Phase 1 PFAS Investigation Report
Holloman Air Force Base and Surrounding Area Otero County, New Mexico

Prepared for

New Mexico Environment Department
Hazardous Waste Bureau
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June 30, 2022

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List of Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
µS/cm	microSiemen(s) per centimeter
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
AFW	Amec Foster Wheeler Environmental & Infrastructure, Inc.
BGNDRF	Brackish Groundwater National Desalination Research Facility
bgs	below ground surface
cm/s	centimeters per second
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COC	contaminant of concern
DBS&A	Daniel B. Stephens & Associates, Inc.
DOD	Department of Defense
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
FFY	federal fiscal year
FSP	field sampling plan
ft/d	feet per day
FTA	fire training area
FTSA	fluorotelomer sulfonic acid
FY	fiscal year
gpm	gallons per minute
GWQB	Ground Water Quality Bureau [New Mexico Environment Department]
HA	health advisory
HASP	health and safety plan
HDPE	high-density polyethylene
HEAL	Hall Environmental Analysis Laboratory
HWB	Hazardous Waste Bureau [New Mexico Environment Department]

MCL	maximum contaminant level
MOA	memorandum of agreement
MSB	Museum of Southwestern Biology
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
NAVD88	North American Vertical Datum of 1988
NCP	National Contingency Plan
ng/L	nanogram(s) per liter
NMAC	New Mexico Administrative Code
NMBGMR	New Mexico Bureau of Geology and Mineral Resources
NMDOH	New Mexico Department of Health
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NRCS	Natural Resources Conservation Service
NWIS	National Water Information System
OSE	New Mexico Office of the State Engineer
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFCA	perfluoroalkyl carboxylic acid
PFDA	perfluorodecanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFSA	perfluoroalkyl sulfonic acid
POL	petroleum, oil, and lubricants
PWS	Public water system
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RSL	regional screening level

SAP	sampling and analysis plan
SCP	State Cleanup Program
SI	site inspection
SWMU	Solid Waste Management Unit
SSL	soil screening level
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TOC	total organic carbon
UCMR 3	Third Unregulated Contaminant Monitoring Rule
UNM	University of New Mexico
US 70	U.S. Route 70
USAF	U.S. Air Force
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
Vista	Vista Analytical
WSNM	White Sands National Monument
WWTP	wastewater treatment plant

1. Introduction

To better understand the scope of potential and existing contamination associated with per- and polyfluoroalkyl substances (collectively referred to as PFAS) in New Mexico, the New Mexico Environment Department (NMED) is working with state and federal partners to conduct sampling for PFAS in water. The NMED Hazardous Waste Bureau (HWB) contracted with Daniel B. Stephens & Associates, Inc. (DBS&A) to characterize PFAS in surface water and groundwater on and in the vicinity of Holloman Air Force Base (AFB) in Otero County (the Holloman site) and Cannon AFB in Curry County (the Cannon site). Biological samples were also collected from and near Holloman Lake for the purposes of assessing the effects of PFAS on avian and small mammal ecology and the resulting implications for human health. NMED project technical support and project management has been provided by the Ground Water Quality Bureau (GWQB). This report presents the results of the first phase of work conducted at the Holloman site under this contract (Figure 1).

1.1 Purpose of the Investigation

The purpose of this work is to quantitatively evaluate the PFAS contaminant source(s) and potential migration pathways using a systematic approach through environmental sampling and analysis. This approach will assist in further characterizing the PFAS release within the study area by quantifying contaminants of concern (COCs) in surface water and groundwater in the vicinity of the release. The results will assist NMED in the selection of a remedy that reduces risks to human health and the environment.

The investigation scope included characterizing the Holloman site hydrogeology, sampling wells that have had PFAS detections or are at potential risk of future PFAS contamination, and identifying and assessing potential migration and exposure pathways to the extent practicable.

DBS&A has evaluated the investigation results to assess the risk to human health and the environment in support of recommendations for remedial action under Sections 20.6.2.4000 through 20.6.2.4115 of the New Mexico Administrative Code (NMAC). All work was conducted consistent with the National Oil and Hazardous Materials Pollution Contingency Plan (National Contingency Plan or NCP) described in Title 40, Code of Federal Regulations (CFR), Part 300.

1.2 Project Objectives

NMED identified four objectives for the investigation of the Holloman site:

1. Provide better definition of existing groundwater plume geometry and predictions of future plume migration and surface water contamination, including empirically derived rates of movements of PFAS contaminants.
2. Identify and sample all participating public and private water supply wells that have had PFAS detections or are at potential risk of future PFAS contamination.
3. Establish a regular and comprehensive groundwater monitoring program.
4. Investigate the extent to which resident and migratory waterfowl at the Lake Holloman Wetlands Complex are contaminated with, or otherwise adversely affected by PFAS.

Progress was not made on all of the project objectives during Phase 1 due to a reduction in the project budget after the project was awarded, as well as access issues with Holloman AFB. The total project budget for both the Cannon and Holloman sites was reduced by approximately 20 percent after award. The project scope was reduced accordingly, by not proceeding with most of the groundwater, atmospheric, and surface water modeling that was initially planned, and not establishing a regular groundwater monitoring program. The original project scope called for investigating the extent to which resident and migratory waterfowl have been affected by PFAS. As discussed in Section 6.4.5, biological (bird and small mammal) sampling was performed; however, DBS&A and the University of New Mexico (UNM) Museum of Southwestern Biology (MSB) were unable to secure access to Holloman AFB for biological sampling during Phase 1 of the project. The biological sampling that was performed occurred along the southern portion of Lake Holloman, which is accessible from U.S. Route 70 (US 70), as well as in other reference (background) areas. The UNM biologists did not go on Holloman AFB during Phase 1. Due to project funding constraints, the bulk of the biological samples that were collected have not been sent for analysis, and will be analyzed during later project phases.

A sampling and analysis plan (SAP) (DBS&A, 2021a and 2021b) was prepared in accordance with the *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4* (U.S. EPA, 2006). The final SAP was provided to NMED on December 13, 2021. The SAP describes procedures to ensure that the project-specific data quality objectives (DQOs) are met and that the quality of data is known and documented. The SAP presents the project description, project organization and responsibilities, and quality assurance (QA) objectives

associated with the sampling and analytical services to be provided in support of characterization activities at the Holloman site.

The overall QA objectives are as follows:

- Obtain robust data of known quality to support goals set forth for this project
- Document all aspects of the quality program, including performance of the work and any required changes to work at the site
- Attain quality control (QC) requirements for analyses specified in the SAP

1.3 Confidentiality

Some of the parties that have allowed groundwater and drinking water samples to be collected from their property for PFAS analysis have requested that the laboratory results be held confidential. In those cases, neither the sample location nor specific results have been divulged herein and discussions of the results have been generalized. Results for sampling that occurred prior to the current NMED Phase 1 PFAS investigation that are described herein are those that are already in the public domain and available on the internet. Results in the public domain include investigations conducted by the U.S. Air Force (USAF) on Holloman AFB, as well as results of sampling published on the NMED PFAS website, and the U.S. Geological Survey (USGS) National Water Information System (NWIS).

1.4 Report Organization

This report is organized as follows:

- Section 1 describes the report organization, states the purpose and objectives of the project, and provides an overview of the nature, environmental and health effects of PFAS, and regulatory criteria for PFAS in soil and drinking water.
- Section 2 provides the background on PFAS sampling requirements, PFAS compounds and their use, toxicity, persistence, and human health effects, and regulatory framework.
- Section 3 provides discussions of the project area, including the City of Alamogordo and Holloman AFB, including the physical setting, climate, soil conditions, and the regional and local geology and hydrogeology.

- Section 4 provides a brief discussion of the sources of PFAS contamination in the project area, factors controlling PFAS migration in soil, surface water, and groundwater, and likely exposure pathways.
- Section 5 summarizes the results of sampling of groundwater and drinking water for PFAS in the local area conducted by various parties, including drinking water providers, the USAF, landowners, the state, and the USGS.
- Section 6 describes the NMED Phase I Investigation work performed by DBS&A under this contract, including compilation of relevant information, development of the work plan, environmental sampling conducted at Holloman AFB, and attempts to obtain access to conduct further work.
- Section 7 describes the data gaps that have been identified and provides recommendations for further work during fiscal year (FY) 2023.
- Appendix A provides the Notice to Proceed.
- Appendix B provides maps produced by the USAF and others showing groundwater flow in the Tularosa basin and at Holloman AFB.
- Appendix C provides the results of slug tests and pumping tests conducted by the USAF at Holloman AFB during the early stages of the Environmental Restoration Program (ERP).
- Appendix D provides the field notes and laboratory report for environmental sampling conducted by DBS&A at Holloman AFB under this contract.
- Appendix E provides data quality assessments of laboratory data.
- Appendix F provides summaries of biological testing performed under this contract.
- Appendix G provides laboratory reports for the biological testing.
- Appendix H summarizes the groundwater modeling performed under this contract.

2. Background

In May 2012, the U.S. Environmental Protection Agency (EPA) required the nation-wide sampling of public water systems (PWSs) serving more than 10,000 people for a list of 21 contaminants, including six PFAS under the Third Unregulated Contaminant Monitoring Rule (UCMR 3) (U.S. EPA, 2017a). The Department of Defense (DOD) later ordered testing of drinking water systems for PFAS at all locations where DOD supplies drinking water (DOD, 2021). In 2017, the

USAF conducted a site inspection for PFAS at five sites on Holloman AFB, and found evidence of widespread PFAS impacts to groundwater and surface water, including at Lake Holloman (AFW, 2018). At about the same time, the U.S. Bureau of Reclamation (USBR) detected elevated levels of PFAS in the evaporation ponds at the Brackish Groundwater National Desalination Research Facility (BGNDRF) in Alamogordo (USBR, 2021). The sampling for PFAS conducted by the State of New Mexico has focused on drinking water sources, including residential wells and public water systems, but has also sampled surface water. The PFAS investigation conducted by the USAF at Holloman AFB and subsequent sampling by the state have found that PFAS contamination at the Holloman site exceeds the EPA 2016 lifetime drinking water health advisory (HA) for perfluorooctanesulfonic acid (PFOS) and/or perfluorooctanoic acid (PFOA) established by EPA of 70 nanograms per liter (ng/L) and poses a serious threat to human health and the environment.

On June 15, 2022, the EPA issued lifetime drinking water HAs for 4 perfluoroalkyl substances, replacing the HAs for PFOA and PFOS as discussed in Section 2.3.

2.1 PFAS

PFAS are a large family (perhaps more than 8,000 [Buck et al., 2021]) of manmade organofluorine compounds that were developed in the early 1940s. Certain PFAS, such as PFOA and PFOS, are mobile, persistent, and bioaccumulative, and are not known to degrade in the environment. PFAS chemical structure gives them unique and valuable properties in industry, including the ability to reduce friction and make products more resistant to soil, stain, grease, water, fire, and temperature. These chemical properties make them useful components in a wide array of industrial and commercial applications, such as textiles and leather products, metal plating, the photographic industry, photolithography, semi-conductors, paper and packaging, non-stick cookware, food packaging, waterproof clothing, fabric stain protectors, lubricants, and pesticides. Some PFAS are also used as high-performance surfactants in products where an even flow is essential, such as paints, coatings, cleaning products, and fire-fighting foams, such as aqueous film forming foam (AFFF), for use on liquid fuel fires (U.S. EPA, 2009 and 2021b).

PFAS are characterized by linear or branched carbon-fluorine chains connected to a functional group and can vary in length from 4 to 14 molecules. The number of carbon atoms, and therefore the length of the chain comprising a particular PFAS, affects its toxicity and persistence and behavior in humans, wildlife, and the environment. Perfluorosulfonic acids (PFSAs) with six or more carbons (e.g., PFOS) and perfluorinated carboxylic acids (PFCAs) with seven or more carbon atoms (e.g., PFOA) are considered long-chain substances (Buck et al., 2011; U.S. EPA,

2021b; ATSDR, 2021). In general, as chain length increases, the bioaccumulation potential of PFAS appears to increase. For reference, the names, acronyms, and families of PFAS discussed in this report are provided in Table 1.

PFAS are extremely persistent in environmental media because the highly stable carbon-fluorine structure of PFAS can only be broken down at very high temperature. Larger PFAS compounds may transform in the environment to so-called "terminal" PFAS compounds, which are typically less than or equal to eight carbon-chain molecules such as PFOA and PFOS and are resistant to environmental degradation processes, such as biodegradation, atmospheric photo-oxidation, direct photolysis, and hydrolysis (ITRC, 2021). Dissipation is by advection, dispersion, and sorption to particulate matter. PFOS has low volatility in ionized form, but can adsorb to positively charged sediment particles and be deposited on the ground and into surface water bodies. Because of its persistence, it can be transported long distances in air or water (U.S. EPA, 2016a).

2.2 AFFF

Of particular concern at the Holloman site is the use of AFFF to extinguish fires involving highly flammable liquids. AFFF creates a vapor-sealing film on a hydrocarbon fuel surface, cooling the liquid fuel, depriving the fuel of oxygen, and providing protection against re-ignition by preventing evaporation (Leeson et al., 2021). The USAF began purchasing and using AFFF containing PFOS and PFOA, for extinguishing petroleum fires and during firefighting training activities in 1970 (AFIMSC, 2017). By mid-2018, the USAF had transitioned to a new AFFF formula, Phos-Check 3 Percent, which is PFOS-free and contains only trace amounts of PFOA (AFCEC, 2018), although it is possible that stockpiles of old AFFF were used after that time. The USAF restricts use of AFFF to emergency responses and treats all releases as hazardous spills. AFFF contained in aircraft hangar fire protection systems was scheduled to be replaced by the end of 2018 (AFCEC, 2018).

2.3 Regulatory Framework

In November 2009, EPA issued residential soil screening levels (SSLs) for PFOA of 16,000 micrograms per kilogram (µg/kg) and for PFOS of 6,000 µg/kg that were derived using EPA's regional screening level (RSL) calculator (U.S. EPA, 2009). In May 2016, the EPA issued a lifetime drinking water HA of 0.07 micrograms per liter (µg/L) (70 ng/L) for PFOS and PFOA, both individually and combined (U.S. EPA, 2016a, 2016b, and 2017b). Sampling results are compared to this HA throughout this document.

On June 15, 2022, the EPA issued lifetime drinking water HAs for 4 perfluoroalkyl substances. These include 2 HAs that replace the HAs that EPA issued in 2016, and final HAs for 2 other PFAS: perfluorobutanesulfonic acid (PFBS) and GenX chemicals (U.S. EPA, 2022). The EPA's new HAs, which identify the concentration of chemicals in drinking water at or below which adverse health effects are not anticipated to occur, are 0.004 ng/L for PFOA, 0.02 ng/L for PFOS, 10 ng/L for GenX chemicals, and 2,000 ng/L for PFBS (FRL 9855-OW). The updated HAs are based on new science that indicates that some negative health effects may occur with concentrations of PFOA or PFOS in water that are near zero (U.S. EPA, 2022). These interim health advisories will remain in place until EPA establishes a National Primary Drinking Water Regulation (U.S. EPA, 2022).

In 2018, the New Mexico Water Quality Control Commission (NMWQCC) added PFOA, PFOS, and PFHxS to the list of toxic pollutants as they relate to groundwater and surface water [20.6.2.3103(A)(2) NMAC and 20.6.2.7(T)(2)(s) NMAC]. In 2019, NMED established preliminary SSLs for PFOA, PFOS, and PFHxS in residential, industrial, and construction worker exposure scenarios at 1.56 milligrams per kilogram (mg/kg), 2.60 mg/kg, and 7.08 mg/kg, respectively. NMED also established a preliminary screening level for these three PFAS compounds in tap water at 0.07 µg/L (NMED, 2019a). These preliminary screening levels applied to each compound individually or in combination (NMED, 2019a).

In June 2022, NMED issued updated preliminary SSLs for PFAS. These include cancer SSLs for perfluorooctanoate and PFOA for residential, industrial/occupational, and construction worker exposure scenarios of 76.1 mg/kg, 498 mg/kg, and 2,690 mg/kg, respectively, as well as a cancer screening level of 11.1 µg/L for tap water (NMED, 2022). Noncancer SSLs were also issued for 12 PFAS compounds, as follows (NMED, 2022):

- Noncancer SSLs of 18.5 mg/kg, 374 mg/kg, and 80.7 mg/kg, respectively, for residential, industrial/occupational, and construction worker exposure scenarios, and a noncancer screening level of 6.02 µg/L for tap water for PFBS and potassium perfluorobutanesulfonate.
- Noncancer SSLs of 1.23 mg/kg, 24.9 mg/kg, and 5.38 mg/kg, respectively, for residential, industrial/occupational, and construction worker exposure scenarios, and a noncancer screening level of 0.401 µg/L for tap water for perfluorohexanesulfonate and PFHxS.
- Noncancer SSLs of 0.185 mg/kg, 3.74 mg/kg, and 0.807 mg/kg, respectively, for residential, industrial/occupational, and construction worker exposure scenarios, and a noncancer screening level of 0.0602 µg/L for tap water, for perfluorononanoate, perfluorononanoic acid

(PFNA), perfluorooctanesulfonate, PFOS, perfluorooctanoate, PFOA, and potassium perfluorooctanesulfonate.

EPA issued the final toxicity assessments for PFBS (U.S. EPA, 2021a) and GenX chemicals in 2021 (U.S. EPA, 2021d) and planned to issue drinking water HAs for these constituents in spring 2022 (U.S. EPA, 2021c). EPA is currently developing toxicity assessments for 5 other PFAS—perfluorobutanoic acid (PFBA), perfluorohexanoic acid (PFHxA), PFHxS, PFNA, and perfluorodecanoic acid (PFDA) (U.S. EPA, 2021c).

In October 2021, EPA issued its PFAS Strategic Roadmap, which establishes timelines for specific actions to protect human health and the environment from PFAS contamination. This effort will include establishing enforceable maximum contaminant levels (MCLs) for PFOA and PFOS, while evaluating additional PFAS and groups of PFAS (U.S. EPA, 2021c). EPA anticipated issuing proposed rules in fall 2022, with final rules in fall 2023 (U.S. EPA, 2021c). At least 28 states have established advisory or regulatory limits or screening levels for two or more PFAS (ITRC, 2021 and 2022).

3. Environmental Setting

This section describes the area of interest for the NMED Holloman AFB PFAS investigation project, which is focused on Holloman AFB and domestic wells in the City of Alamogordo. However, water utilities, the state, and others have conducted sampling for PFAS, including domestic and municipal wells within and south of the City of Alamogordo, and surface water supplies in the Sacramento Mountains east of Alamogordo (Figure 1).

3.1 Site Description

The NMED-directed Holloman AFB PFAS investigation project area is roughly bounded by the western Holloman AFB boundary on the west, the west side of the Sacramento Mountains on the east, the City of Alamogordo on the north, and water supply well fields to the south. Primary residential areas in the project area include housing on Holloman AFB, the City of Alamogordo, and outlying communities, which are located along the base of the Sacramento Mountains. Principal well fields that supply potable water to Holloman AFB are located south of Alamogordo (Figure 1).

The City of Alamogordo, the county seat of Otero County, was established in 1898 to support the construction of the El Paso and Northeastern Railway. The city was incorporated in 1912

and as of the 2020 census, has a population of approximately 31,500. Alamogordo primarily has a service-and-retail economy, with very little manufacturing. Holloman AFB is the largest employer of Alamogordo residents, and accounts for about half of the Alamogordo economy. Tourism has also played an important economic role with the creation of White Sands National Monument in 1933 and White Sands National Park in 2019 (NPS, 2022).

Holloman AFB is located a few miles west of Alamogordo and occupies approximately 50,763 acres of federally owned land (Figure 1). The base is southeast of and contiguous to the much larger (2.2 million acre) White Sands Missile Range. US 70, which runs southwest-northeast across New Mexico, borders the south end of Holloman AFB.

Construction of Holloman AFB began in early 1942, designated first as the Alamogordo Bombing and Gunnery Range, now White Sands Missile Range. The airfield was established in mid-1942 as Alamogordo Army Air Field. In 1948, the base was renamed Holloman AFB (ITSI, 2010). The main operational and most developed areas at Holloman AFB are located in the southern part of the facility where the main entrance and contractor's entrance to the base off of US 70 are located (Figure 2). This area contains the aircraft operations area, including runways, which run north-south, east-west, and northeast southwest, and associated aircraft hangar and maintenance facilities. The administrative area, base hospital, on-base housing, and a golf course are located in the southeast quadrant of the base. The wastewater treatment plant with former and current wastewater lagoons are located west of the golf course. Lake Holloman, which receives discharges from Holloman AFB, is located in the southwest corner of the base.

3.1.1 Physiography and Topography

The Holloman site is located on the eastern side of the Tularosa Basin, an intermontane basin in south-central New Mexico, which is part of the Mexican Highland Section of the Basin and Range physiographic province (Figure 3) (Fenneman, 1931 and 1946). The area is characterized by tilted fault block mountains with low desert plains and basins. The Tularosa Basin is bounded by the Sacramento Mountains on the east, the San Andres Mountains on the west. It is bounded on the north by a broad, high topographic divide. To the south, the basin is separated from the Hueco Bolson in west Texas by a low divide (Figure 3). The basin extends north approximately 125 miles from the New Mexico-Texas state line and is approximately 40 miles from west to east at Alamogordo. The Tularosa Basin encompasses approximately 6,500 square miles (Orr and Myers, 1986).

Alluvial fans emanate from the major drainages that empty into the basin. The slopes of the basin are incised by occasional ephemeral drainages that do not extend very far into the basin. South of Alamogordo, the alluvial fans extend about 2 to 3 miles from the mouths of the canyons before the gradient flattens significantly. The floor of the basin is nearly flat, but slopes gradually to the south at about 7 feet per mile (Fenneman, 1931). The New Mexico portion of the Tularosa Basin is a bolson and drains to alkali flats on the west side of the basin. The floor of the basin slopes gently southward and contains many depressions, or playas, that have no drainage outlet. These depressions form ephemeral lakes during rainy periods; when dry, they commonly become alkali flats (McLean, 1970). The low point in the basin is at an elevation of approximately 3,900 feet relative to the North American Vertical Datum of 1988 (NAVD88) at Lake Lucero in the southwest portion of the basin.

