. Detected results and RPDs for the field duplicates are summarized in Table 2. All precision values were within the QPP-specified limits of less than 30% RPD or the difference between analytical results less than the LOQ with the following exception.

- Perfluorohexane sulfonic acid (PFHxS) and PFOS were detected in sample GRIFS-GW-001 at concentrations of 0.0683 micrograms per liter (µg/L) and 0.617 µg/L, respectively, but were not detected in field duplicate GRIFS-GW-002 above the LOQs of 0.021 µg/L and 0.10 µg/L, respectively. AMEC J qualified the detected PFHxS and PFOS results from sample GRIFS-GW-001 and UJ qualified the non-detected PFHxS and PFOS results from sample GRIFS-GW-002 because of the potential sampling or analytical imprecision. (Qualifiers and reason code: J/UJ-FDD)

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9.0 LABORATORY SPLIT SAMPLES

AMEC submitted sample GRIFS-GW-004 to both Accutest and Vista for analysis of PFCs by EPA Method 537. Results and RPDs for the two analyses are summarized in Table 3. All precision values were within the QPP-specified limits of less than 100% for solid samples, less than 50% for water samples, or the difference between results less than two times the higher LOQ.

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10.0 SUMMARY AND CONCLUSIONS

AMEC evaluated a total of 204 data records from field samples during the validation. AMEC J or UJ qualified 40 records (19.6%) as estimated values because of initial calibrations outside of specifications, field duplicate imprecision, low internal standard recovery, and/or analyte concentrations between the LOD and the LOQ. Qualified data are summarized in Table 4.

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REFERENCES

AMEC, 2014. Final (Revision 1), PFCs Release Determination at Multiple BRAC Bases, Quality Program Plan (QPP), Contract FA8903-08-D-8766, Task Order 0177, July 2014.

Department of Defense (DoD), 2010. DoD Quality Systems Manual for Environmental Laboratories, Version 4.2. 25 October, 2010.

EPA, 2009. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1, September 2009. EPA Document #: EPA/600/R-08/092.

EPA, 2014. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, EPA/540-R-014-002.

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TABLES

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Table 1
Field Samples Submitted to Accutest Laboratories
Griffiss Air Force Base, New York
Perfluorinated Compounds Release Determination

Sample Identification	Collection Date	Sample Matrix	Laboratory SDG	Laboratory Sample Identification	Notes
GRIFS-FT030P-BLK01	11/18/2014	QC Water	FA20060	FA20060-1	Rinsate Blank
GRIFS-SO-001	11/17/2014	Soil	FA20060	FA20060-2	Stage IV
GRIFS-SO-002	11/17/2014	Soil	FA20060	FA20060-3	Stage IV
GRIFS-SO-003	11/17/2014	Soil	FA20060	FA20060-4	
GRIFS-SO-004	11/17/2014	Soil	FA20060	FA20060-5	
GRIFS-SO-005	11/17/2014	Soil	FA20060	FA20060-6	
GRIFS-SO-006	11/17/2014	Soil	FA20060	FA20060-7	MS/MSD
GRIFS-SO-007	11/17/2014	Soil	FA20060	FA20060-8	
GRIFS-SO-008	11/17/2014	Soil	FA20060	FA20060-9	
GRIFS-SO-009	11/17/2014	Soil	FA20060	FA20060-10	
GRIFS-SO-010	11/18/2014	Soil	FA20060	FA20060-11	
GRIFS-SO-011	11/18/2014	Soil	FA20060	FA20060-12	Field Duplicate of Sample GRIFS-SO-010
GRIFS-FT030P-BLK02	11/18/2014	QC Water	FA20060	FA20060-13	Field Blank
GRIFS-GW-001	11/18/2014	Groundwater	FA20060	FA20060-14	
GRIFS-GW-002	11/18/2014	Groundwater	FA20060	FA20060-15	Field Duplicate of Sample GRIFS-GW-001
GRIFS-SO-012	11/18/2014	Soil	FA20060	FA20060-16	
GRIFS-SO-013	11/18/2014	Soil	FA20060	FA20060-17	
GRIFS-SO-014	11/18/2014	Soil	FA20060	FA20060-18	
GRIFS-SO-015	11/18/2014	Soil	FA20060	FA20060-19	
GRIFS-SO-016	11/18/2014	Soil	FA20060	FA20060-20	
GRIFS-SO-017	11/18/2014	Soil	FA20060	FA20060-21	
GRIFS-SO-018	11/18/2014	Soil	FA20060	FA20060-22	
GRIFS-SO-019	11/18/2014	Soil	FA20060	FA20060-23	
GRIFS-SO-020	11/18/2014	Soil	FA20060	FA20060-24	Field Duplicate of Sample GRIFS-SO-019, MS/MSD
GRIFS-FT030P-BLK03	11/19/2014	QC Water	FA20140	FA20140-1	Rinsate Blank
GRIFS-FT030P-BLK04	11/19/2014	QC Water	FA20140	FA20140-2	Field Blank
GRIFS-GW-003	11/19/2014	Groundwater	FA20140	FA20140-3	
*GRIFS-GW-004	11/19/2014	Groundwater	FA20140	FA20140-4	Split Sample GRIF-GW-004_SS
GRIFS-GW-005	11/19/2014	Groundwater	FA20140	FA20140-5	
GRIFS-GW-006	11/19/2014	Groundwater	FA20140	FA20140-6	
GRIFS-GW-008	11/19/2014	Groundwater	FA20140	FA20140-7	
GRIFS-GW-009	11/19/2014	Groundwater	FA20140	FA20140-8	
GRIFS-GW-010	11/19/2014	Groundwater	FA20140	FA20140-9	
GRIFS-SW-001	11/19/2014	Surface Water	FA20140	FA20140-10	Stage IV
GRIFS-SW-002	11/19/2014	Surface Water	FA20140	FA20140-11	
GRIFS-SW-003	11/19/2014	Surface Water	FA20140	FA20140-12	Field Duplicate of Sample GRIFS-SW-002, MS/MSD
GRIFS-GW-007	11/19/2014	Groundwater	FA20140	FA20140-13	Stage IV