Holloman AFB is located on relatively flat alluvial plains west of Alamogordo. These plains are bordered to the west by the White Sands gypsum dune field. The alkali flats and white gypsum sands lie about 4,000 feet NAVD88. The land surface at Holloman AFB generally slopes to the southwest at about 10 feet per mile. The surface elevation ranges from approximately 4,200 feet in the northeast corner of the Base to approximately 4,020 feet at Lake Holloman in the southwest corner of the Base. West of Lake Holloman, the land elevation rises toward Hurtz Spring and a low bedrock outcrop that was once used as a rock quarry by the State Highway Department (Radian, 1989).

3.1.2 Surface Drainage

The Tularosa Basin is an endorheic basin, which is a closed basin with no external drainage. Surface water either infiltrates or collects in shallow playa lakes where it evaporates. The largest of the playa lakes, Lake Lucero, is located at the lowest point in the basin approximately 20 miles southwest of Holloman AFB (Figure 3).

There are two perennial streams that discharge into the Tularosa Basin: Rio Tularosa (Tularosa Creek), which enters the basin west of Mescalero, and La Luz Creek, which, combined with the flow from Fresnal Creek, enters the basin near the village of La Luz, north of Alamogordo (Figure 3). Most of the drainages that discharge to the Tularosa Basin from the Sacramento Mountains are ephemeral and have small watersheds.

Surface drainage within the undeveloped parts of the Base is controlled by the major arroyos including Lost River and Dillard Draw and their tributaries. Surface flows are to the southwest toward the White Sands National Park.

There are several prominent southwest-trending drainages that enter Holloman AFB from the east and receive intermittent flows during seasonal thunderstorms (Figure 4). The largest of these drainages is the Lost River drainage system, including Malone Draw and Ritas Draw. Prior to the development of the base and US 70, Dillard Draw emptied into the southern area of the base, creating a network of flats and playas, including what is now Lake Holloman (USACE and HDR, 2013). Construction activities have disrupted the natural flow of this wetland ecosystem.

While there are no perennial streams within Holloman AFB or in the nearby surrounding area, perennial spring fed pools exist within the Base. They are the final one-third of the Lost River, a set of pools near the confluence of Ritas and Malone Draws, and the Salt Lakes just south of the Lost River and Camera Pad Road Pond (USACE and HDR, 2013). Hurtz Spring is located in a bedrock outcrop west of Lake Stinky.

Drainage within the developed portion of Holloman AFB is directed by way of ditches and culverts to the southwest corner of the base. Prior to the construction of the wastewater treatment plant in 1996, runoff flowed directly to the wastewater treatment lagoons (Radian, 1989). The wastewater treatment system at Holloman AFB consisted of seven aeration/ evaporation lagoons designated A through G, located in the southwest corner of the base (Figure 4). In 1998, five of the lagoons were closed and covered with a minimum of 1 foot of soil, leaving only Lagoon G to receive treated wastewater (FWEC, 1999). Just southwest of the lagoons, a natural playa lake known as Lake Holloman received runoff from Holloman AFB, as well as effluent from the sewage lagoons. A dam/dike was constructed across the southern quarter of Lake Holloman and seepage through that dam and overflow has created a small playa lake known as Lake Stinky (Radian, 1989).

3.1.3 Climate

The Alamogordo-Holloman AFB area is situated in a semiarid region within the northern portion of the Chihuahuan Desert. It has a cold arid climate (Köppen climate classification Bwk), characterized by cold winters and warm to hot, dry summers. Based on weather data from the station at Alamogordo Dam, approximately 2 miles north of Alamogordo, for the period June 1909 through January 2009, the coldest months are December, January, and February, and the hottest months are June, July, and August. Diurnal temperature variations average almost 29°F. Average annual precipitation for the period was 10.95 inches, with nearly 49 percent of precipitation occurring from June through August (WRCC, 2022). The average annual pan evaporation rate for the period 1939-1975 was nearly 105 inches, ranging from 2.89 inches in December to more than 14 inches in June (WRCC, 2022). Average monthly data for

temperature, precipitation and pan evaporation are illustrated in Figure 5. The average annual wind speed at Holloman AFB for the period 1996-2006 was approximately 9.5 miles per hour (mph), ranging from 8.1 mph in November to 11.8 mph in April (WRCC, 2022). Throughout the year, gusty winds average between 25 and 30 mph (Windfinder, 2022).

3.1.4 Soils

The distribution of soils in the southern part of Holloman AFB mapped by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) is shown on Figure 6. The soils on Holloman AFB are primarily gypsiferous sandy loams, formed by the reworking of basin-fill deposits derived from the nearby mountains by alluvial and eolian processes. Approximately 60 percent of the southern portion of Holloman AFB is covered by Nasa-Yesum Complex soils, although the soils in nearly 25 percent of that area have been altered or obscured by development and construction activities (Figure 6). Soils along the arroyos and in the area east of Lake Holloman tend to contain more silt and clay. All of the soils have high gypsum content and high salinity. For the most part, the soils are considered well-drained and generally have low to negligible runoff potential (NRCS, 2022).

3.2 Geology

The Tularosa Basin is a downfaulted, intermountain basin located in the southern portion of the Rio Grande Rift (Figure 7). The Tularosa Basin is an endorheic basin, which is a closed basin with no external drainage. The basin was created during the late Cenozoic, about 30 million years ago during a period of crustal extension (Sandeen, 1954; Pray, 1961). The formation of parallel north-south normal faults uplifted the Paleozoic strata outside the faults forming the Sacramento and San Andres Mountains, while the area inside the faults was downdropped forming a graben structure, which has since filled with basin-fill deposits. The Sacramento and San Andres Mountains are tilted fault-block mountains that dip to the east and west, respectively. Steep escarpments of both ranges face the basin with the backsides dipping gently away from the basin.

The Tularosa Basin is underlain by the same Mesozoic and Paleozoic sediments that comprise the adjacent mountains, and is covered by heterogeneous, poorly consolidated basin-fill deposits. The basin-fill deposits consist of sediments that are of alluvial, eolian, and lacustrine or playa origin. Alluvial fan deposits are characteristically laterally discontinuous units of interbedded sand, silt, and clay. The eolian deposits consist primarily of gypsum sand. Alluvial and eolian deposits are often indistinguishable because eolian processes rework the alluvial

sediments while also depositing gypsum sands. Lacustrine or playa deposits in the area consist of clay containing gypsum crystals. Lacustrine deposits are juxtaposed with alluvial fan and eolian deposits (FWEC and Radian, 1995a).

Based on the logs of deep borings, most of the basin-fill consists of unconsolidated calcareous and/or gypsiferous clay and silt interbedded with lenses of clayey or silty sand and gravel (Meinzer and Hare, 1915). The sediments in the Tularosa Basin are derived from the erosion of limestone, dolomite and gypsum in the surrounding mountains, primarily from the Yeso Formation (Sandeen, 1954). Sediments derived from Pennsylvanian strata in the Sacramento and San Andres Mountains tend to be finer-grained with minor amounts of sand. Farther north on the east side of the basin where the basin-fill sediments are derived from Cretaceous strata, sand and gravel layers are more common (Meinzer and Hare, 1915). Streams flowing into the basin deposited coarser deposits near the mountain front becoming finer-grained with distance from the source. The basin-fill sediments along the margins of the basin include gravel, sand, and clay in alluvial fans. Extensive lacustrine and evaporite deposits are found within the basin (Orr and Myers, 1986). In the area south of Alamogordo, the basin-fill deposits were calculated to be as much as 9,000 feet thick based on Bouguer gravity data (Healey et al., 1978).

3.3 Hydrogeology

3.3.1 General

Significant zones of fresh groundwater occur in the Tularosa Basin. The most widely developed aquifer in the basin is the alluvial basin fill. Lenses of fresh water (total dissolved solids [TDS] concentrations of less than 1,000 milligrams per liter [mg/L]) occur in the alluvial fill adjacent to the mountains on the east and west sides of the southern part of the basin. On the east side of the basin, several water supply well fields tap a zone of fresh water that extends north from Grapevine Canyon to about 3 miles south of Alamogordo (Orr and Myers, 1986). This zone is reported to be about 1,200 feet thick and provides a potable water source for Alamogordo, Holloman AFB, and White Sands National Park.

The basin-fill aquifer exists under water table conditions in the first saturated zone. Depth to the water table in the basin fill aquifer is more than 200 feet below ground surface (bgs) near the Sacramento Mountains, but ranges from about 5 to 50 feet bgs at Holloman AFB. Groundwater in the east side of the basin and in the Alamogordo-Holloman area flows predominantly to the west and southwest, but locally appears to be influenced by the arroyos. A number of regional groundwater flow maps are provided in Appendix B.

The principal source of recharge to the basin fill aquifer is precipitation in the adjacent Sacramento Mountains, and consequent flows from the mountain canyons. Some of the water discharged from the canyons infiltrates to groundwater through the coarse-grained sediments at the head of each alluvial fan (Hood, 1958; McLean, 1970; Ballance, 1976). Because the sediments become finer-grained with distance from the edge of the mountains, surface runoff that does not evaporate or soak into the ground flows out into the basin and accumulates on the playas ("dry lakes" or "alkali flats"), the largest of which is Lake Lucero, located about 20 miles southwest of Holloman AFB at the southwest end of the White Sands dunes. At Lake Lucero, which is also a discharge point for groundwater, sulfate salts, primarily gypsum, are formed by evaporation and provide a source for the dune field of White Sands National Park.

Recharge reaches the basin in three ways: discharge from perennial streams, flood flow from summer thunderstorms, and snowmelt runoff from winter storms. There are only two perennial streams that discharge into the basin: Rio Tularosa (Tularosa Creek), which enters the basin west of Mescalero, and La Luz Creek, which, combined with the flow from Fresnal Creek, enters the basin near the village of La Luz, north of Alamogordo. Most of the drainages that discharge to the Tularosa Basin from the Sacramento are ephemeral and have small watersheds. Constant flow from the Rio Tularosa and La Luz Creek likely provides more recharge to the basin fill aquifer that the flood flow from ephemeral streams (Garza and McLean, 1977). Intense summer thunderstorms can produce high runoff, but are generally of such short duration that little water is recharged to groundwater. Groundwater recharge occurs mainly through snowmelt from winter storms (McLean, 1970; Ballance, 1976).

Water in the alluvial deposits of the Tularosa Basin is freshest near the mountain front and generally increases in salinity with distance from the mountain front and with depth (Meinzer and Hare, 1915; Hood, 1958; McLean, 1970; Ballance, 1976; Garza and McLean, 1977; Orr and Myers, 1986, Nationview/Bhate, 2009). Surface water that recharges groundwater acquires dissolved solids from the runoff area, which contains soluble materials such as gypsum, dolomite, and limestone. Additional minerals are dissolved as the water moves through the basin-fill sediments. Groundwater quickly dissolves highly soluble minerals, such as gypsum, so that groundwater quality continues to degrade with increased contact time. As a result, potable groundwater occurs near the recharge area near the base of the mountains. Groundwater under Holloman AFB is non-potable, with TDS concentrations often in excess of 10,000 mg/L.

As noted in Section 3.1.2, there are several pools along the ephemeral drainages within Holloman AFB created by springs. At least one of these pools located along Lost Creek was

sampled by the USGS in 1999 and found to contain sodium (31,600 mg/L), chloride (60,000 mg/L), sulfate (19,400 mg/L), (15,800 mg/L), and TDS (121,000 mg/L) (USGS, 2022).

The only spring identified in the area is Hurtz Spring, located in a bedrock outcrop west of Lake Stinky (Figure 4). This spring appears to be located on White Sands Missile Range property. No chemistry data have been found for this spring.

3.3.2 Hydraulic Conductivity

Slug tests were conducted by USAF contractors during early remedial investigations at sites at Holloman AFB to obtain estimates of the hydraulic conductivity of the basin-fill aquifer. Slug test results were reviewed and compiled from the following reports: Walk, Haydel & Associates, Inc. (WHA) (1989), Radian (1989 and 1992), and FWEC and Radian (1995a and 1995b). Almost all of the slug tests were "rising head" tests, where a slug was inserted in the well, and the water level was allowed to stabilize. The slug was then removed and water level recovery was monitored. These results provide a reasonable estimate of the hydraulic conductivity in the southern portion of Holloman AFB.

Estimates of hydraulic conductivity for 164 slug tests conducted at 31 sites within Holloman AFB ranged from 1.0×10^{-5} to 8.09×10^{-3} centimeters per second (cm/s) (0.0028 to 22.9 feet per day [ft/d]). The results of the slug tests for each site are summarized in Table 2a, including the minimum and maximum calculated hydraulic conductivity, and the geometric mean of tests conducted at each site. The results for individual slug tests are provided in Appendix C. The locations of sites where slug tests were conducted are shown in Figure 8.

We identified results for two constant rate pumping tests at locations upgradient and downgradient of the sewage lagoons. For the upgradient test, a pumping well was installed and screened from 57 to 67 feet bgs. Observation piezometers were installed about 77 feet from the pumping well, with one screened at 4 to 9 feet bgs and the other at 58 to 68 feet bgs. The test was conducted for 130 minutes at 2 gallons per minute (gpm).

For the downgradient pumping test, a pumping well was installed and screened from 42 to 52 feet bgs. Three observation piezometers were installed about 100 feet from the pumping well with one screened at 5 to 10 feet, one at 29 to 34 feet, and one at 39 to 49 feet. The test was conducted for 420 minutes at 5 gpm. The results of the pumping tests are provided in Table 2b, as reported by Radian (1989). Radian (1989) concluded that the basin-fill sands, silts, and clays were hydraulically interconnected.

4. Conceptual Site Model

This section describes the sources of PFAS contamination and potential exposure pathways.

4.1 Sources of Contamination

PFAS have been identified in soil, surface water, and groundwater at AFFF release areas identified at Holloman AFB, likely related to the use of AFFF that contained PFOS, PFOA, and potentially additional PFAS compounds. Information reviewed indicates that the AFFF release areas are likely the main source of the PFAS contamination in surface water at the southwest edge of Holloman AFB, and that PFAS impacted groundwater is likely present downgradient of the base. Amec Foster Wheeler Environment & Infrastructure, Inc. (AFW) (2018) identified a total of five AFFF release areas at Holloman AFB, which are shown in Figure 9. The results of soil, surface water, and groundwater investigations for PFAS at these release areas are summarized in the Section 5.

PFAS contamination has also been detected in groundwater at the BGNDRF and at an adjacent former landfill site in the southwest portion of Alamogordo (Figure 10). Sampling by NMED has also identified PFAS impacts to several domestic wells in the area. These results are discussed in Section 5.

4.2 Exposure Pathways

Soil and groundwater data indicate that the most significant PFAS source areas at Holloman AFB are the firefighting training area to the northeast of the main base and the evaporation pond used to test firefighting equipment location in the West Area of the main base (Figure 9). PFAS released to soil at these locations (and potentially other source areas not yet investigated) migrated vertically through the vadose zone, and impacted groundwater in the basin fill aquifer at and downgradient of the areas. The USAF investigation of the base-wide sewer system (Nationview, 2012) indicates that the sewer is probably leaking. Sampling has confirmed that wastewater contains PFAS, making this another source of PFAS contamination in groundwater. Wastewater was also discharged directly to the unlined sewage lagoons and eventually to Lake Holloman before the wastewater treatment plant (WWTP) was constructed in 1996. After 1996, treated wastewater, which to this day contains PFAS, was discharged to Lagoon G, eventually reaching Lake Holloman. During a part of this time, treated effluent from the WWTP was used to water the Base golf course (Figure 9). The initial assessment conducted by the USAF in 2017 identified impacts to soil, surface water, and groundwater, but the USAF has not determined the

extent of PFAS contamination at the Base, but impacts reported at Lake Holloman likely extend off-site beyond the lake.

The NMED GWQB is investigating the PFAS contamination identified at the BGNDRF, and the old Alamogordo landfill. Potential sources identified thus far include a former facility where Presto Manufacturing produced non-stick coated cookware, an area where Presto may have disposed of plant wastewater, a former Alamogordo landfill, a former Alamogordo wastewater treatment facility, and a former evaporation pond operated by the city (Figure 10) (NMED, 2021a).

Initial investigations conducted at Holloman AFB by the USAF and the New Mexico Department of Health (NMDOH) have demonstrated that soil, surface water, and groundwater at the Holloman site are impacted by PFAS (AFW, 2018; NMED, 2019b). Potential receptors associated with current and future land use include USAF personnel, residents, visitors, grounds maintenance workers, utility workers, construction workers, and wildlife.

Off-site sampling conducted by EPA, NMED, and NMDOH demonstrate the presence of PFAS in certain private water supply wells in the Alamogordo area. Potential receptors include residents, visitors, and workers who use groundwater for domestic and agricultural purposes.

5. PFAS Sampling in the Project Area

This section presents information and results of PFAS sampling conducted within the general project area by various parties. The methods used to analyze samples and the target analytes for each investigation are summarized in Table 3.

5.1 Third Unregulated Contaminant Monitoring Rule (UCMR 3) Program

In 2013 and 2014, the City of Alamogordo collected a total of 15 water samples from five locations within the Alamogordo Domestic Water System (PWS NM3513319), including samples from four treatment plants and one supply well (Figure 11). This sampling was performed in response to requirements established by EPA under UCMR 3 (U.S. EPA, 2017a). EPA required that samples be analyzed for 6 PFAS (3 PFSAs, including PFOS, and 3 PFCAs, including PFOA) using EPA method 537.

The results were posted to an online database by EPA in January 2017 and to the NMED PFAS Data webpage in January 2020 (NMED, 2020b). The results of the PFAS analysis of the 15 samples from the Alamogordo system are summarized in Table 5. No target analytes were detected, although the reporting limits for the different PFAS were relatively high, ranging from 10 to 90 ng/L.

5.2 USAF Investigations

There have been numerous investigations of soil and groundwater conditions conducted at Holloman AFB since the late 1980s, but investigation of PFAS has been recent and of limited extent compared to previous investigations. In 2015, USAF conducted a preliminary assessment (PA) at Holloman AFB to identify AFFF storage and use areas where PFAS compounds may have been released. The USAF contractor, HydroGeoLogic, Inc., identified a total of 31 potential AFFF release areas during the PA research and recommended that field investigations be conducted at four of those sites (HGL, 2015). A fifth AFFF release area was identified by AFW during a scoping visit in October 2016 (AFW, 2017).

Five areas were investigated for PFAS impacts by the USAF at Holloman AFB in 2017 (AFW, 2018) (Figure 9). The fire training area (ERP Site FT-31) and Evaporation Basin 2 received direct discharges of AFFF on a regular basis for many years. The other three sites received wastewater from Holloman AFB and included the base golf course, seven unlined sewage lagoons, and Lake Holloman. Soil, surface water, and groundwater samples were analyzed for a total of 16 PFAS using EPA method 537. Following is a brief description of the PFAS release areas at Holloman AFB and results from PFAS investigations conducted by the USAF at these sites.

5.2.1 FT-31

FT-31 is the former fire training area (FTA) located in the southeast portion of Holloman AFB and northwest of the Main Base (Figure 9). FT-31 was used for firefighting training exercises from 1942, when the Base opened, to 1991, when those activities were moved to the current FTA. FT-31 encompasses an area approximately 400 feet in diameter and contains five solid waste management units (SWMUs), including two unlined, gravel-covered burn pits approximately 100 and 60 feet in diameter (FWEC and Radian, 1995a). To handle runoff, an oil/water separator, waste oil tank, and discharge pit were installed in 1979. Waste fuels, solvents, and oils used as the fuel source for the training activities were replaced with jet fuel (JP-4) in 1979 (FWEC and Radian, 1995a). The use of AFFF containing PFOA or PFOS in firefighting operations at the Base

began in 1970, and continued until sometime after 2017 (AFW, 2018). The layout of FT-31 is shown in Figure 12.

During the USAF 2017 PFAS site inspection at FT-31 (AFW, 2018), a total of 12 soil samples (including two duplicate samples) were collected from five soil borings (Figure 12). Soil samples were collected from each boring at the surface (0.0 to 0.5 feet bgs) and just above the water table. The results of laboratory analysis of soil samples for PFAS from FT-31 are provided in Table 5. The proportions of PFAS detected in the soil samples are shown in Figure 13. Up to 10 PFAS were detected in all but one soil sample from FT-31, including 5 PFCAs generally dominated by PFOA or PFHxA (i.e., having the highest concentrations and greatest proportions of total PFAS), 3 PFSAs dominated by PFOS, and 2 fluorotelomer sulfonic acids (FTSAs) (8:2 FTS and 6:2 FTS). PFAS detected generally contained 8 carbons or fewer. PFOS was the dominant PFAS. The soil results indicate that releases of PFAS occurred at FT-31 and reached the shallow water table.

A total of 4 groundwater samples, including 1 duplicate sample, were collected from 3 monitor wells at FT-31 (Figure 12). The results of laboratory analysis of groundwater samples for PFAS from FT-31 are provided in Table 6. The proportions of PFAS detected in the groundwater samples are shown in Figure 14. Generally, 7 PFAS were detected in each groundwater sample from FT-31, including 3 PFCAs dominated by PFHxA, 3 PFSAs dominated by PFAxS, and 1 FTSA, 6:2 FTS. PFAS detected all contained 8 carbons or fewer. PFOA and PFOS concentrations exceeded the 2016 EPA HA in all samples, with maximum concentrations of 254,000 and 48,400 ng/L, respectively, in the groundwater sample from well FT31-LM5.

5.2.2 Evaporation Pond 2

Evaporation Pond 2 (Figure 9) was installed in 1991, and collects all discharge from floor drains in hangars located in the western ramp area east of the pond (AFW, 2017). Those hangars are equipped with AFFF fire suppression systems. The Holloman AFB Fire Department also uses this basin for monthly AFFF tests and firehose washouts, and was doing so when AFW conducted their scoping visit (October 2016). AFFF was reportedly sprayed from fire trucks into the pond until a consistent flow pattern was established. Liquid in the basin was left to evaporate. According to base personnel, the basin never overflowed and does not drain to the sewer system (AFW, 2017). The area around Evaporation Basin 2 is shown in Figure 15.

During the USAF PFAS inspection, two borings were advanced at Evaporation Pond 2. Soil samples were obtained from both borings at the surface (0.0 to 0.5 feet), and just above the

water table (Figure 15). The results of laboratory analysis of soil samples for PFAS from these borings are provided in Table 5. Up to 10 PFAS were detected in all but one soil sample from Evaporation Pond 2, including 5 PFCAs generally dominated by PFOA or PFHxA, 3 PFSAs dominated by PFOS, and 2 FTSAs. The proportions of PFAS detected in the USAF soil samples from Evaporation Pond 2 are shown in Figure 16. PFAS detected generally contained 8 carbons or fewer. PFOS was the dominant PFAS. The soil results indicate that releases of PFAS occurred from Evaporation Pond 2 and reached the shallow water table.

One groundwater sample was collected from monitor well MW05001 at Evaporation Pond 2. The results of laboratory analysis of the groundwater sample for PFAS is provided in Table 6. A total of 7 PFAS were detected, including 3 PFCAs dominated by PFHxA, 3 PFSAs dominated by PFOS, and 1 FTSA, 6:2 FTS. The proportions of PFAS detected in the groundwater sample are shown in Figure 17. PFAS detected all contained 8 carbons or fewer. PFOA and PFOS exceeded the 2016 EPA HA with concentrations of 26,600 and 1,040,000 ng/L, respectively. Releases of PFAS have clearly occurred from Evaporation Pond 2 and impacted groundwater beneath the site.

5.2.3 Wastewater System Sites

The WWTP located in the southwest portion of Holloman AFB was constructed in 1996 (HGL, 2015). Prior to that time, approximately 1.2 million gallons per day of untreated wastewater was discharged into unlined lagoons, designated A through G, in the southwest portion of the base (Figure 9) (AFW, 2018). The wastewater flowed through the lagoons in sequence and discharged into Lake Holloman. Lagoons A through F have since been reclaimed and capped and only Lagoon G remains active. Wastewater sludge was dewatered and compacted, but not removed from the lagoons prior to capping (FWEC, 1999). The WWTP has the capacity to treat an average of 1.5 million gallons of wastewater per day. The plant includes a digester tank, a series of aeration and clarification tanks, and 16 sludge drying beds. Dried sludge is collected and disposed at the regional landfill. At the time of the preliminary PFAS assessment, effluent from the WWTP was discharged to one of three outfalls: Lagoon G, Lake Holloman, and the base golf course. This section describes the analytical results from a sample of wastewater effluent and from environmental samples collected from the three outfall areas.

5.2.3.1 WWTP Effluent

The USAF collected a primary sample and duplicate sample of wastewater effluent from the WWTP in 2017. A total of 8 PFAS were detected in the effluent samples, including 4 PFCAs dominated by PFHxA, 3 PFSAs dominated by PFOS and PFHxS, and 1 FTSA, 6:2 FTS (Table 7).

The proportions of PFAS detected in the wastewater samples are shown in Figure 18. The total PFAS in the primary sample of effluent was 1955.08 ng/L, with both PFOA and PFOS exceeding the 2016 EPA HA.

In October 2021, USAF collected a sample of wastewater effluent from the WWTP and submitted it for PFAS analysis to Pace and Vista Analytical (Vista) (Swift River/Versar, 2021e), while the 2017 analysis was performed by SGS Accutest (AFW, 2018). The results of the 2021 analyses, which included 20 PFAS, are also provided in Table 7. The 2021 sample was not analyzed for FTSAs, which were detected in the 2017 sample. Otherwise, the PFAS detected in 2017 were also detected in 2021, but with some significant differences. Total PFAS decreased from 2017 to 2021. All PFCAs showed an increase in concentration in 2021, while all PFSAs showed a decrease. Notably, while PFOA increased from 73.8 in 2017 to 96 ng/L in 2021, PFOS decreased from 776 to 360 ng/L. PFHxA increased from 229 ng/L in 2017 to 630 ng/L in 2021; PFHxS decreased from 602 ng/L to 402 ng/L. The differences in proportions of total PFAS are illustrated in Figure 18.

5.2.3.2 Sewage Lagoon Area

During the PFAS investigation, USAF advanced a total of six soil borings at the sewage lagoons (Figure 19) (AFW, 2018) and collected a total of 14 soil samples, including 2 duplicate samples. Soil samples were obtained from each boring at the surface (0.0 to 0.5 foot) and at depths up to 20 feet bgs. The results of laboratory analysis of soil samples for PFAS from these borings are provided in Table 5. Up to 7 PFAS were detected, including 4 PFCAs, generally dominated by PFOA or PFHxA, and 3 PFSAs dominated by PFOS or PFHxS. The proportions of selected PFAS detected in the soil samples are shown in Figure 20. PFAS detected generally contained 8 carbons or fewer. PFOS was the dominant PFAS. The soil results indicate that releases of PFAS occurred at the sewage lagoons and reached the shallow water table.

One sediment sample was collected by USAF at the northwest corner of Lagoon G (Figure 19). Four PFAS were detected with a total concentration of 97.7 µg/kg. The results of laboratory analysis of sediment samples for PFAS from the wastewater system sites are provided in Table 8. Only 1 PFCA (PFHxA), 2 PFSAs, and 6:2 FTS were detected. PFOS was present in the greatest percentage of total PFAS detected. The proportions of PFAS detected in the sediment samples from the wastewater system sites are shown in Figure 21.

One surface water sample was collected by USAF at the northwest corner of Lagoon G, the same location where the sediment sample was collected (Figure 19). The results of laboratory analysis of surface water samples for PFAS from the wastewater system sites are provided in Table 9. A

total of 8 PFAS were detected in the surface water sample from near Lagoon G, with a total PFAS concentration of approximately 17,202 ng/L. PFAS detected included 4 PFCAs, dominated by PFHxA, 3 PFSAs, dominated by PFHxS, and 1 FTSA (6:2 FTS). The proportions of PFAS detected in the surface water samples from the wastewater system sites are shown in Figure 22, with 6:2 FTS in the sample from near Lagoon G comprising a high proportion of total PFAS detected compared to other surface water samples from the wastewater system sites.

Groundwater samples were collected from three monitor wells on the west side of the sewage lagoons (Figure 19). As many as 8 PFAS were detected in the three groundwater samples, including 4 PFCAs dominated by PFHxA, 3 PFSAs dominated by PFOS or PFHxS, and 1 FTSA, 6:2 FTS (Table 6). The proportions of PFAS detected in the USAF groundwater samples from the wastewater system sites are shown in Figure 23. Total concentration of PFAS in the groundwater samples ranged from 2,458.5 to 22,957 ng/L. PFOA and PFOS exceeded the 2016 EPA HA in each sample.

5.2.3.3 Outfalls to Lake Holloman

During the PFAS investigation, USAF collected two sediment samples and two surface water samples at the inlets from Holloman AFB to Lake Holloman (Figure 24) (AFW, 2018). The results of laboratory analysis of sediment samples for PFAS from the wastewater system sites are provided in Table 8. Total PFAS in the sediment samples from the north and east inlet to Lake Holloman were 204.31 and 737.45 µg/kg, respectively. Total PFSAs comprise more than 90 percent of total PFAS, with PFOS dominating (Figure 21).

The results of laboratory analysis of surface water samples for PFAS near the inlets to Lake Holloman are provided in Table 9. Total PFAS in the surface water samples from the north and east inlet to Lake Holloman were 2,100.6 and 7,504.6 ng/L, respectively. Up to 4 PFCAs, dominated by PFHxA, comprise about 17 to 22 percent of total PFAS detected in the north and east samples, respectively (Figure 22). Total PFSAs, dominated by PFOS and PFHxS, comprise about 77 and 72 percent of total PFAS detected in the north and east samples, respectively.

5.2.3.4 Holloman AFB Golf Course

In an effort to reduce the amount of potable water used to irrigate the Holloman AFB golf course, effluent from the Holloman AFB WWTP was used to fill two ponds and irrigate the golf course from September 2011 to April 2020. During the PFAS investigation, the USAF collected sediment and surface water samples from golf course Ponds 1 and 2, and a groundwater sample from well GC-MW3 located downgradient of the golf course (Figure 25).

The results of the PFAS analysis of sediment samples from the golf course ponds are provided in Table 8. Total PFAS in sediment samples from Pond 1 and 2 were 40 and 221.9 µg/kg, respectively. PFOS and PFHxS were the only two PFAS detected, and PFOS comprised more than 90 percent of the total PFAS in both samples (Figure 21). The lack of PFCAs and presence of only PFSAs likely reflects the mobility of the PFCAs and the propensity for the PFSAs to bind to sediment.

The results of the PFAS analysis of surface water samples from the two golf course ponds are provided in Table 9. Total PFAS in surface water samples from Pond 1 and 2 were 2,708.8 and 3,031 ng/L, respectively. PFAS detected in each sample included 4 PFCAs dominated by PFHxA and 4 PFSAs dominated by PFOS and PFHxS (Figure 22). The sample from Pond 2 also contained 6:2 FTS. Total PFSAs exceeded total PFCAs in both samples. The proportions of PFAS in surface water samples from the Ponds are very similar to the proportions observed in the 2017 effluent samples (Figure 18).

The results of the PFAS analysis of the groundwater sample from monitor well GC-MW3 downgradient of the golf course are provided in Table 6. The sample contained total PFAS at 2,659.7 ng/L, with 3 PFCAs dominated by PFHxA, 3 PFSAs dominated by PFHxS, and 1 FTSA, 6:2 FTS (Figure 23). PFOA and total PFOA + PFOS exceeded the 2016 EPA HA of 70 ng/L.

As noted above, Holloman AFB used treated effluent from the WWTP to fill the ponds on the golf course and to irrigate the course from September 2011 to April 2020. The 2017 groundwater sample from GC-MW3 was the first in this area to be tested for PFAS. Since then, USAF has analyzed groundwater samples for PFAS from four monitor wells around the course, which are shown on Figure 26 (from Swift River/Versar, 2022). The results of those PFAS analyses are provided in Table 10. Samples from well 3, which is sampled most frequently for PFAS, have been analyzed for up to 18 PFAS, as shown in Table 10. Samples from wells 1, 2, and 4 have only been analyzed for PFOA, PFOS, and PFHxS, which are regulated in New Mexico. PFOA, PFOS, and PFHxS have been detected in wells 1, 3, and 4, which is upgradient of the golf course. The PFAS have not been detected in two samples from well 2, which is located within the golf course and would be expected to be impacted.

5.3 U.S. Bureau of Reclamation

The USBR operates the BGNDRF, a 43-acre federal research facility located in southwest Alamogordo (Figure 27). Research is conducted by various parties and focuses on technologies to improve utilization of brackish groundwater. Although USBR semiannual reports to NMED

(USBR, 2021 and 2022) indicate that the BGNDRF has four brackish groundwater wells that can provide source water for research efforts, according to New Mexico Office of the State Engineer (OSE) records, the USBR has five such wells. The facility also has the capability to import saline water (TDS greater than 10,000 mg/L) from off-site (Tetra Tech, 2014). The facility has three evaporation ponds that are used for disposal of concentrate generated at BGNDRF. The large evaporation pond has a capacity of 721,000 gallons, and the two smaller ponds have capacities of 341,000 gallons each. The ponds are lined and equipped with leak detection systems (USBR, 2022). The facility also includes ten one-half-acre agricultural research plots (Figure 27).

The BGNDRF operates under discharge permit DP-1472 issued by NMED. USBR regularly analyzes samples of groundwater from four of the five supply wells and surface water from the three evaporation ponds. Those sampling results are available on-line at www.usbr.gov/research/bgndrf/water.html, and are summarized in semiannual reports submitted by USBR to NMED (USBR, 2022).

Maps of the BGNDRF show two wells designated as Well 4: an on-site well located west of Evaporation Pond 1 is referred to here as Well 4A. A former irrigation well (OSE POD No. T00052-S2) located to the north-northeast of the site is referred to here as Well 4B (Figure 27). According to NMED (Young, 2022), water quality information for "Well 4" reported by USBR in its semiannual reports, refers to samples from well 4B. General information about these wells is provided in Table 11, including well depth, and temperature and TDS content of the water produced.

5.3.1 Evaporation Ponds

In December 2017, USBR collected a sample of "agriculture water" and water (concentrate) samples from the three evaporation ponds and tested those samples for PFAS (USBR, 2021). This was the first time samples of water from BGNDRF were tested for PFAS. USBR has since analyzed samples from the evaporation ponds for PFAS on four occasions (Table 12); the most recent report to NMED does not include test results for agricultural water (Newton and Allen, 2014).

The 2017 samples collected by USBR were analyzed for 14 PFAS using EPA method 517M. No PFAS were detected in the sample of agriculture water (USBR, 2021). Six PFAS were detected in samples from the three evaporation ponds at similar concentrations and proportions (Table 12 and Figure 28). PFOA dominates each sample with concentrations well above the 2016 EPA HA of 70 ng/L. PFHxS and PFOS are present in second and third highest proportions, respectively.

The PFAS detected and their relative proportions, particularly the low levels of PFHxS, at least suggest that the PFAS in the pond water are not related to an AFFF source.

Since mid-2019, USBR has analyzed samples from the evaporation ponds for PFAS on four occasions (Table 12) (USBR, 2022). Unfortunately, rather than analyze the samples for a full suite of PFAS, USBR apparently only analyzes the samples for PFOA, PFOS, and PFHxS. As in the 2017 samples, the level of PFOA is much greater than the other two analytes, followed by PFHxS and PFOS. Only PFOA exceeds the 2016 EPA HA.

5.3.2 Groundwater

Since 2019, USBR has collected and analyzed samples from their supply wells on a semiannual basis for PFOA, PFOS, and PFHxS (USBR, 2021; Newton and Allen, 2014). The analytical results for USBR groundwater samples for PFAS at BGNDRF are provided in Table 13. The locations of the BGNDRF wells are shown on Figure 27. PFOA concentrations in BGNDRF wells 2 and 4B consistently exceed the 2016 EPA HA of 70 ng/L, with maximum concentrations of 460 and 230 ng/L, respectively. The highest concentrations were detected in the most recent samples and PFOA levels in well 4B are clearly increasing. Groundwater sampling at the BGNDRF by NMDOH is discussed in Section 5.4.2.

5.4 Sampling by the State of New Mexico

The NMED and the NMDOH conducted water sampling for PFAS in Otero County in 2019. In February and April 2019, the NMDOH collected water samples from 20 domestic wells in the Alamogordo area, 5 wells at the USBR's BGNDRF, 4 monitor wells at White Sands National Monument (WSNM, now White Sands National Park), and 3 surface water locations on Lake Holloman. All samples were analyzed for 21 PFAS using EPA method 537 modified with isotope dilution (537M-ID). NMED posted the results of the sampling on the NMED PFOS Data website in May 2019 (NMED, 2019b). The USGS performed statewide water sampling for NMED in 2020 and 2021. The results of those sampling events are summarized in the following sections.

Information regarding exact sample collection locations (e.g., wellhead, interior faucet, etc.) and sample collection methodology was not provided.

5.4.1 Domestic Wells

In February and April 2019, the NMDOH collected water samples from 20 domestic wells in the Alamogordo area. Although the locations of the domestic well samples and the laboratory

analytical reports are being held confidential by the State, NMED did post the general results to their PFAS Data website. The general results of PFAS analysis of samples collected by NMDOH are provided in Table 14.

PFAS were detected in 6 of 20 samples from domestic wells, including all 4 samples with the prefix "LD" (NMED, 2019b). PFOA was detected in all 6 samples and was the only PFAS detected in 4 of the 6 samples. Where more than one PFAS was detected, PFOA is dominant, at concentrations 10 or more times greater than the next highest PFAS concentrations. PFOS was detected in only 1 of the 6 samples. Concentrations of PFOA and PFOS did not exceed the 2016 EPA HA of 70 ng/L. The combined concentration of PFOA and PFOS in sample LD-4 (68 ng/L) is just below the 2016 EPA HA. Low concentrations of 5 other PFAS were also detected in this sample with PFOA making up nearly 77 percent of the total PFAS (Figure 29). No other PFAS exceeded 6 percent of total PFAS. Without location information for these samples, potential sources of PFAS in the samples cannot be evaluated. Additional sampling was conducted in the "LD" by the USGS in 2021, as discussed in Section 5.4.7. The high proportion of PFOA in sample LD-4 is similar to that observed in the samples from the BGNDRF.

5.4.2 BGNDRF Wells

The NMDOH collected a total of 5 groundwater samples from 5 wells at the BGNDRF as indicated by the tabulated data provided by NMED on its PFAS Data website (NMED, 2019b). Other information related to the samples has been held confidential; however, the USBR does present the results of the NMDOH samples in their reports to NMED. In their semiannual reports to NMED, the USBR discusses the PFAS sampling conducted by NMDOH, as well as their own efforts and provides some additional information regarding the NMDOH samples (USBR, 2022). USBR reports that the NMDOH sample identified as Well 2 was actually collected from the Well 2 storage tank, while the sample labeled Well 4 was collected from the pump at Well 2. The sample labeled Well 5 was actually obtained from the pump at Well 4 (USBR, 2022). In this case, Well 4 is believed to refer to off-site well 4B (see discussion of BGNDRF well IDs in Section 5.3).

The results of PFAS analysis of groundwater samples collected by the NMDOH from the 5 wells are provided in Table 15. A total of 4 PFCAs, dominated by PFOA, and 3 PFSAs, with the concentration of PFOS the greatest, were detected in samples identified as Well 2 and Well 4. PFOA concentrations exceeding the 2016 EPA HA were detected in samples designated Well 2, Well 4, and Well 5. Lower levels of PFOS and several other PFAS, including PFBA, PFPeA, PFHxA, PFHpA, and PFHxS, were also detected in the samples (NMED, 2019b).

The proportions of PFAS detected in the NMDOH water samples from BGNDRF Well 2 and Well 4B are shown in Figure 30. Also shown are the proportions of total PFAS detected in the average of the water samples collected by USBR from evaporation ponds 1, 2, and 3 in 2017 (Section 5.3.1). Groundwater and surface water samples from the BGNDRF contain the same suite of PFAS at similar proportions.

5.4.3 Public Drinking Water Systems

In March 2019, NMED collected drinking water samples from seven public drinking water systems in the Alamogordo area, including samples from four entry points in the Boles Acres water system, the Prather treatment plant, a well at the Dollar General store in Boles Acres, and the entry point to the Holloman AFB chlorination plant. The locations of these sample points are being held confidential by the State, but were estimated using NMED Drinking Water Bureau's Drinking Water Watch, a searchable database of information on PWSs (Figure 31). The samples were analyzed for 14 PFAS using EPA method 537M; as shown in Table 16, none were detected (NMED, 2019b). The information currently available does not include reporting limits for the analyses.

5.4.4 White Sands National Monument

In February 2019, the NMDOH collected groundwater samples from 4 monitor wells at the WSNM located west of Holloman AFB (NMED, 2019b). The samples were designated WS-1 through WS-4, but the locations are being held confidential by the State, and it is not known from which monitor wells NMDOH collected the samples. The samples were analyzed for 21 PFAS using EPA method 537M-ID; the results are provided in Table 17. PFAS were not detected in 3 of 4 samples. Low levels of PFBA, PFBS, and PFHxS were detected in sample WS-3. PFOA and PFOS were not detected in any of the samples.

5.4.5 Lake Holloman

The NMDOH collected three surface water samples from Lake Holloman in April 2019. The locations of the sample points are being held confidential by the State, but the sample identifier indicates from which part of the lake the samples were obtained. Lake Holloman is shown in Figure 24. Samples were analyzed for 21 PFAS using EPA method 537M-ID. The results of laboratory analysis of the NMDOH surface water samples for PFAS from Lake Holloman are provided in Table 18. The proportions of PFAS detected in the surface water samples are shown in Figure 32. The same 11 PFAS were detected in each sample, including 6 PFCAs, with PFHxA having the highest concentrations and greatest proportions of total PFAS, 4 PFSAs dominated

by PFHxS, and 1 FTSA, 6:2 FTS. PFAS detected at the highest concentrations were PFHxA, PFPeA, and PFHxS. PFOA levels ranged from 990 to 1,600 ng/L and PFOS levels ranged from 1,700 to 5,900 ng/L, greatly exceeding the 2016 EPA HA of 70 ng/L.

It is difficult to compare the results of the USAF sampling at the inlets to Lake Holloman (Section 5.2.3.3) to samples from Lake Holloman collected by the NMDOH. The NMDOH analysis included a few PFAS that were not target analytes for the USAF. Of those, PFBA and PFPeA comprised a significant portion of the total PFAS in the NMDOH samples. Otherwise, the same PFAS detected by USAF were also detected in the NMDOH samples.