Notes:
* Sample GRIFS-GW-004 was also submitted to Vista Analytical Laboratory (SDG 1400885, Sample ID 1400885-01) for split sample analysis.
MS/MSD = Matrix Spike / Matrix Spike Duplicate
SDG = Sample Delivery Group

Table 2
Field Duplicate Detections
Griffiss Air Force Base, New York
Perfluorinated Compounds Release Determination

Analyte	LOQ	Primary Sample	Field Duplicate	Units	RPD	Notes
Samples GRIFS-SO-010 and GRIFS-SO-011						
Perfluorooctane sulfonic acid	0.014	0.0565	0.0758	mg/kg	29%	
Samples GRIFS-GW-001 and GRIFS-GW-002						
Perfluoroheptanoic acid	0.021	0.0102 J	0.016 U	µg/L	NC	± LOQ
Perfluorohexane sulfonic acid	0.021	0.0683	0.016 U	µg/L	NC	J/UJ-FDD
Perfluorooctanoic acid	0.042	0.0236 J	0.032 U	µg/L	NC	± LOQ
Perfluorooctane sulfonic acid	0.100	0.617	0.016 U	µg/L	NC	J/UJ-FDD
Samples GRIFS-SO-019 and GRIFS-SO-020						
Perfluorohexane sulfonic acid	0.012	0.00748 J	0.00618 J	mg/kg	19%	
Perfluorooctane sulfonic acid	0.120	1.6	1.39	mg/kg	14%	
Samples GRIFS-SW-002 and GRIFS-SW-003						
Perfluoroheptanoic acid	0.020	0.0113 J	0.0115 J	µg/L	1.8%	
Perfluorohexane sulfonic acid	0.020	0.135	0.137	µg/L	1.5%	
Perfluorooctane sulfonic acid	0.020	0.285	0.289	µg/L	1.4%	

Notes

± LOQ = the difference between analyte concentrations is less than the limit of quantification (LOQ).
µg/L = micrograms per liter
mg/kg = milligrams per kilogram
NC = not calculable
RPD = Relative Percent Difference

Qualifiers

J = The associated result is quantitatively uncertain
U = The analyte was analyzed for, but was not detected above the reported limit of detection.

Reason Code

FDD = Field duplicate imprecision

Table 3
Laboratory Split Sample Results
Griffiss Air Force Base, New York
Perfluorinated Compounds Release Determination

Analyte	Higher LOQ	Accutest	Vista	Units	RPD	Notes
Sample GRIFS-GW-004						
Perfluoroheptanoic acid	0.040	0.0735	0.0545	µg/L	30%	
Perfluorooctanoic acid	0.080	0.11	0.0743	µg/L	39%	
Perfluorononanoic acid	0.040	0.032 U	0.00428 J	µg/L	NC	± 2 LOQs
Perfluorobutane sulfonic acid	0.040	0.032 U	0.0154	µg/L	NC	± 2 LOQs
Perfluorohexane sulfonic acid	0.322	0.598	0.290 J	µg/L	69%	± 2 LOQs
Perfluorooctane sulfonic acid	0.400	4.70	3.59	µg/L	27%	

Notes

± 2 LOQ = The difference between analyte concentrations is less than twice the higher limit of quantification (LOQ).