5.4.6 Alamogordo PFAS Site

To follow up on the discovery of PFAS at the BGNDRF in 2019, NMED designated the area surrounding the BGNDRF as the Alamogordo PFAS site, and conducted a pre-Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) screening assessment followed by a PA (NMED 2020a) and a site inspection (SI) (NMED, 2021a) of the area. NMED identified several potential sources of PFAS detected in groundwater at the BGNDRF, including a former Presto Manufacturing plant, a former Alamogordo City landfill, former wastewater treatment plants and associated wastewater disposal ponds owned or used by the City of Alamogordo (Figure 10). The Presto facility, located about 3,500 feet south-southeast of the BGNDRF reportedly manufactured PFAS-coated cookware from 1972 to mid-2002 (NMED, 2020a). Limited information has been found regarding operations and waste disposal practices at Presto, and no investigations have been conducted at that site. The former City-owned landfill was located immediately to the east of the BGNDRF and operated from the late 1950s to 1988 (NMED, 2020a). The former landfill property is the location of the new City desalination plant and at least 3 monitor wells have been installed there. The desalination plant includes a lined evaporation pond to dispose of process concentrate, but is not yet operational. During the SI, NMED collected soil and groundwater samples in the area. Samples were analyzed for a total 33 PFAS compounds. The results are discussed below.

The Superfund Oversight section of the NMED GWQB collected soil and groundwater samples from several locations within the Alamogordo PFAS site. Groundwater samples were collected from a total of 17 locations, including samples from 13 private domestic wells, 3 monitor wells at the Alamogordo Desalination facility, and Well 2 at the BGNDRF. The locations and analytical results for samples from private domestic wells are being held as confidential. Analytical results for the samples collected monitor wells at the City facility and the BGNDRF are provided as Table 19. The locations of these 4 wells are shown on Figure 33. Total PFAS in the 4 wells

ranged from 9.92 ng/L at DPMW-3 on the east side of the former Alamogordo landfill to 368.73 ng/L in sample BRF-2, which is from well 2 at the BGNDRF site. In all 4 samples, PFCAs comprised more than 80 percent of total PFAS. PFOA was the dominant PFCA, with 3 of 4 samples exceeding the 2016 EPA HA for PFOA. PFOS was also detected, but none of the samples exceeded the 2016 EPA HA for PFOS. The proportions of selected PFAS detected in groundwater are shown in Figure 34.

5.4.7 Sampling by the USGS for NMED

In December 2020, the NMED Drinking Water Bureau and the USGS entered into a memorandum of agreement (MOA), under which the USGS would collect samples from surface water and groundwater locations throughout New Mexico and analyze those samples for water quality parameters, including PFAS (NMED and USGS, 2020). In Otero County, the USGS collected groundwater and surface water samples from active community public water supply systems. Sampling was conducted in federal fiscal year (FFY) 2020 and 2021. The USGS is expected to issue a comprehensive interpretive report in FFY 2022 (NMED and USGS, 2020).

In November 2021, NMED posted an updated list of locations sampled by the USGS and the results for PFAS detected in each sample (NMED, 2021b). DBS&A used this information to download the latitude and longitude of each groundwater location sampled by USGS from the NMED Drinking Water Bureau's Drinking Water Watch on-line database. Surface water sample locations were plotted using locations in the USGS NWIS. To obtain the complete analytical results, including reporting limits, DBS&A downloaded the analytical results for each location from the USGS's NWIS. In addition to 28 PFAS, information on the NWIS included field parameters (temperature, pH, specific conductance), general chemistry, dissolved metals, tritium, carbon-14, and isotopes of carbon, oxygen, and hydrogen.

5.4.7.1 Surface Water

Between December 2020 and May 2021, USGS personnel collected 12 surface water samples from 11 locations, including 6 springs and 5 other water supply facilities (e.g., reservoirs, diversions, intakes, or infiltration galleries) operated by various entities in the Alamogordo area (Figure 35). The results for PFAS analysis of the surface water samples are provided in Table 20. The only PFAS detected was PFHxS (2.5 ng/L or less), which was detected in samples from Lower Springer Spring, Reservoir 1-3, Upper Springer infiltration gallery, and Fresnal Canyon intake (Figure 35).

Field parameters, general chemistry, dissolved metals, tritium, carbon-14, and isotope analyses of surface water samples collected by the USGS are provided in Table 21. As discussed in Section 2.3, the NMWQCC added 3 PFAS to the list of toxic pollutants as they relate to groundwater and surface water [20.6.2.3103(A)(2) NMAC and 20.6.2.7(T)(2)(s) NMAC]; however, numeric standards for these compounds have not been set. The New Mexico surface water quality standards are codified at 20.6.4 NMAC, and depend on whether the reach is ephemeral or perennial, and also on the designated use(s) of particular streams. Water quality standards applicable to perennial surface water in the Tularosa Basin are provided in 20.6.4.801 NMAC; the designated uses that apply to these reaches include coldwater aquatic life, irrigation, livestock watering, wildlife habitat, domestic water supply and primary contact. These designated uses have pH standards of within the range of 6.6 to 8.8 (coldwater aquatic life) and 6.6 to 9.0 (primary contact), but no numeric standards for chloride or TDS.

5.4.7.2 Groundwater

Between September 2020 and August 2021, USGS personnel collected 24 groundwater samples from 21 public water supply wells operated by various entities in the Alamogordo area (Figure 36). The results for PFAS analysis of groundwater samples collected by the USGS are provided in Table 22. No PFAS were detected in samples from 19 of the 21 wells. Isolated low levels of PFOA (8 ng/L) and 6:2 FTS (11 ng/L) were detected in the ADWS Golf Course Well and ADWS Well 4, respectively, in the Alamogordo Domestic Water System. The detection of 6:2 FTS in ADWS Well 4 was not confirmed by a follow-up sample.

Field parameters, general chemistry, dissolved metals, tritium, carbon-14, and isotope analyses of groundwater samples collected by the USGS are provided in Table 23. None of the groundwater samples in Table 21 exceeded the New Mexico water quality standards with the following exceptions:

- 13 samples exceeded the standard for chloride of 250 mg/L with a maximum of 514 mg/L in La Luz Well 4 (Figure 35).
- 14 samples exceeded the standard for sulfate of 600 mg/L with a maximum of 1,420 mg/L in Snake Tank Well 5 located north of Tularosa (Figure 36).
- 21 of 24 samples exceeded the standard for TDS of 1,000 mg/L with a maximum of 2,510 mg/L in Snake Tank Well 5.

6. NMED Phase I Investigation

This section presents the results of work performed by DBS&A during the NMED Phase I characterization and monitoring activities at Holloman AFB. The scope of services included the following six tasks:

- Compiling and reviewing existing documents and data, as summarized above
- Preparing the necessary planning documents, including a work plan, SAP, and site-specific health and safety plan (HASP)
- Participating in a site visit to evaluate monitor well locations
- Performing the site characterization activities identified in the work plan and SAP
- Performing groundwater modeling using data derived from field activities
- Preparing this Phase 1 Progress Report summarizing the results of the file review, field investigation, and groundwater monitoring, and presenting recommendations for Phase 2 activities.

Each of these activities is described in the following subsections.

6.1 Review of Existing Site Data

DBS&A has identified and compiled documents and data related to the PFAS investigations at Holloman AFB and the surrounding area. This has been an ongoing process as new references and new sources of such data are identified. DBS&A has stored all of the compiled materials in a searchable document index, which is updated as needed. Efforts to compile existing information are summarized in this section.

The USAF has issued several documents related to the PFAS investigations at Holloman AFB, including the *Preliminary Assessment Report* (HGL, 2015), the *Final Site Inspection Report* (AFW, 2018), and the *Final Site Inspection Addendum* (AFCEC, 2021). These and many other documents related to environmental investigation and response activities conducted at USAF installations, including Holloman AFB, under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), are publicly available at https://ar.afcec-cloud.af.mil, a website maintained by the USAF Civil Engineering Center (AFCEC). Some of these documents were provided to NMED and are publicly available at https://hwbdocuments.env.nm.gov/Holloman%20AFB/. The NMED site includes copies of many

reports and correspondence related to historical soil, surface water, and groundwater investigations at Holloman AFB.

Analytical data from various sampling efforts for PFAS were identified and reviewed and are discussed in Section 5 of this report. Analytical data were obtained from the USAF PFAS reports listed above, the NMED PFAS Data website at https://www.env.nm.gov/pfas/data, and from the USGS NWIS website.

Information on the geology and hydrogeology of Holloman AFB and the surrounding area were obtained from various reports prepared by the USGS, the New Mexico Bureau of Geology and Mineral Resources (NMBGMR), OSE, and various consultants working for the USAF at Holloman AFB. Key reports containing lithologic logs for boring and monitor wells located throughout Holloman AFB are cited in this report. DBS&A also compiled and reviewed publicly available information for off-site wells from the OSE, USGS NWIS, and NMED Drinking Water Bureau's Drinking Water Watch.

6.2 Planning Documents

Prior to the site visit, DBS&A prepared a work plan for sampling of sediment, surface water, and groundwater at Holloman AFB (DBS&A, 2021a). The SAP was prepared as a combination quality assurance project plan (QAPP) and field sampling plan (FSP), to detail sample collection procedures and analytical methods for the characterization and monitoring of PFAS on and in the vicinity of Holloman AFB. These two standard deliverables were combined into one document to streamline the planning process, while ensuring that data collected were of sufficient quality for their intended use.

In addition to sampling wells that were previously reported to be impacted with PFAS (AFW, 2018), the initial SAP (DBS&A, 2021a) proposed to sample a number of groundwater monitor wells in the southern part of the base that were sampled as part of the 2008 basewide background study (Nationview/Bhate, 2009). However, on arrival for the site visit, DBS&A was advised by Holloman AFB personnel that most of those wells, particularly those in the southwest portion of the base (Figure 37), had been abandoned.

6.3 Site Visit

DBS&A conducted a site visit at Holloman AFB on October 13, 2021. During the site visit, DBS&A personnel met with environmental personnel at Holloman AFB to discuss potential investigations to be conducted on behalf of NMED, in accordance with the work plan (DBS&A,

2021a). As noted above, during the site visit, DBS&A was notified by Holloman AFB personnel that many of the groundwater monitor wells that were proposed for sampling in the southwest portion of the base either could not be located or had been abandoned. During the site visit, Holloman AFB personnel showed DBS&A a number of different ERP sites, including the former fire training area and the golf course area, and a number of monitor wells that could be sampled. Based on this information, DBS&A revised the work plan accordingly (DBS&A, 2021b).

6.4 Field Activities

The sampling effort at Holloman AFB was conducted in accordance with the work plan approved by NMED (DBS&A, 2021b), and with the NMED Remediation Oversight Section State Cleanup Program (SCP), outlined in 20.6.2 NMAC. All field activities were performed in accordance with the HASP (Appendix A of the SAP [DBS&A, 2021]). DBS&A sample locations are shown in Figure 38. Proposed direct-push sampling (Figure 37) was not conducted because site access could not be obtained from USAF that owns property adjacent to the base boundary.

6.4.1 Sample Handling and Analytical Methods

NMED contracted directly with Hall Environmental Analysis Laboratory (HEAL) in Albuquerque for laboratory analysis of sediment, surface water, and groundwater samples from the Holloman site. HEAL subcontracted with Vista for the analysis of samples for PFAS. Sample containers with appropriate preservatives were provided by HEAL. Upon collection, all environmental samples were placed on ice in dedicated sample coolers and shipped to HEAL under appropriate chain-of-custody. HEAL separated the sample volumes for PFAS analysis and forwarded those containers to Vista.

Vista analyzed sediment, surface water, and groundwater samples for 29 PFAS using EPA methods 533 and 537.1M-ID. HEAL analyzed surface water and groundwater samples for total organic carbon (TOC), total Kjeldahl nitrogen (TKN), dissolved nitrate-nitrite, dissolved major anions and cations, and dissolved metals, including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, vanadium, and zinc. The laboratory reports for sediment, surface water, and groundwater samples analyzed by HEAL and Vista are provided in Appendix D. The results of laboratory analyses for PFAS and general chemistry are discussed in the following sections.

6.4.2 Sediment Sampling

A total of 12 sediment samples, including 2 duplicate samples, were collected by DBS&A from 10 locations at Holloman AFB (Figure 39). Sediment samples were collected at the surface (0.0 to 0.5 feet bgs) using a high-density polyethylene (HDPE) cup that was decontaminated between samples.

The results of laboratory analyses of sediment samples for PFAS collected by DBS&A are provided in Table 24. PFOA, PFOS, and PFHxS concentrations in each sediment sample collected by DBS&A are shown on Figure 39. Total PFAS in sediment samples ranged from 47.34 µg/kg at SED-6 to 118,639 µg/kg at SED-8. A total of 5 PFCAs (PFBA, PFPeA, PFHxA, PFHpA, and PFOA) and three PFSAs (PFBS, PFHxS, and PFOS) were detected in all sediment samples. On average, PFSAs comprised the greatest proportion (more than 70 percent) of the PFAS detected with PFOS comprising 37 to 92 percent of total PFAS detected. PFNA, PFPeS, PFHpS, and 6:2 FTS were detected in 10 or more samples.

Sediment sample SED-8 was collected from Evaporation Pond 2 (Figure 39), where direct disposal of AFFF has occurred on a monthly basis since 1991. Sediment sample SED-8 contained all 11 PFCA target compounds and all 5 PFSA target compounds, 1 FTSA (4:2 FTS), and 2 FOSA analytes. PFOS was detected at 109,000 µg/kg, which was approximately 92 percent of the total PFAS detected. None of the other PFAS detected exceeded 1.3 percent of the total PFAS detected. The laboratory results of SED-8 likely reflect the chemical signature of AFFF being discharged into the pond.

Sediment samples 1, 2, and 3 were collected from the concrete-lined ditch that flows south from the area of Evaporation Pond 2 (Figure 39). Evaporation Pond 2 reportedly has no outlet, although it seems likely that this ditch would collect runoff from the area surrounding the evaporation pond. Total PFAS in these 3 samples ranged from 342 to 825 µg/kg, with PFOS comprising about 40 to 71 percent of total PFAS detected. The proportions of selected PFAS detected in sediment samples at and near Evaporation Pond 2 are shown in Figure 40a. Compared to the sediment sample from Evaporation Pond 2 (SED-8), total PFAS concentrations are much lower in sediments from the ditch, but are still dominated by PFOS. However, the ditch samples contain a significant percentage of 6:2 FTS, while the sample from Evaporation Pond 2 contained none.

Sediment sample SED-6 was collected from an unlined ditch on the west side of a culvert that passes beneath Forty Niner Avenue, more than 2,000 feet west of Evaporation Pond 2 (Figure 39), in an area where AFFF use was not reported. The concentration of total PFAS was

47.3 µg/kg. A total of seven PFCAs and three PFSAs were detected comprising about 18 and 82 percent of total PFAS, respectively. Additional investigation is needed to determine the area that drains to this location to possibly explain the relatively low levels of PFAS detected in the surface sediment.

Sediment samples SED-9 and SED-10 were collected from Ponds 1 and 2, respectively, at the Holloman AFB golf course. Total PFAS in the primary samples were approximately the same (131.5 and 128 µg/kg, respectively), but the duplicate sample of SED-9 contained much higher PFOS and total PFAS (467.7 µg/kg). Otherwise, the primary samples contained about equal amounts of PFCAs and PFSAs.

Sediment sample SED-11 was collected from the south end of Lagoon G, and samples SED-4 and SED-5 were collected from the wetlands area west of Lagoon G (Figure 39). Total PFAS in these 3 samples ranged from 713.69 µg/kg at SED-4 to 4,300 µg/kg at SED-11, with PFOS comprising about 51 to nearly 80 percent of total PFAS detected.

The proportions of selected PFAS detected in sediment samples collected by DBS&A at other locations (SED-4, 5, 6, 9, 10, and 11) on Holloman AFB are shown in Figure 40b. PFOS comprises 36.7 to 68 percent of total PFAS in these samples, while PFOA generally comprised less than 1.5 percent of total PFAS. Also present at significant concentrations were 2 PFCAs (PFPeA and PFHxA) and 1 PFSA (PFHxS). The FTSA, 6:2 FTS, was generally detected at low levels (1 to 5 percent) in these samples.

6.4.3 Surface Water Sampling

A total of 3 surface water samples and 1 duplicate sample were collected by DBS&A at Holloman AFB. Samples were collected using a 1-liter HDPE container attached to an extendable pole. The HDPE container was deconned between samples. Sample SW-1 was collected at the south end of Lagoon G, and samples SW-2 and SW-3 were collected from the northeast and southeast shores of Lake Holloman. Approximate sample locations, as well as the detected PFOA, PFOS, and PFHxS concentrations are shown in Figure 41.

The results of laboratory analysis of surface water samples for PFAS collected by DBS&A are provided in Table 25. The same 15 PFAS were detected in each of the surface water samples including 7 PFCAs, 5 PFSAs, and 3 FTSAs. In each sample, the concentrations of PFOA and PFOS, while lower in sample SW-1, exceeded the drinking water 2016 EPA HA of 70 ng/L (Figure 41).

The proportions of selected PFAS detected in the surface water samples are shown in Figure 42. Not shown are seven PFAS which were detected at lower concentrations, and thus lower percentages of total PFAS detected. Notable are the similarities in proportions of PFAS detected in samples from Lake Holloman and the general similarities with samples collected by the NMDOH in 2019 (Figure 32).

General chemistry data for surface water samples collected by DBS&A are provided in Table 26. Final field parameters for the surface water samples are provided in Table 27, including surface water samples SW-1 from Lagoon G and SW-2 from Lake Holloman. Field parameters were not collected for site SW-3 at Lake Holloman due to time constraints.

Field parameters for the surface water samples collected from Lagoon G and the east side of Lake Holloman had pH greater than 10. All 3 surface water samples were reported to be moderately turbid. TDS in surface water samples ranged from 2,980 mg/L at location SW-1 to 47,700 mg/L at location SW-3. Specific conductance ranged from 3,900 microsiemens per centimeter (µS/cm) at Lagoon G to 87,000 µS/cm at Lake Holloman. Total carbonate alkalinity, all as bicarbonate, was 116.5 mg/L as calcium carbonate ($CaCO_3$) at SW-1. Total alkalinity in samples from Lake Holloman was a combination of bicarbonate and carbonate anions with a maximum total of 215.4 mg/L. TOC concentration was fairly low (5 mg/L) at location SW-1, while both samples from Lake Holloman had TOC concentration of 76 mg/L.

As discussed in Section 2.3, the NMWQCC added 3 PFAS to the list of toxic pollutants as they relate to groundwater and surface water [20.6.2.3103(A)(2) NMAC and 20.6.2.7(T)(2)(s) NMAC]; however, numeric standards for these compounds have not been set. The New Mexico surface water quality standards are codified at 20.6.4 NMAC, and depend on whether the reach is ephemeral or perennial, and also on the designated use(s) of particular streams. Water quality standards applicable to perennial surface water in the Tularosa Basin are provided in 20.6.4.801 NMAC, and the designated uses that apply to these reaches include coldwater aquatic life, irrigation, livestock watering, wildlife habitat, domestic water supply and primary contact. These designated uses have pH standards within the range of 6.6 to 8.8 (coldwater aquatic life) and 6.6 to 9.0 (primary contact), but no numeric standards for chloride, sulfate, or TDS.

6.4.4 Groundwater Sampling

A total of 16 groundwater samples, including 1 duplicate sample, were collected by DBS&A at Holloman AFB from 15 existing monitor wells. Wells were purged and sampled using a

peristaltic pump, using disposable tubing for each location. Samples were collected from 5 wells at the former fire training area FT-31, 1 well at Evaporation Pond 2, 5 wells at different ERP sites in the North Area, and 4 wells at the golf course, as shown on Figure 43. The results of laboratory analysis of groundwater samples for PFAS collected by DBS&A are provided in Table 28a. The limited well construction information that DBS&A was able to identify for these wells is provided in Table 28b. Final field parameters for groundwater samples are provided in Table 27.

6.4.4.1 Fire Training Area FT-31

DBS&A collected a total of 5 groundwater samples from 5 monitor wells at FT-31 (Figure 43). The results of laboratory analysis of groundwater samples for PFAS collected by DBS&A from FT-31 are provided in Table 28. The proportions of selected PFAS detected in the groundwater samples are shown in Figure 44. Detections in the groundwater samples from FT-31 included 9 to 16 PFAS, with up to 7 PFCAS dominated by PFHxA, up to 5 PFSAs dominated by PFBS or PFHxS, and up to 3 FTSAs. Concentrations of PFOA and PFOA, individually and combined, exceeded the 2016 EPA HA of 70 ng/L in only two samples with maximums of 143,000 and 43,200 ng/L, respectively, in the sample from well FT31-LM5.

Groundwater samples were also analyzed for a suite of general chemistry parameters. The results of laboratory analysis of all groundwater samples for general chemistry collected by DBS&A, including FT-31, are provided in Table 29. TDS concentrations in groundwater samples from FT-31 ranged from 20,300 to 24,100 mg/L, with specific conductance ranging from 36,000 to 45,000 µS/cm. Total carbonate alkalinity, all as bicarbonate, ranged from 162.4 to 298.3 mg/L. TOC concentrations in samples from FT-31 ranged from 1.5 to 12 mg/L and averaged 5.4 mg/L. The following analytes exceeded their respective MCLs in all samples from FT-31: TDS, chloride, sulfate, and nitrate+nitrite as nitrogen, assuming all is nitrate. Fluoride was not detected, but the reporting limit of 2.0 mg/L exceeded the MCL of 1.6 mg/L.

6.4.4.2 Evaporation Pond 2

DBS&A collected a groundwater sample from the only monitor well at Evaporation Pond 2, well MW05001 (Figure 43). A total of 20 PFAS totaling 664,230 ng/L, including 8 PFCAs, 5 PFSAs, and 3 FTSAs were detected in the sample collected by DBS&A from well MW05001 (Table 28). The proportions of selected PFAS detected in the groundwater sample are shown in Figure 45. PFCAs were dominated by PFHxA at 12.6 percent of total PFAS detected in the sample. PFSAs were dominated by PFOS at 42.2 percent of total PFAS, and FTSAs were dominated by 6:2 FTS at 24.7 percent of total PFAS.

Well MW05001 was installed and sampled during the PFAS SI (AFW, 2018). Overall, total PFAS declined significantly from a total of 1,580,100 ng/L in 2017 to the current 664,230 ng/L. Although the current sample was analyzed for more PFAS, most PFCAs and PFSAs decreased in concentration and proportion of total PFAS. FTSAs, 6:2 FTS and 8:2 FTS, increased in concentration and proportion of total PFAS.

The groundwater sample from the well at Evaporation Pond 2 (MW05001) was also analyzed for a suite of general chemistry parameters. The results of laboratory analysis of all groundwater samples for general chemistry collected by DBS&A, including MW05001, are provided in Table 29. The sample from well MW05001 contained TDS at a concentration of 4,240 mg/L with specific conductance of 4,600 µS/cm. Total carbonate alkalinity of the sample, all as bicarbonate, was 116.2 mg/L. TOC concentration was 6.8 mg/L. Concentration of the following analytes exceeded MCLs in the sample from MW05001: TDS, fluoride, and sulfate.

6.4.4.3 North Area ERP Sites

Groundwater samples were collected from 5 monitor wells at three ERP sites in the North Area of the main base (Figure 43). A total of 1 sample was collected from ERP Site 29 (Former Army Landfill), one from Sites 30/33 (Grease Disposal Pits), and 3 samples were collected from Sites 2/5 (petroleum, oil, and lubricants [POL] spill sites). These wells were selected because they are generally located upgradient of the main base. The results of laboratory analysis of groundwater samples for PFAS collected by DBS&A from these 5 wells are provided in Table 28. Very low concentrations of PFOS (3.28 and 1.23 ng/L, respectively) were detected in the samples from Sites 29 and 30/33. Total PFAS concentrations increased significantly at Sites 2/5, with 799 ng/L in the sample from upgradient well S1-MW3 to 56,816 ng/L at well MW-02&05-10, which is generally downgradient of the former aboveground storage tank farm (Figure 43). A total of 6 PFCAs dominated by PFHxA (comprising 20 to 31 percent of total PFAS) were detected in samples from wells MW-02&05-02 and MW-02&05-10. Also detected in these 2 wells were 5 PFSAs, dominated by PFHxS, and 3 FTSAs dominated by 6:2 FTS. PFOA and/or PFOS in the samples from wells at Sites 2/5 exceeded the 2016 EPA HA of 70 ng/L. The high concentrations of PFAS at this location indicate the possibility of an AFFF release at or near this location.

Groundwater samples from wells in the North Area were also analyzed for a suite of general chemistry parameters. The results of laboratory analysis of all groundwater samples for general chemistry collected by DBS&A are provided in Table 29. TDS concentrations in groundwater samples from wells in the North Area ranged from 6,820 to 36,100 mg/L, with specific conductance ranging from 8,800 to 71,000 µS/cm. Total carbonate alkalinity, all as bicarbonate,

ranged from 141 to 590.7 mg/L. TOC ranged from 1.9 to 20 mg/L and averaged 8.5 mg/L. Concentrations of the following analytes exceeded MCLs in one of more samples from wells in the North Area: TDS, chloride, sulfate, nitrate+nitrite-N, and fluoride.

6.4.4.4 Golf Course Wells

DBS&A collected groundwater samples from 4 monitor wells at the base golf course (Figure 43). As discussed in Section 5.2.3.4, from September 2011 to April 2020, treated wastewater effluent from the WWTP was used to irrigate the course and fill Ponds 1 and 2 located there. Also, as noted previously, the USAF has sampled the golf course wells for PFAS several times in the past in accordance with their NMED discharge permit DP-1173, which allowed irrigation of the golf course with treated wastewater. The results of laboratory analysis of groundwater samples for PFAS collected by DBS&A from these 4 wells are provided in Table 28.

PFAS were detected in samples from each of the 4 golf course wells, with total PFAS concentrations ranging from 37.3 ng/L in well GC-MW02, located within the golf course area, to 5,361.5 ng/L in downgradient well GC-MW03. Concentrations of PFOA and PFOS only exceed the 2016 EPA HA of 70 ng/L in well 3. A total of 4 to 6 PFCAs and 4 to 5 PFSAs were detected in the samples. The FTSA 6:2 FTS is detected in samples from wells 2 and 3. The proportions of selected PFAS are shown in Figure 46. Samples from wells 1 and 2 are dominated by PFSAs, mostly PFHxS, with ratios of PFCAs to PFSAs (PFCAs/PFSAs) of 0.33 and 0.49, respectively. At well 3, that ratio increases to 0.80; at well 4, the upgradient well, PFCAs dominate and the ratio is 1.31.

Groundwater samples collected from monitor wells at the golf course were also analyzed for a suite of general chemistry parameters. The results of laboratory analysis of all groundwater samples for general chemistry collected by DBS&A, including the golf course wells, are provided in Table 29. TDS in the groundwater samples from the golf course wells was 8,790 mg/L at downgradient well GC-MW03, but ranged from 35,700 to 53,700 mg/L in the other 3 wells. Specific conductance was 16,000 µS/cm at GC-MW03, and ranged from 67,000 to 99,000 µS/cm in the other 3 wells. Total carbonate alkalinity, all as bicarbonate, ranged from 107.9 to 412.3 mg/L. TOC concentrations ranged from 1.8 to 7.6 mg/L, and averaged 4.35 mg/L. The following analytes exceeded the MCLs in all groundwater samples from the golf course wells: TDS, chloride, sulfate, fluoride, and nitrate+nitrite-N.

6.4.5 Biological Sampling

The UNM MSB, under subcontract to DBS&A, surveyed and sampled the birds of Holloman Lake for the purpose of assessing the effects of PFAS on avian ecology and the resulting implications for human health. The Holloman Lake bird surveys occurred on 23 separate days between December 2021 and June 2022. During these visits, the UNM biologists surveyed the birds present, looked for evidence of breeding, gathered observations about avian ecology and natural history, and collected specimens to be used for PFAS screening of tissues. Sampling during the winter months was focused on collecting ducks, the group of birds most likely to be consumed by humans; later collecting efforts were focused on nongame species. In total, UNM MSB collected 128 birds from Holloman Lake, distributed among three distinct seasons (winter, migration, and breeding), representing 37 species. The UNM MSB has thousands of additional avian tissue samples in their archives to serve as control samples.

The UNM MSB also surveyed the small mammal community around Lake Holloman, using independent traplines of varied trap type designed to sample the various habitat types and the full small mammal community. In addition, a creosote/mesquite shrubland at the Oliver Lee Memorial State Park site in Otero County was sampled to serve as a local control site. Three seasonal collecting events were conducted in October 2021, March 2022, and May 2022, and consisted of more than 3,000 trap nights. A total of 282 small mammal specimens from 11 species were collected during these events. The UNM MSB prepared summaries of the FY2022 biological sampling activities (Appendix F).

A subset of the biological samples was sent for PFAS analyses during FY2022, and the sample results were received prior to finalizing this report. The samples that were analyzed included 20 avian tissue samples and 20 small mammal blood and tissue samples. Specifically, the biological samples consisted of the following:

- 20 game-bird muscle samples, including 11 Holloman Lake and 9 control samples
- Paired blood and liver tissue samples for 2 cotton rats (genus *Hispidus*) found at a Holloman Lake wetland
- Paired blood and liver tissue samples for 2 Merriam's kangaroo rats (*Dipodomys merriami*) collected in upland desert vegetation at Holloman Lake
- Control blood and liver tissue samples (1 each) from a Merriam's kangaroo rat collected at Oliver Lee Memorial State Park

- Paired blood and liver tissue samples for a grasshopper mouse (grasshopper mice are carnivorous and feed on other rodents, allowing for potential bioaccumulation of PFAS)
- Paired blood and liver samples from four additional rodent species collected at Holloman Lake

Avian samples that were analyzed were selected from representative game species that are hunted at Holloman Lake and eaten by people. Game bird species that were analyzed for PFAS include green-winged teal (*Anas crecca*) (n = 2 samples), redhead (*Aythya americana*) (n = 2), American coot (*Fulica americana*) (n = 1), common merganser (*Mergus merganser*) (n = 2), ruddy duck (*Oxyura jamaicensis*) (n = 1), and northern shoveler (*Spatula clypeata*) (n = 2). Control samples from some of the same species and from mallards (*Anas platyrhynchos*) were collected at other wetlands around the state. Muscle tissue was screened because it is representative of the tissue consumed by people, and therefore immediately relevant to human health.

Rodent samples were selected from representative species found along the shoreline of Holloman Lake and its inflows, in addition to surrounding uplands characterized by desert vegetation. Rodents from the surrounding uplands were included to evaluate the possibility of PFAS soil contamination from windblown dust. The unit of measurement for PFAS concentrations was µg/kg in muscle tissue, and ng/mL in liver and blood samples. The laboratory report for the biological samples is provided in Appendix G.

PFOS, PFOA, PFNA, PFDA, and PFHxS concentrations were, with few exceptions, higher by two or more orders of magnitude in blood, liver, and muscle tissue samples from Holloman Lake compared to the control samples. Samples from Holloman Lake also yielded longer lists of PFAS chemicals, some of which were not detected in control samples (e.g., PFHpA, PFUnA, PFPeS).

The difference between the PFOS concentrations found in Holloman Lake and the control bird samples is shown in Figure 47. PFOS compounds were detected at relatively low concentrations in two common mergansers from Holloman Lake (51 µg/kg and 17 µg/kg). However, compared to the other waterfowl species sampled, common mergansers are continuously present at Holloman Lake for only a short period of the year (January and February, and for another two weeks around mid-March and again in mid-April). The two birds included in the PFAS analysis were collected in mid and late January 2022, and would therefore have been exposed to contaminants at Holloman Lake for only a short duration.

PFAS contamination in rodents from Holloman Lake also appeared elevated compared to the control sample results. In particular, L-perfluorohexanesulfonic acid reached concentrations of

10,000 ng/mL and 8,000 ng/mL in the livers of the 2 house mice collected at Holloman Lake. Up to 15 PFAS chemicals were detected in the blood and liver samples of cotton rats from Holloman Lake, a finding that was not surprising given the species' association with water. However, high PFOS concentrations were found in the blood and liver of Merriam's kangaroo rats collected away from the shoreline in desert vegetation. This last finding raises the possibility that soils are also being contaminated by windblown dust from the lake, especially as Merriam's kangaroo rats can meet their water requirements from a diet of dry seeds alone.

Waterfowl from Holloman Lake appear to be contaminated with PFAS at concentrations orders of magnitude greater than the control sample results. High levels of contamination of muscle tissues in waterfowl from Holloman Lake may mean that consumption of these birds may represent a risk to human health. Additional sample analyses (involving other species collected) and comparison to additional control values from other areas will be needed for a more complete understanding of the PFAS contamination at Holloman Lake, wildlife impacts, and potential risks related to human consumption.

6.4.6 Management of Investigation-Derived Waste

Disposable personal protective equipment (PPE), including disposable gloves, and general sampling waste, such as paper towels, were bagged and brought back to the DBS&A warehouse in Albuquerque for proper disposal.

Purge water was containerized in a 55-gallon drum. On June 16, 2022, the purge water drum was picked up from Holloman AFB and disposed of at a licensed facility.

6.4.7 Laboratory Data Review

The data quality assessment for the sampling performed under this contract is provided as Appendix E.

6.5 Groundwater Modeling

Preliminary Holloman AFB groundwater modeling was conducted to assess potential PFAS groundwater plume lengths downgradient of source areas given available data. Preliminary modeling was conducted once it was clear that Holloman AFB access would not be obtained in time for drilling to occur during FY2022 and project resources could be redirected. Holloman AFB groundwater modeling activities conducted during FY2022 are summarized in Appendix H. Predicted plume lengths range as large as 3,750 feet for PFOS and 5,060 feet for PFOA

considering a range of parameter values. Predicted plume lengths were found to be sensitive to assumed values of hydraulic conductivity and gradient and assumed PFAS sorption to aquifer media. Modeling results provide bounding cases for potential downgradient plume length, and may guide future modeling and data collection efforts.

7. Summary and Conclusions

The results of sampling for PFAS conducted by various parties in the Holloman-Alamogordo area indicate that releases of PFAS have occurred from several sources at Holloman AFB, including the AFFF source areas identified by the USAF, as well as POL site 2, and from as yet undetermined sources at the Alamogordo PFAS site in southwest Alamogordo. Additional investigations are required determine the extent of PFAS contamination in both areas. The NMED GWQB Superfund Oversight section currently is planning an additional investigation at the Alamogordo PFAS site, but the schedule for this work has not been determined.

DBS&A collected sediment, surface water, and groundwater samples as part of the Phase I PFAS investigation, and they were analyzed for 29 PFAS using EPA methods 533 and 537.1M-ID. DBS&A collected sediment samples from 10 locations at Holloman AFB. A total of 5 PFCAs (PFBA, PFPeA, PFHxA, PFHpA, and PFOA) and 3 PFSAs (PFBS, PFHxS, and PFOS) were detected in all sediment samples. On average, PFSAs comprised the greatest proportion (more than 70 percent) of the PFAS detected in sediment, with PFOS comprising 37 to 92 percent of total PFAS detected. PFNA, PFPeS, PFHpS, and 6:2 FTS were detected in 10 or more samples.

DBS&A collected surface water samples from 3 locations at Lake Holloman, and the same 15 PFAS were detected in each of the surface water samples, including 7 PFCAs, 5 PFSAs, and 3 FTSAs. In each sample, the concentrations of PFOA and PFOS, while lower in sample SW-1, exceeded the drinking water 2016 EPA HA of 70 ng/L.

DBS&A collected groundwater samples from 15 wells at Holloman AFB, including from 5 wells at the former fire training area FT-31, 1 well at Evaporation Pond 2, 5 wells at different ERP sites in the North Area, and 4 wells at the golf course. Detections in the groundwater samples included the following:

- FT-31 included 9 to 16 PFAS, with up to 7 PFCAS dominated by PFHxA, up to 5 PFSAs dominated by PFBS or PFHxS, and up to 3 FTSAs.

- Evaporation Pond 2 monitor well included a total of 20 PFAS, including 8 PFCAs, 5 PFSAs, and 3 FTSAs. PFCAs were dominated by PFHxA, PFSAs were dominated by PFOS, and FTSAs were dominated by 6:2 FTS.
- The ERP sites in the North Area, located generally located upgradient of the main base, had very low concentrations of PFOS for Sites 29 and 30/33, with a significant increase at Sites 2/5. A total of 6 PFCAs dominated by PFHxA were detected in samples from wells MW-02&05-02 and MW-02&05-10, also with detections of 5 PFSAs, dominated by PFHxS, and 3 FTSAs, dominated by 6:2 FTS.
- The Holloman AFB golf course wells included a total of 4 to 6 PFCAs and 4 to 5 PFSAs. The FTSA 6:2 FTS is detected in samples from wells 2 and 3.

The findings of the Phase I Holloman site PFAS investigation are consistent with previous investigations. The proposed scope of the Phase I groundwater investigation was more extensive than previous investigations; however, a number of wells that DBS&A planned to sample, particularly in the southern portion of Holloman AFB, were not sampled during the current investigation because they could not be located or had been abandoned. DBS&A did not obtain access to Holloman AFB for drilling activities in FY2022, limiting the scope of the current investigation. The USAF has thus far not approved our efforts to install new groundwater monitor wells or collect biological samples on Holloman AFB.

The biological sampling that was performed occurred along the southern portion of Lake Holloman, which is accessible from US 70, as well as in other reference (background) areas. The UNM MSB collected 128 birds from Holloman Lake representing 37 species and 282 small mammal specimens from 11 species. A total of 40 biological samples have been analyzed for PFAS to date. PFAS chemicals were detected only in trace amounts in the control samples; PFOS, PFOA, PFNA, PFDA, and PFHxS concentrations were, with few exceptions, higher by two or more orders of magnitude in blood, liver, and muscle tissue samples from Holloman Lake. Additional sample analyses (involving other species collected) will be needed for a more complete understanding of the PFAS contamination at Holloman Lake.

Preliminary groundwater modeling was conducted in order to provide bounding cases, and indicates that PFAS plumes may extent as far as several hundred to several thousand feet downgradient of source areas.

8. Recommendations

Additional PFAS investigations will occur in FY2023 (Phase 2). The FY2023 Holloman site PFAS investigation project objectives will include the following:

- Expanding the monitoring network, installing new wells where necessary, and establishing a regular groundwater monitoring program.
- Providing better definition of existing groundwater plume geometry (PFAS isoconcentration maps and cross sections) and modeling simulated predictions of future plume migration and surface water contamination, including empirically derived rates of movements of PFAS contaminants.
- Investigating the extent to which resident and migratory waterfowl at the Lake Holloman Wetlands Complex are contaminated with or otherwise adversely affected by PFAS, and the potential for human PFAS exposure.

Specific FY2023 field activities will include drilling new monitor wells and collecting sediment, surface water, and groundwater samples from the following locations:

- Surface water and sediment sampling at the locations described below and shown on Figure 48
  - SW-1, current evaporation pond at the current fire training area
  - SW-2, concrete lined evaporation pond on the south flight line
  - SW-3, potential evaporation pond on west side of base
  - SW-4, upper reach of Lost River (Malone Draw) near where it enters the base
  - SW-5, near outfall of Lost Lake
  - SW-6, Hurtz Spring located in a rock and gravel pit west of Lake Holloman
- Groundwater sampling at the locations described below and shown on Figure 49 (some of the proposed locations are on White Sands Missile Range, and are subject to change depending on site access)
  - GW-1, south of the current evaporation pond at the current fire training area.
  - GW-2, former chrome plating facility and spill site (Building 281, ERP Site 18).

- GW-3, upgradient of the Main Base, downgradient of the munition's bunkers at the corner of Saber Road and Douglas Road.
- GW-4, GW-5, and GW-6 are new monitor wells to be installed to replace those previously located on the west side of the sewage lagoons.
- GW-7, GW-8, GW-9 are new monitor wells to be installed downgradient (west and southwest) of Evaporation Pond 2. DBS&A recommends that a fourth new monitor well be installed north of GW-7.
- GW-10, GW-11, and GW-12 are new monitor wells to be located downgradient (west) of Lake Holloman.
- DP-20, an existing 1-inch dimeter monitor well at ERP Site SS-2&5 (POL)
- MW-02&05-09a or MW-02&05-06. Both wells are downgradient of POL site 2 and were sampled as recently as late 2018.

Other proposed FY2023 Holloman site PFAS investigation activities include the following:

- Coordination meetings between NMED, DBS&A, and Holloman AFB regarding site investigation activities and site access.
- Facilitation of a public meeting in Alamogordo to present the results of the FY2022 Holloman site PFAS investigation and outline the project's FY2023 goals and objectives.
- Additional analytical or numerical groundwater (and potentially surface water) modeling activities to assess PFAS transport and better define the nature and extent of PFAS contamination at the Holloman site.
- Laboratory analysis of additional biological samples that were collected during FY2022 and further comparison to biological samples from other areas to better define the extent to which resident and migratory waterfowl and small mammals at the Lake Holloman Wetlands Complex are contaminated with or otherwise adversely affected by PFAS.
- Additional biological sampling of birds and small mammals from or near surface water bodies on Holloman AFB and control areas, if warranted, based on the analytical results from the samples collected in FY2022.
- Atmospheric dispersion and deposition modeling, if warranted, based in part on the results of the biological sample analyses.