µg/L = micrograms per liter

NC = not calculable

RPD = Relative Percent Difference

Qualifiers

J = The associated result is quantitatively uncertain

U = The analyte was analyzed for, but was not detected above the reported limit of detection.

Table 4
Qualifiers Added During Validation
Griffiss Air Force Base, New York
Perfluorinated Compounds Release Determination

Sample Identification	Analyte	Results	Validation Qualifiers and Reason Codes
GRIFS-GW-001	Perfluoroheptanoic acid	0.0102 µg/L	J ICR2, TR
	Perfluorohexane sulfonic acid	0.0683 µg/L	J FDD
	Perfluorononanoic acid	0.017 µg/L	UJ ICR2
	Perfluorooctane sulfonic acid	0.617 µg/L	J ICR2, FDD
	Perfluorooctanoic acid	0.0236 µg/L	J ICR2, TR
GRIFS-GW-002	Perfluoroheptanoic acid	0.016 µg/L	UJ ICR2
	Perfluorohexane sulfonic acid	0.016 µg/L	UJ FDD
	Perfluorononanoic acid	0.016 µg/L	UJ ICR2
	Perfluorooctane sulfonic acid	0.016 µg/L	UJ ICR2, FDD
	Perfluorooctanoic acid	0.032 µg/L	UJ ICR2
GRIFS-GW-004_SS	Perfluorohexane sulfonic acid	0.290 µg/L	J TR
	Perfluorononanoic acid	0.00428 µg/L	J TR
	Perfluorooctane sulfonic acid	3.59 µg/L	J ISL
GRIFS-GW-006	Perfluorooctanoic acid	0.533 µg/L	J TR
GRIFS-GW-007	Perfluorononanoic acid	0.0102 µg/L	J TR
GRIFS-GW-008	Perfluoroheptanoic acid	0.0834 µg/L	J TR
	Perfluorooctanoic acid	0.152 µg/L	J TR
GRIFS-GW-009	Perfluorononanoic acid	0.0291 µg/L	J TR
GRIFS-GW-010	Perfluorobutane sulfonic acid	0.0989 µg/L	J TR
	Perfluorononanoic acid	0.0585 µg/L	J TR
GRIFS-SO-007	Perfluoroheptanoic acid	0.011 mg/kg	UJ ICR2
	Perfluorononanoic acid	0.011 mg/kg	UJ ICR2
	Perfluorooctane sulfonic acid	0.0133 mg/kg	J ICR2, TR
	Perfluorooctanoic acid	0.022 mg/kg	UJ ICR2
GRIFS-SO-012	Perfluoroheptanoic acid	0.011 mg/kg	UJ ICR2
	Perfluorononanoic acid	0.011 mg/kg	UJ ICR2
	Perfluorooctane sulfonic acid	0.935 mg/kg	J ICR2
	Perfluorooctanoic acid	0.023 mg/kg	UJ ICR2
GRIFS-SO-015	Perfluorooctane sulfonic acid	0.488 mg/kg	J ICR2
GRIFS-SO-016	Perfluoroheptanoic acid	0.0097 mg/kg	UJ ICR2
	Perfluorononanoic acid	0.0097 mg/kg	UJ ICR2
	Perfluorooctane sulfonic acid	0.0157 mg/kg	J ICR2
	Perfluorooctanoic acid	0.0568 mg/kg	J ICR2
GRIFS-SO-018	Perfluorooctane sulfonic acid	0.638 mg/kg	J ICR2
GRIFS-SO-019	Perfluorohexane sulfonic acid	0.00748 mg/kg	J TR
	Perfluorooctane sulfonic acid	1.6 mg/kg	J ICR2
GRIFS-SO-020	Perfluorohexane sulfonic acid	0.00618 mg/kg	J TR
	Perfluorooctane sulfonic acid	1.39 mg/kg	J ICR2

Table 4
Qualifiers Added During Validation
Griffiss Air Force Base, New York
Perfluorinated Compounds Release Determination

Sample Identification	Analyte	Results	Validation Qualifiers and Reason Codes
GRIFS-SW-002	Perfluoroheptanoic acid	0.0113 µg/L	J TR
GRIFS-SW-003	Perfluoroheptanoic acid	0.0115 µg/L	J TR

Notes

µg/L = micrograms per liter
mg/kg = milligrams per kilogram
_SS = split sample

Validation Qualifiers

J = The associated result is quantitatively uncertain
UJ = The analyte was not detected above the reported sample quantitation limit. The reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Reason Codes

ICR2 = The initial calibration is outside specifications.
FDD = Field duplicate imprecision
TR = Result reported between the limit of quantitation and the limit of detection

APPENDIX C

LABORATORY ANALYTICAL REPORTS

(CD-ROM)

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