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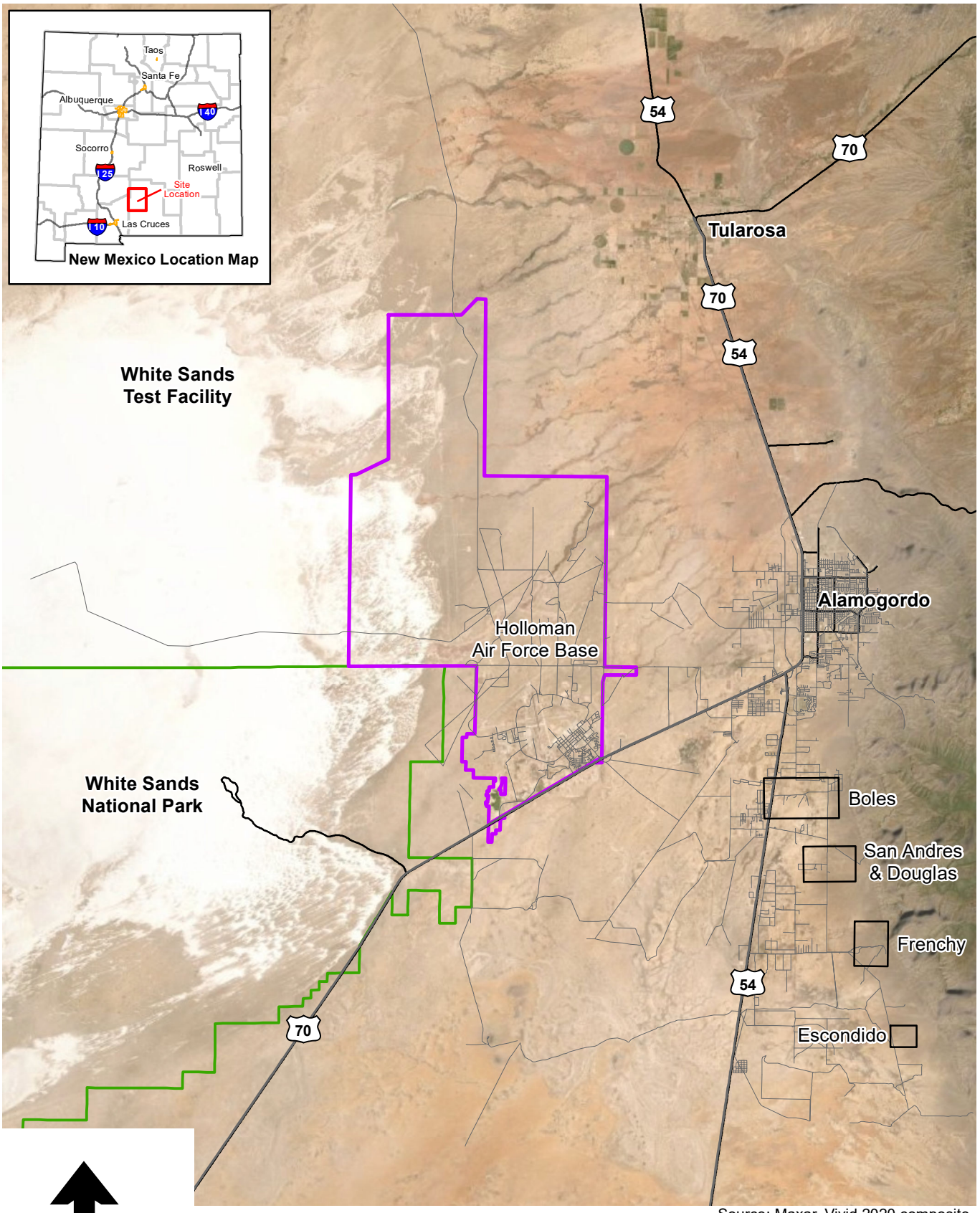
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Figures



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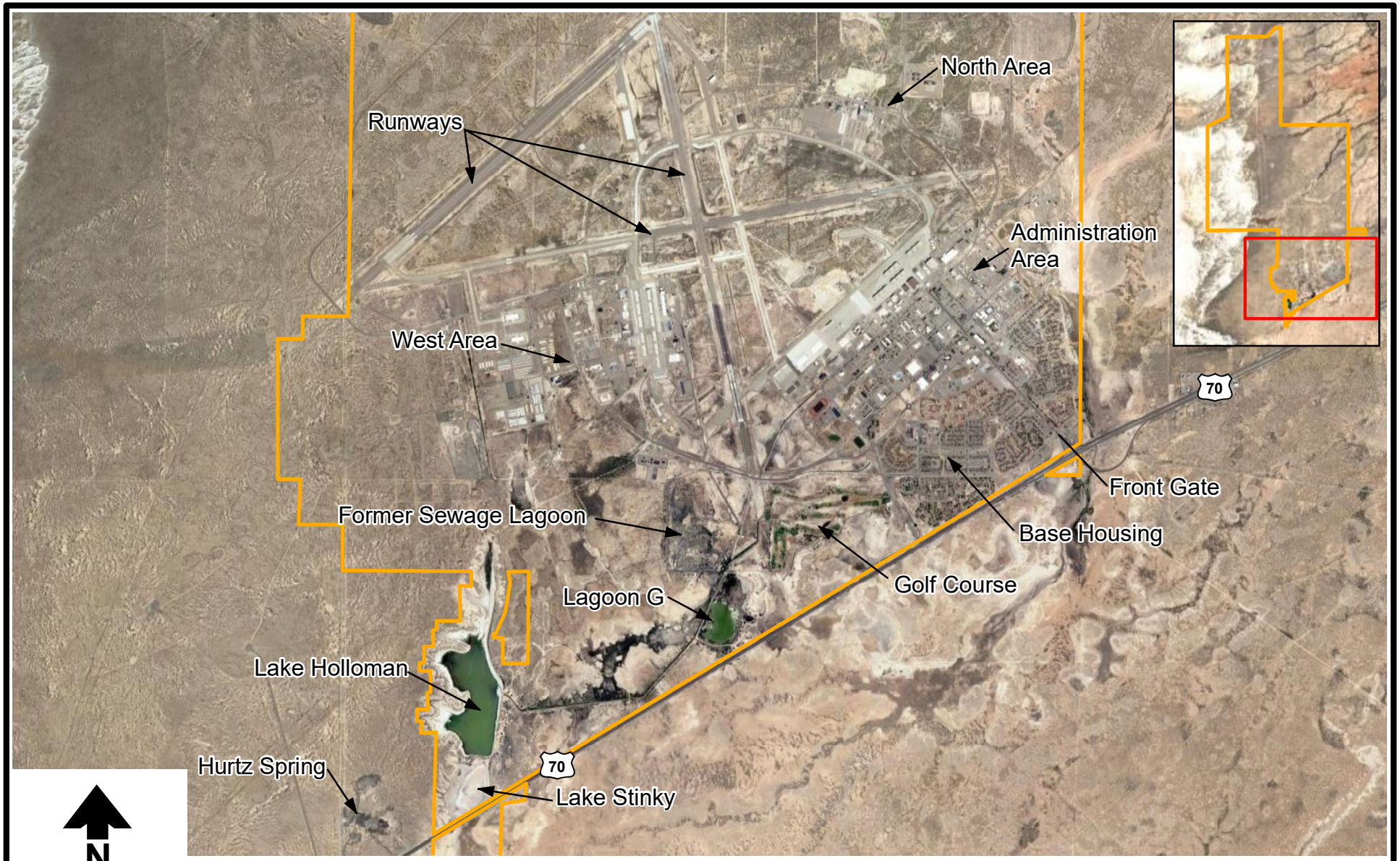
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JN DB21.1060

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Vicinity Map

Figure 1

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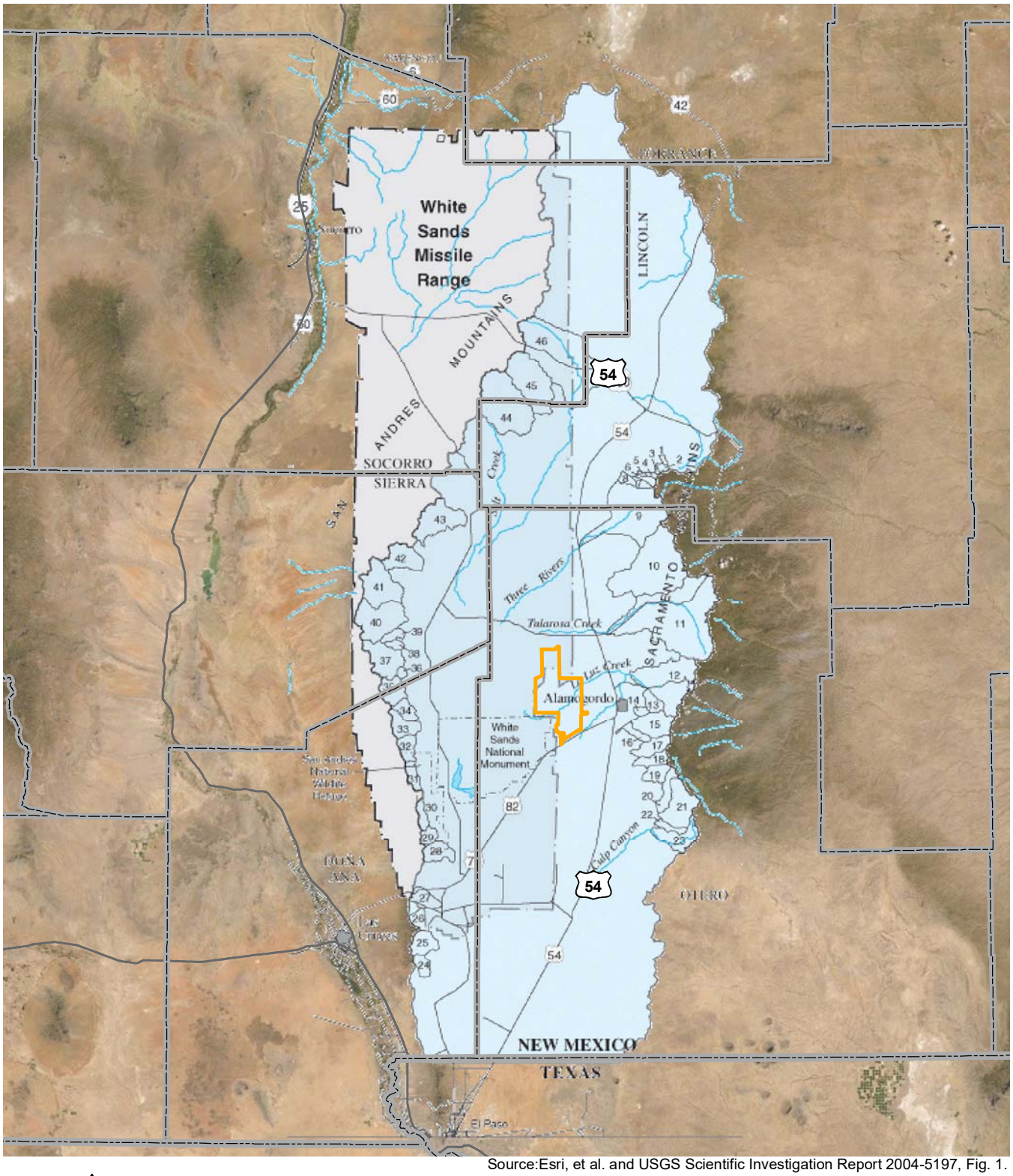
Source: Google Earth Pro, 5/27/2016

Figure 2

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NMED PFAS INVESTIGATION, HOLLOMAN AFB

Main Base Layout



Source:Esri, et al. and USGS Scientific Investigation Report 2004-5197, Fig. 1.

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Explanation

Holloman AFB Installation boundary

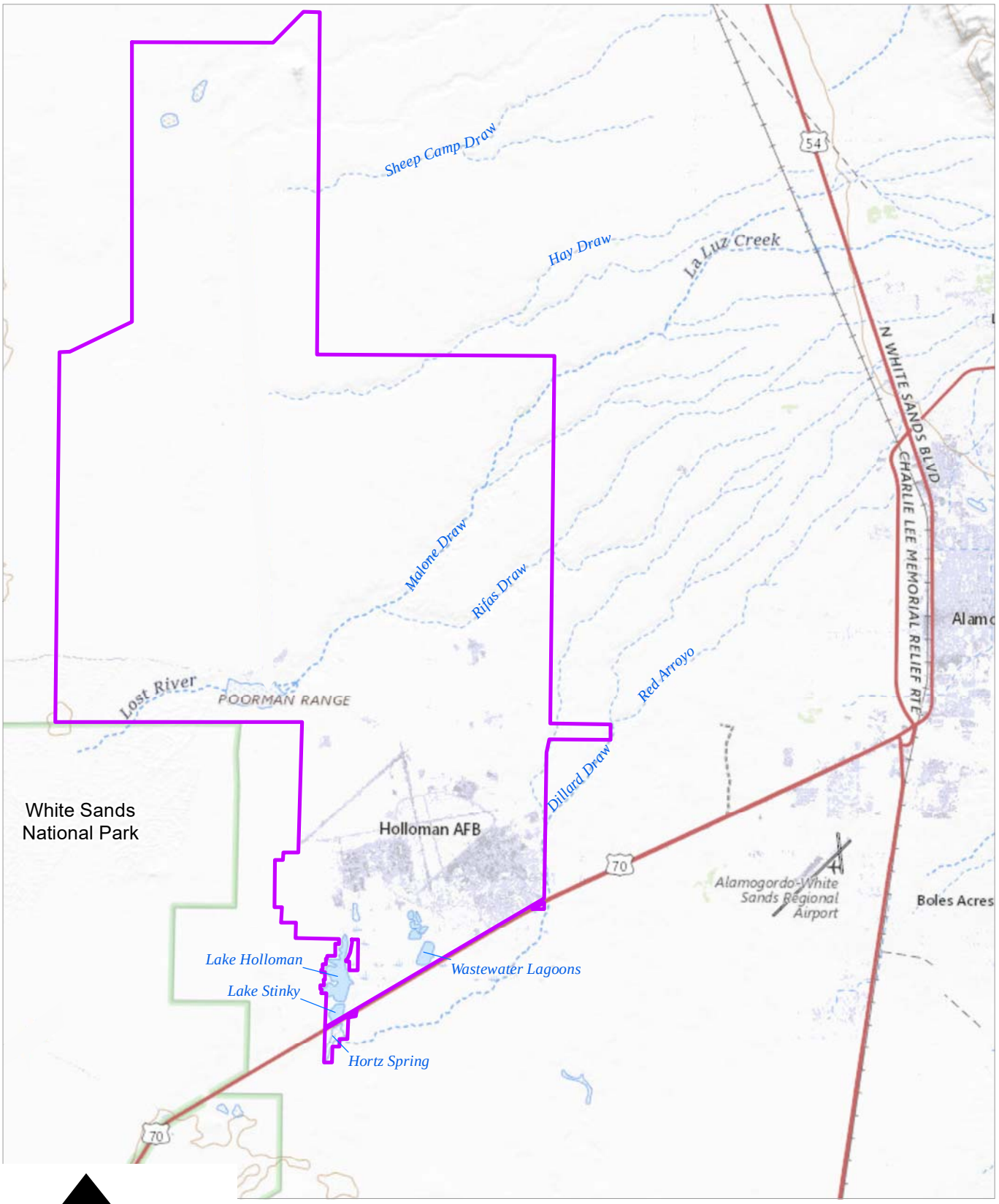
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Miles

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NMED PFAS INVESTIGATION, HOLLOMAN AFB
Tularosa Basin

Figure 3



Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National

N

0 6000 12000 Feet

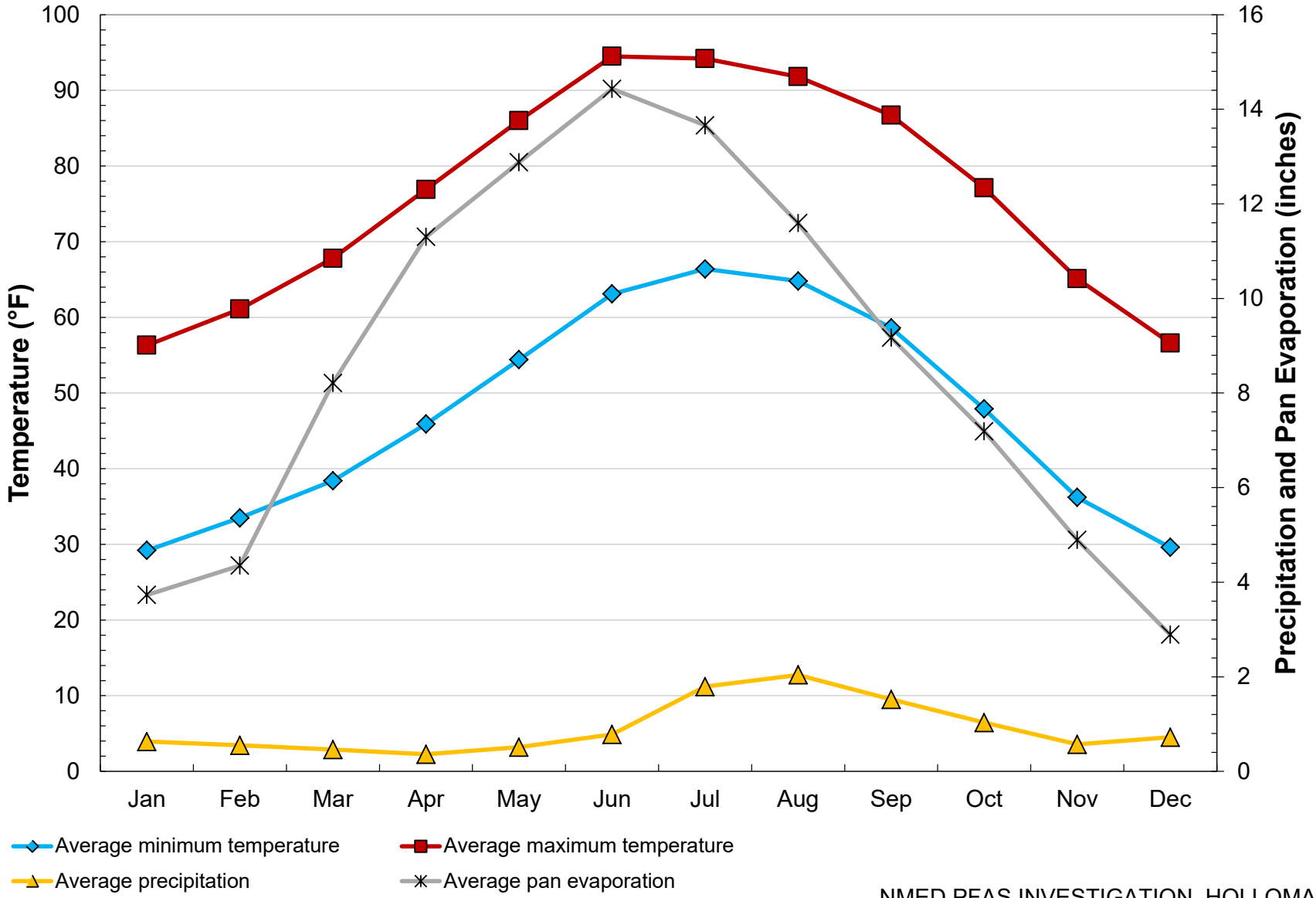
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NMED PFAS INVESTIGATION, HOLLOMAN AFB
Surface Water

Figure 4

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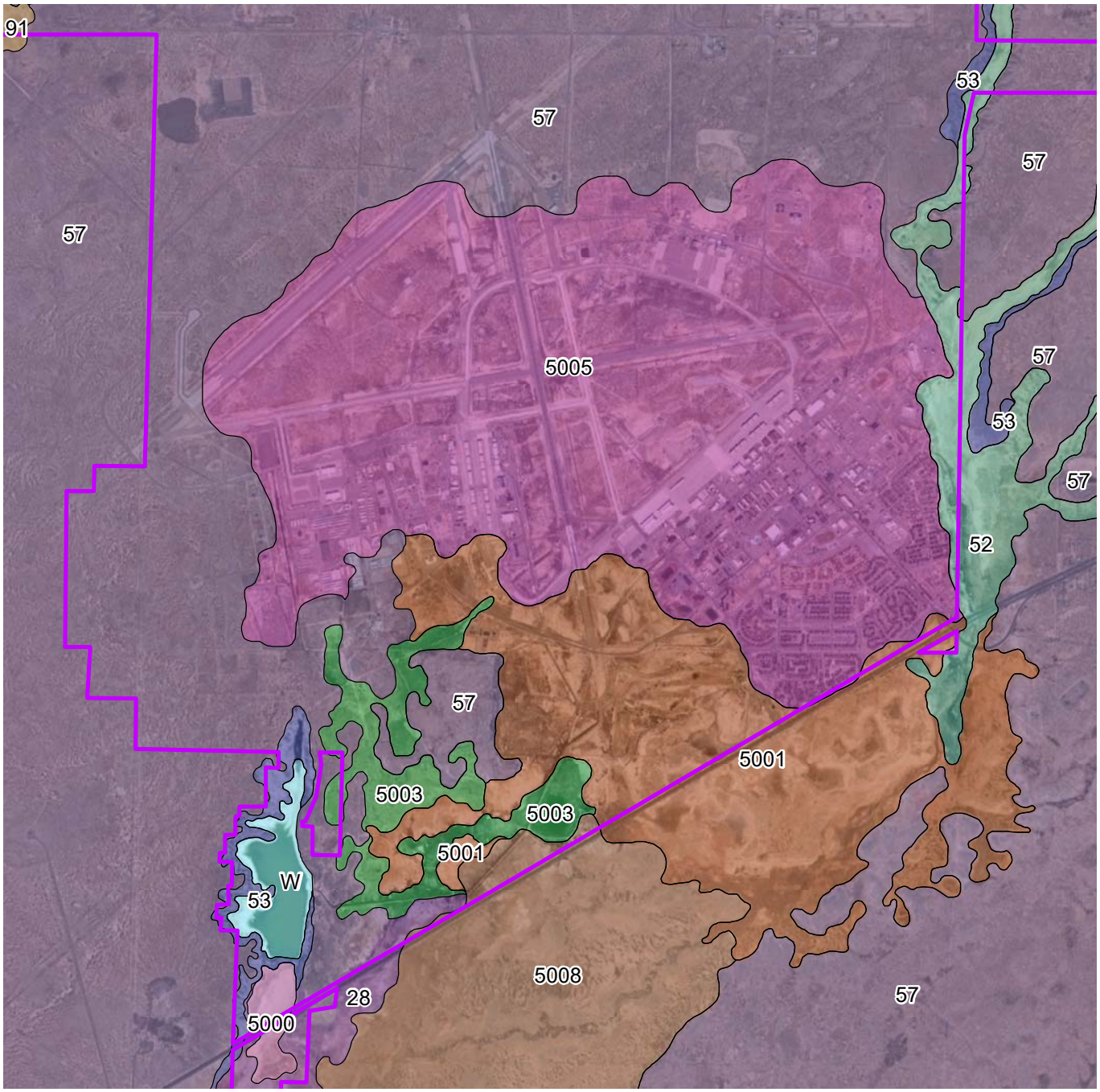
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Average Monthly Data for Temperature, Precipitation, and Pan Evaporation Alamogordo Dam, New Mexico

Figure 5

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N

0 2000 4000 ft

Explanation

Holloman Air Force Base

Soil Data Source:
USDA, SSURGO
SSA version est.: 09/12/2021
https://websoilsurvey.sc.egov.usda.gov/
Downloaded May 11, 2022

28	Flake-Saltspring complex, 0 to 3 percent slopes
52	Matador-Bomber association, 0 to 5 percent slopes
53	Matador family gypsiferous sand, 5 to 90 percent slopes
57	Nasa-Yesum complex, 0 to 6 percent slopes
90	Yesum gypsiferous fine sandy loam, saline, 0 to 3 percent slopes
5000	Gypsic Aquisalids and Gypsic Haplosalids soils, 0 to 1 percent slopes
5001	Matador family-Saltspring association, 0 to 5 percent slopes
5003	Saltspring clay loam, 0 to 1 percent slopes
5005	Urban land-Nasa-Yesum complex, 0 to 5 percent slopes
5008	Flake-Yesum association, 0 to 8 percent slopes
W	Water

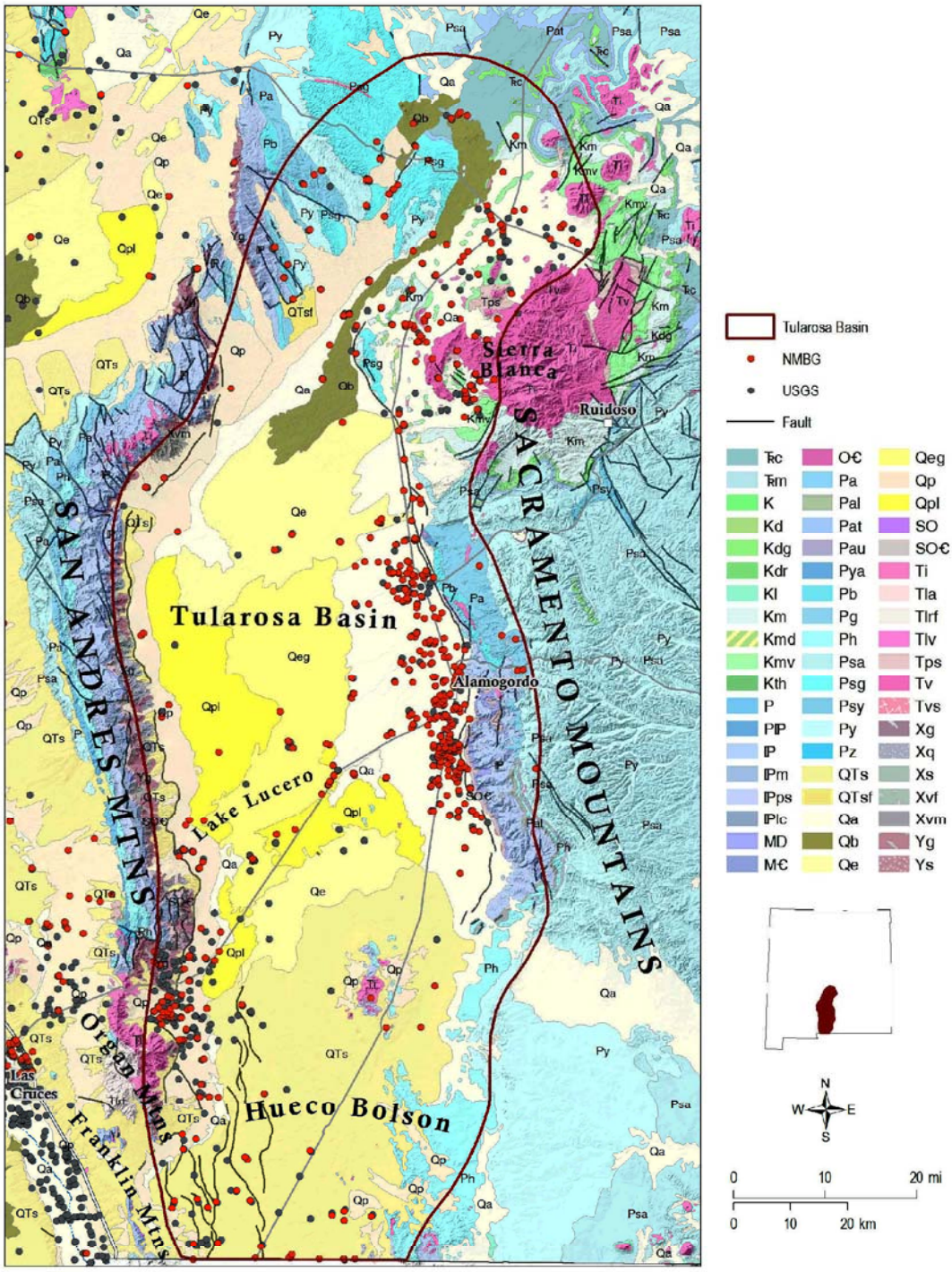
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NMED PFAS INVESTIGATION, HOLLOMAN AFB

Soils Map

Figure 6



Source:Land, Lewis, 2016, Overview of Fresh and Backish Water Quality in New Mexico, New Mexico Bureau of Geology Mineral REsources, Open-file Report, v. 0583

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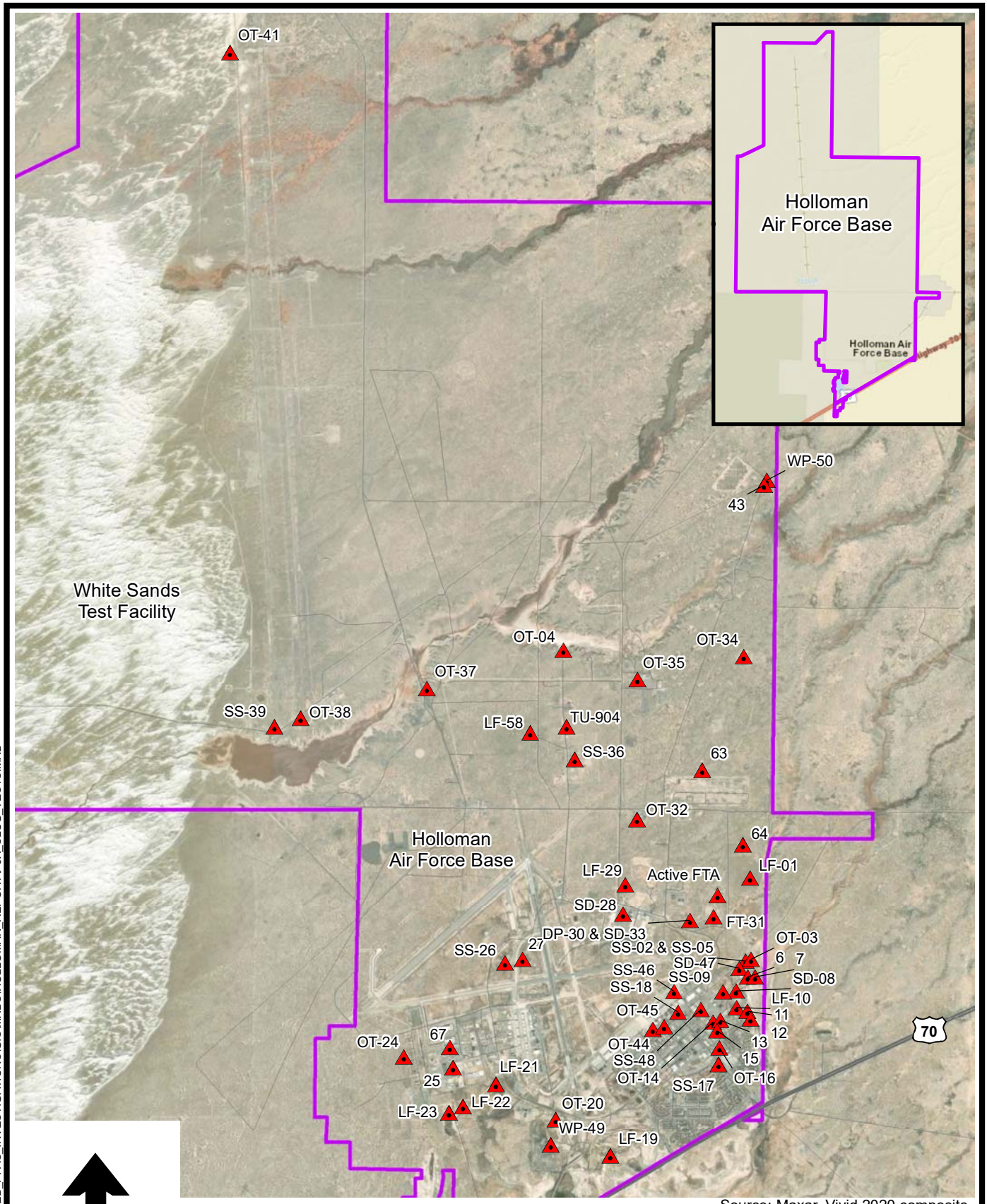
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NMED PFAS INVESTIGATION, HOLLOMAN AFB
Geology of the Tularosa Basin

Figure 7



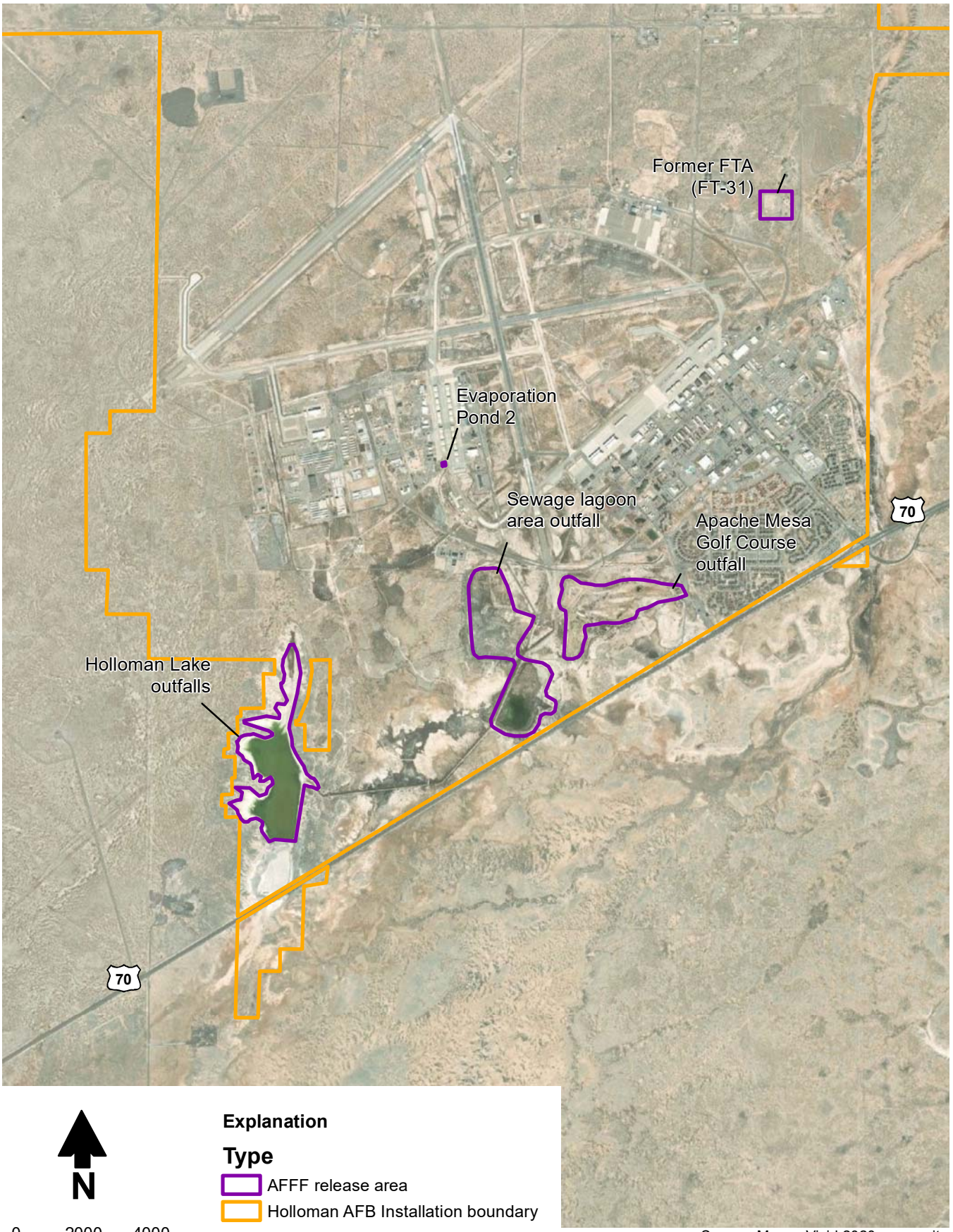
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NM16.0001

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Slug Test Locations

Figure 8



Source: Maxar, Vivid 2020 composite

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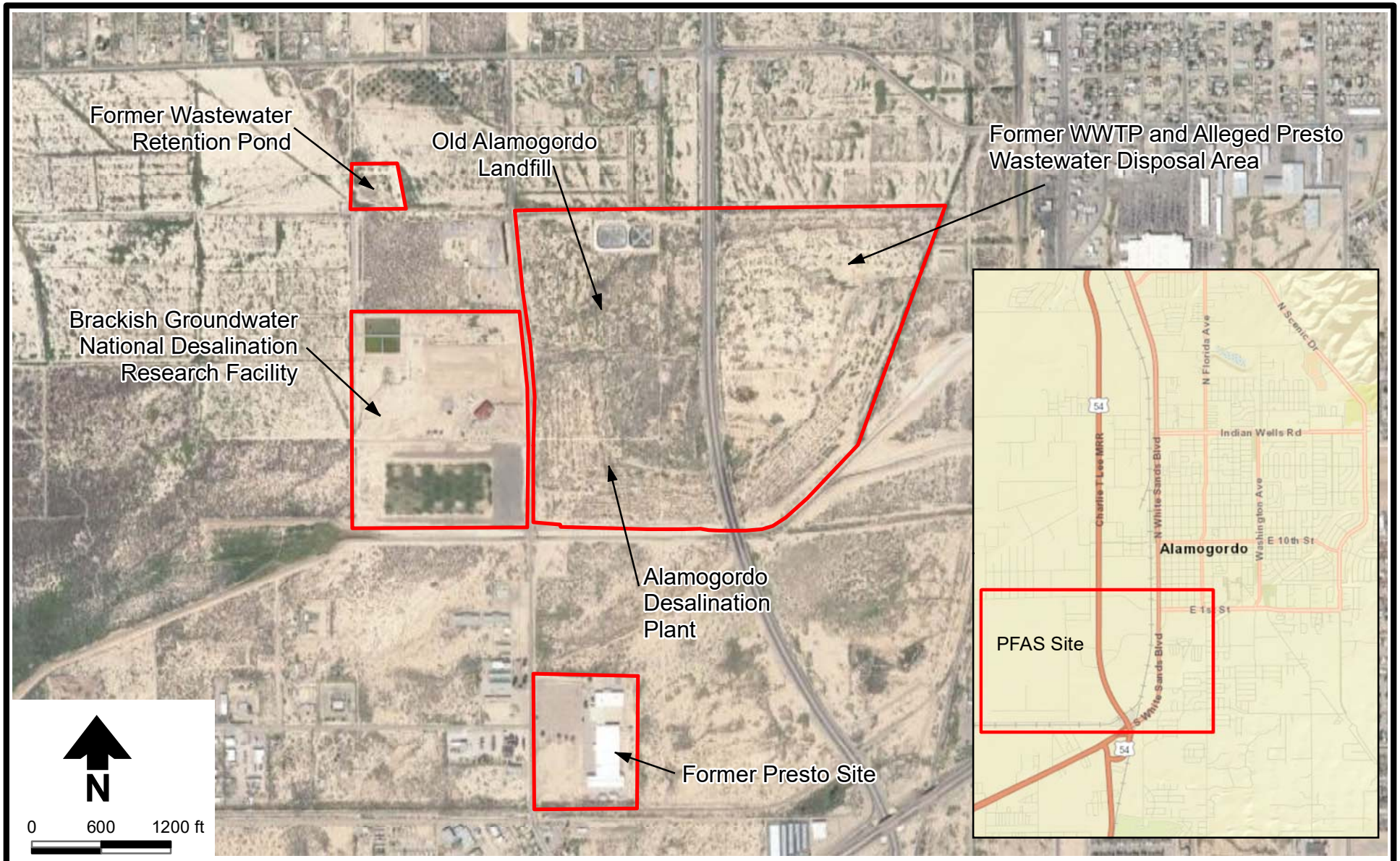
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JN DB20.1356

NMED PFAS INVESTIGATION, HOLLOMAN AFB

AFFF Release Areas

Figure 9

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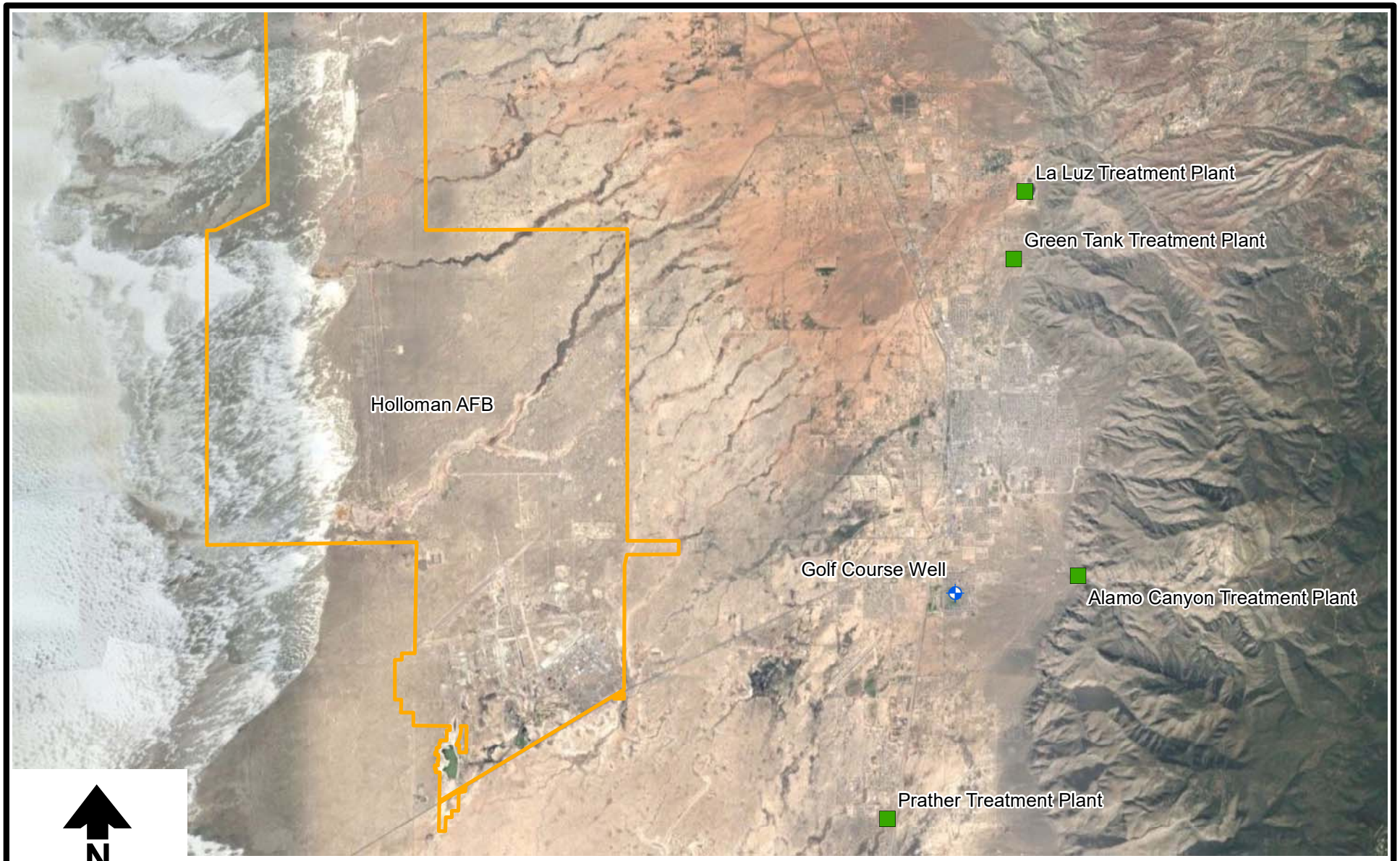
Source: Google Earth Pro, 5/27/2016

Figure 10

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NMED PFAS INVESTIGATION, HOLLOMAN AFB
Alamogordo PFAS Site

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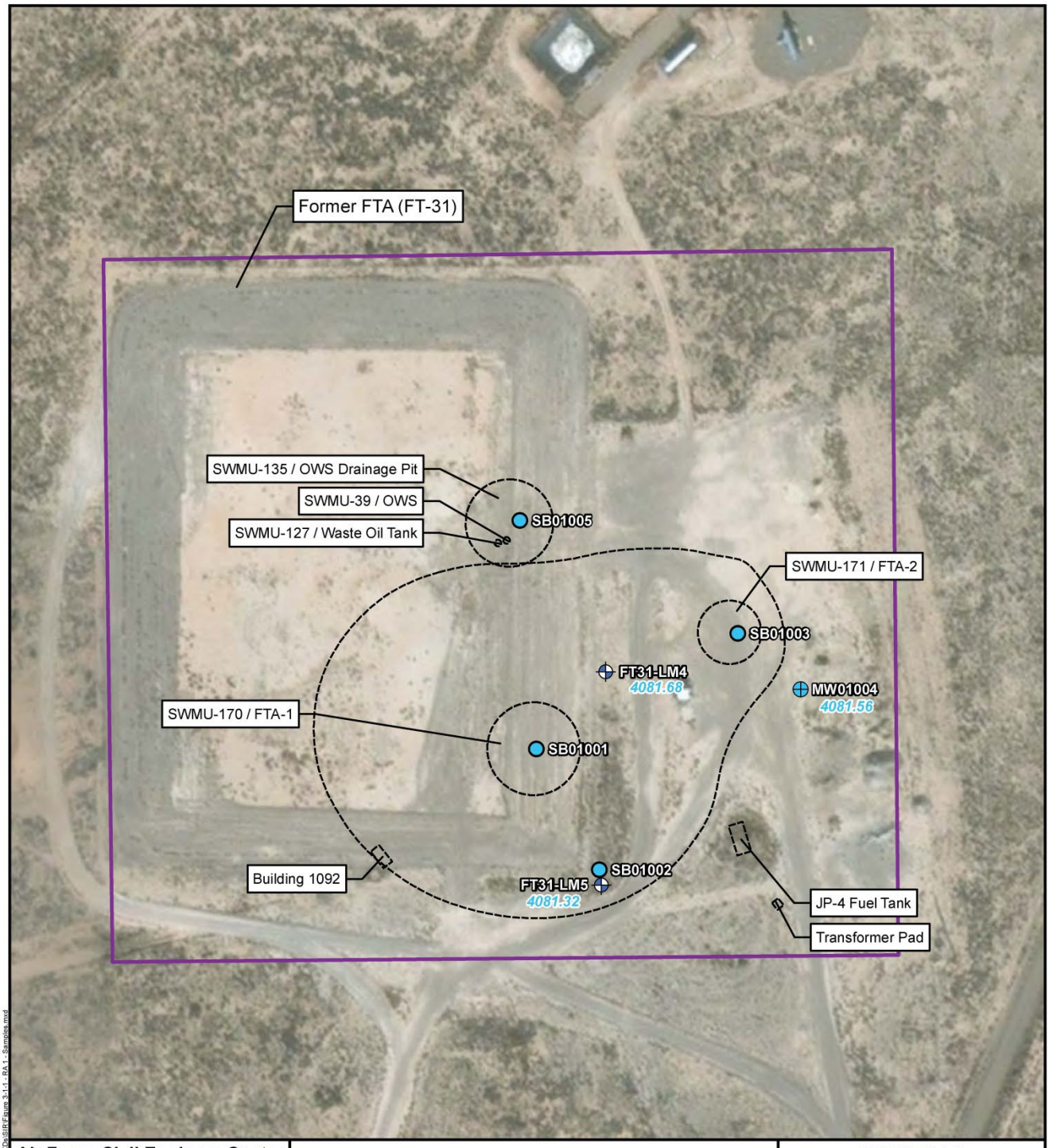
Source: Google Earth Pro, 5/27/2016

Figure 11

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DB21.1160

NMED PFAS INVESTIGATION, HOLLOMAN AFB

City of Alamogordo UCMR3 Sample Locations



Air Force Civil Engineer Center

2261 Hughes Avenue
Building 171, Suite 155
JBSA Lackland, Texas 78236

Disclaimer: For general reference purposes only.

Project: 775303101.0014

By: M.Vavra | Date: 4/12/2018

0 50 100 200 Feet

Symbol Key

- Monitoring Well
- Monitoring Well / Soil Boring
- Soil Boring
- AFFF Release Area
- Approximate Historic Features

FIGURE 3.1-1
Sampling Locations and Groundwater Elevations
Former FTA (FT-31)
AFFF Release Area 1
Holloman Air Force Base
Alamogordo, New Mexico

Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Environmental Programs Worldwide Site Inspection Report

Source: AFW, 2018

NMED PFAS INVESTIGATION, HOLLOMAN AFB

USAF Sample Locations
Former Fire Training Area FT-31

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Figure 12

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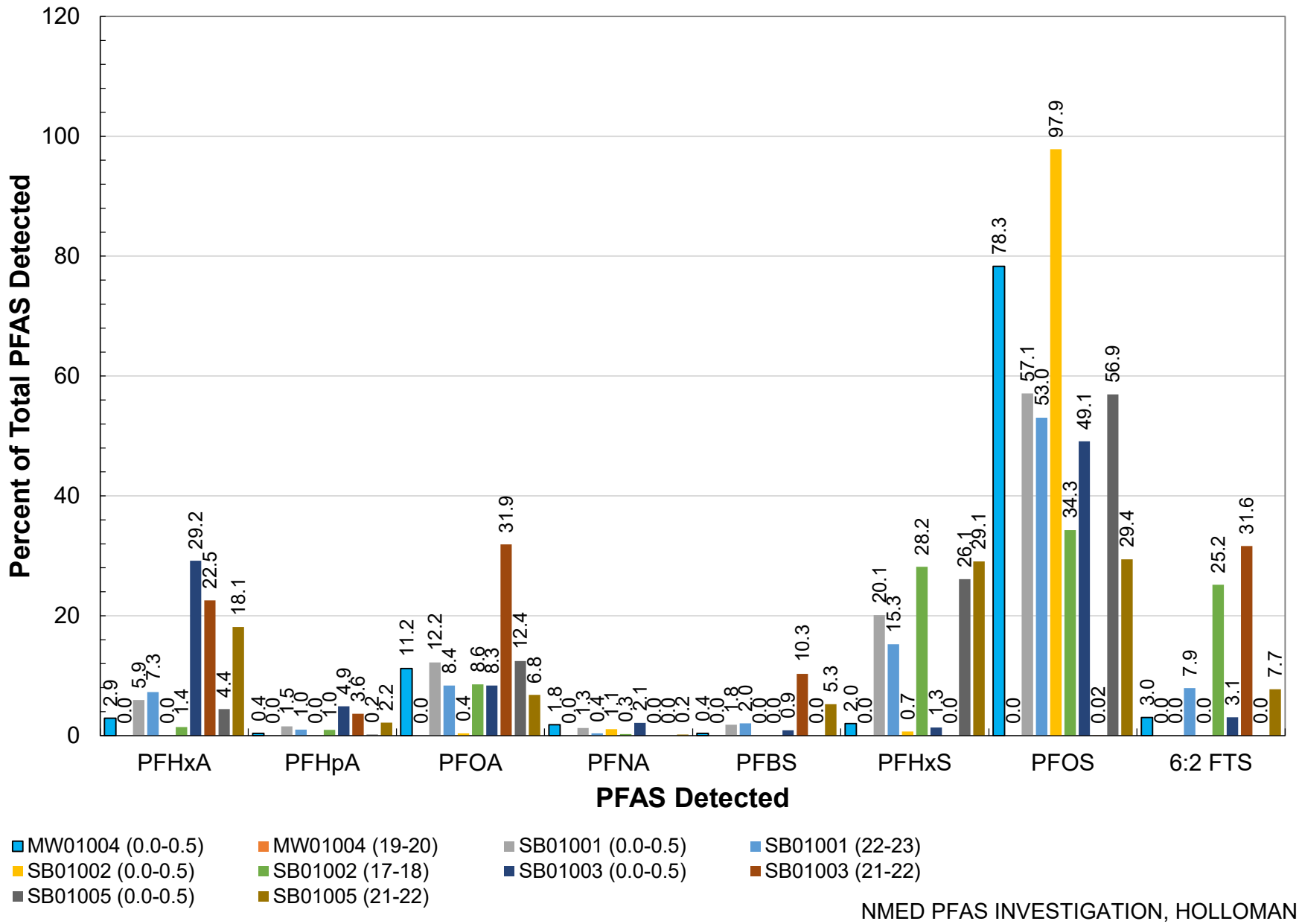


Figure 13

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in USAF Soil Samples from FT-31

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6/26/2022 DB21.1060

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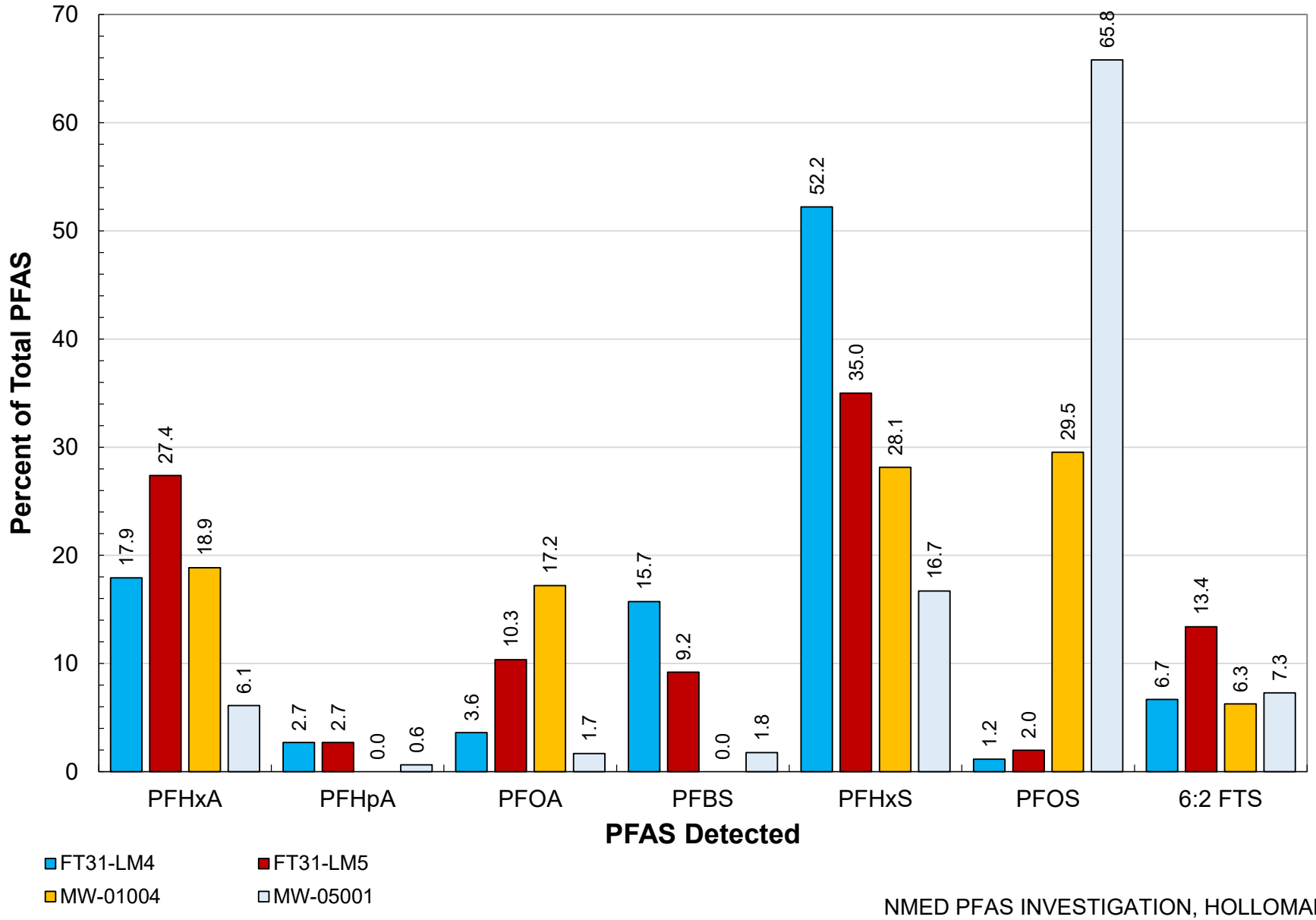


Figure 14

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of PFAS Detected in USAF Groundwater Samples from FT-31

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060



Source: AFW, 2018

NMED PFAS INVESTIGATION, HOLLOMAN AFB

USAF Sample Locations
Evaporation Pond 2

Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

Figure 15

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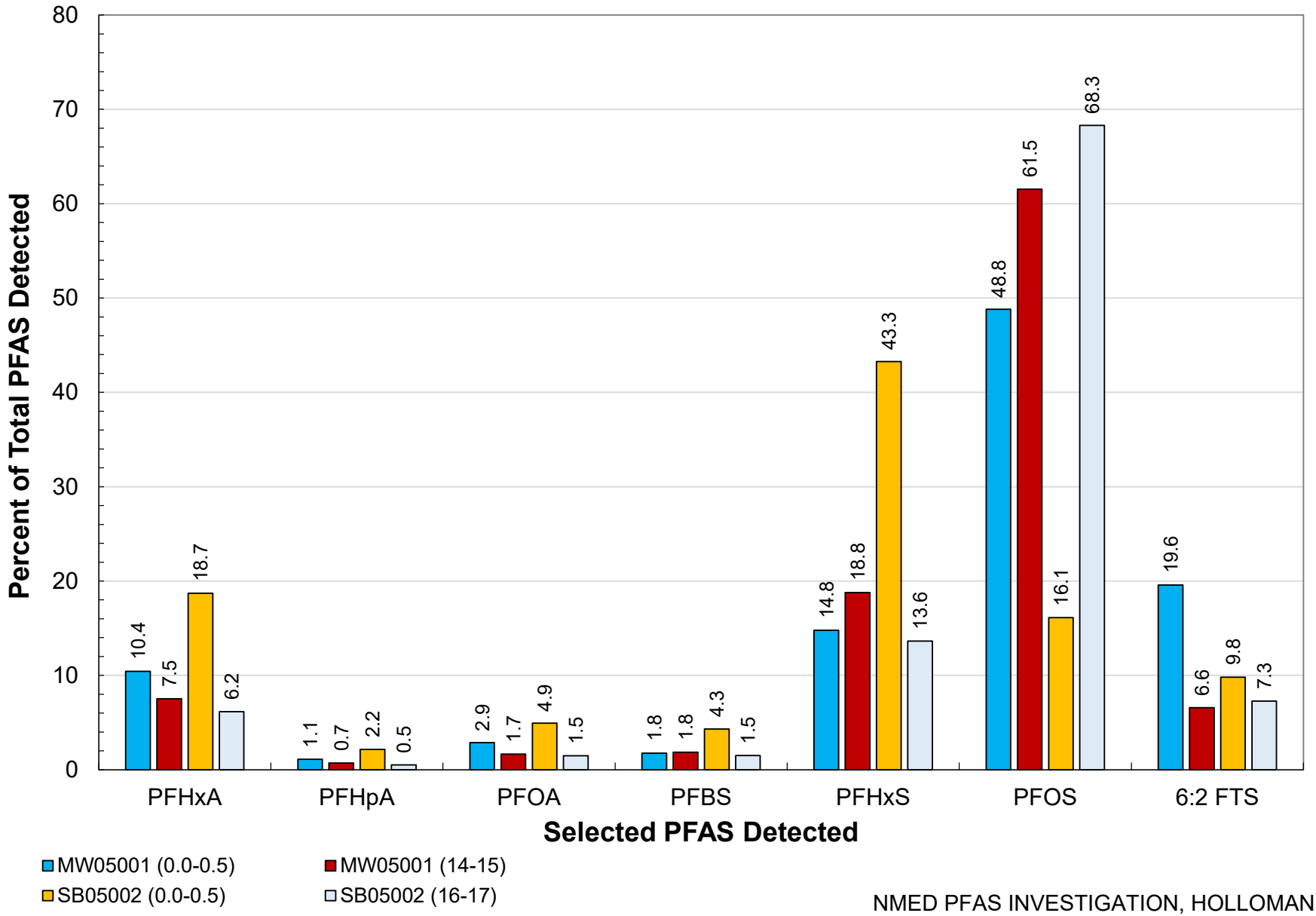


Figure 16

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in USAF Soil Samples from Evaporation Pond 2

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

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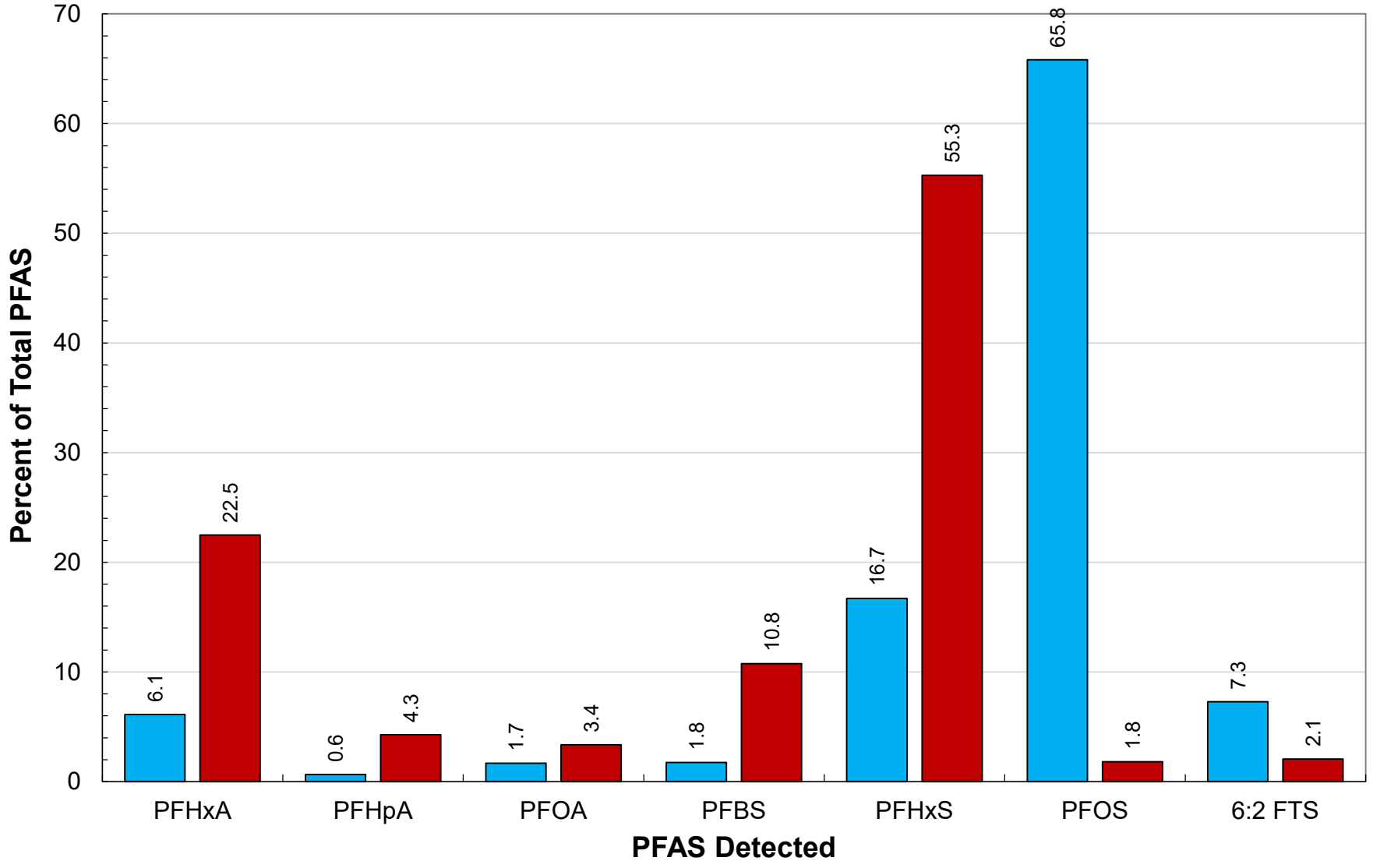


Figure 17

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of PFAS Detected in USAF Groundwater Samples, Evaporation Pond 2, and Golf Course

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

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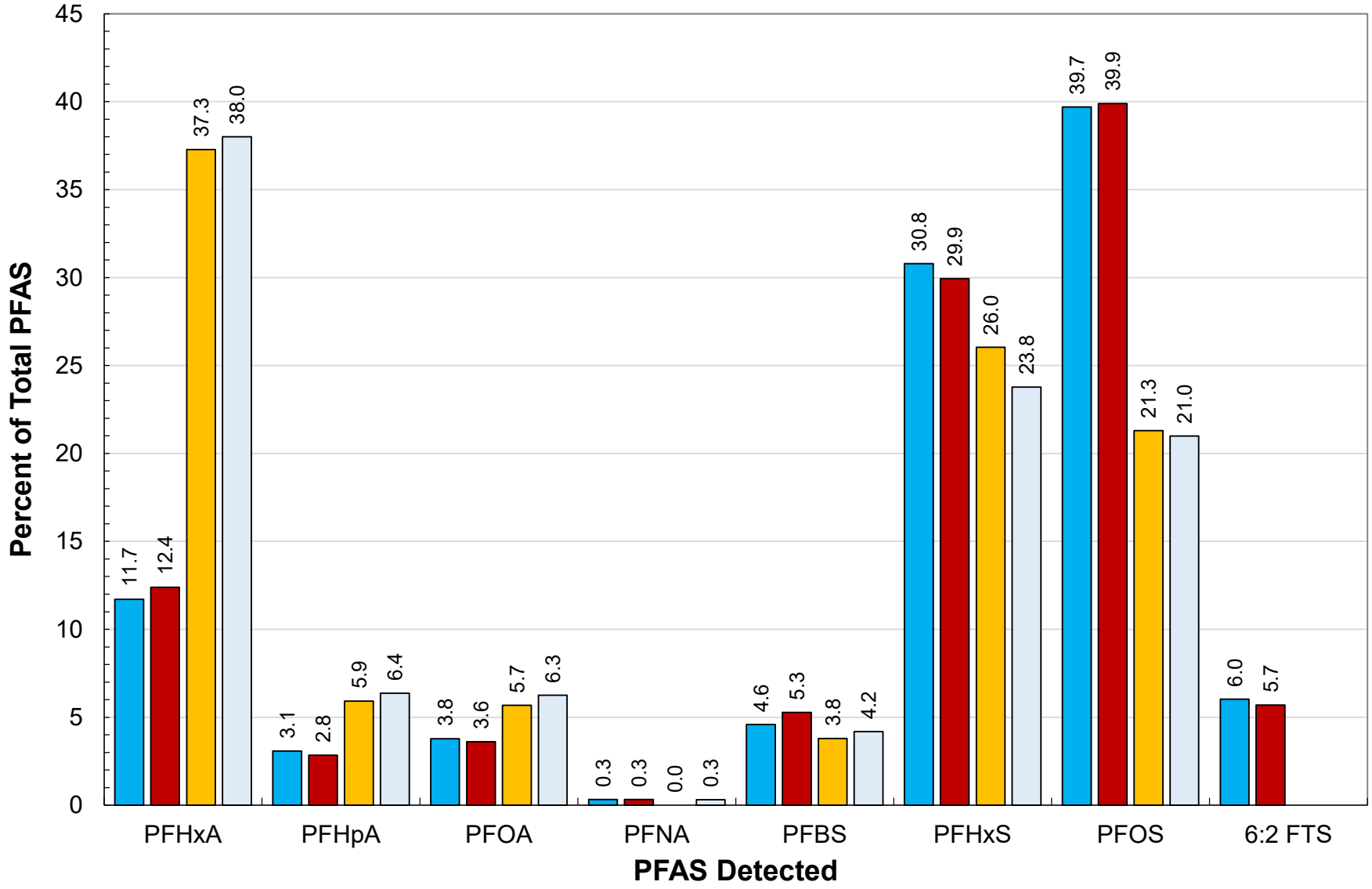


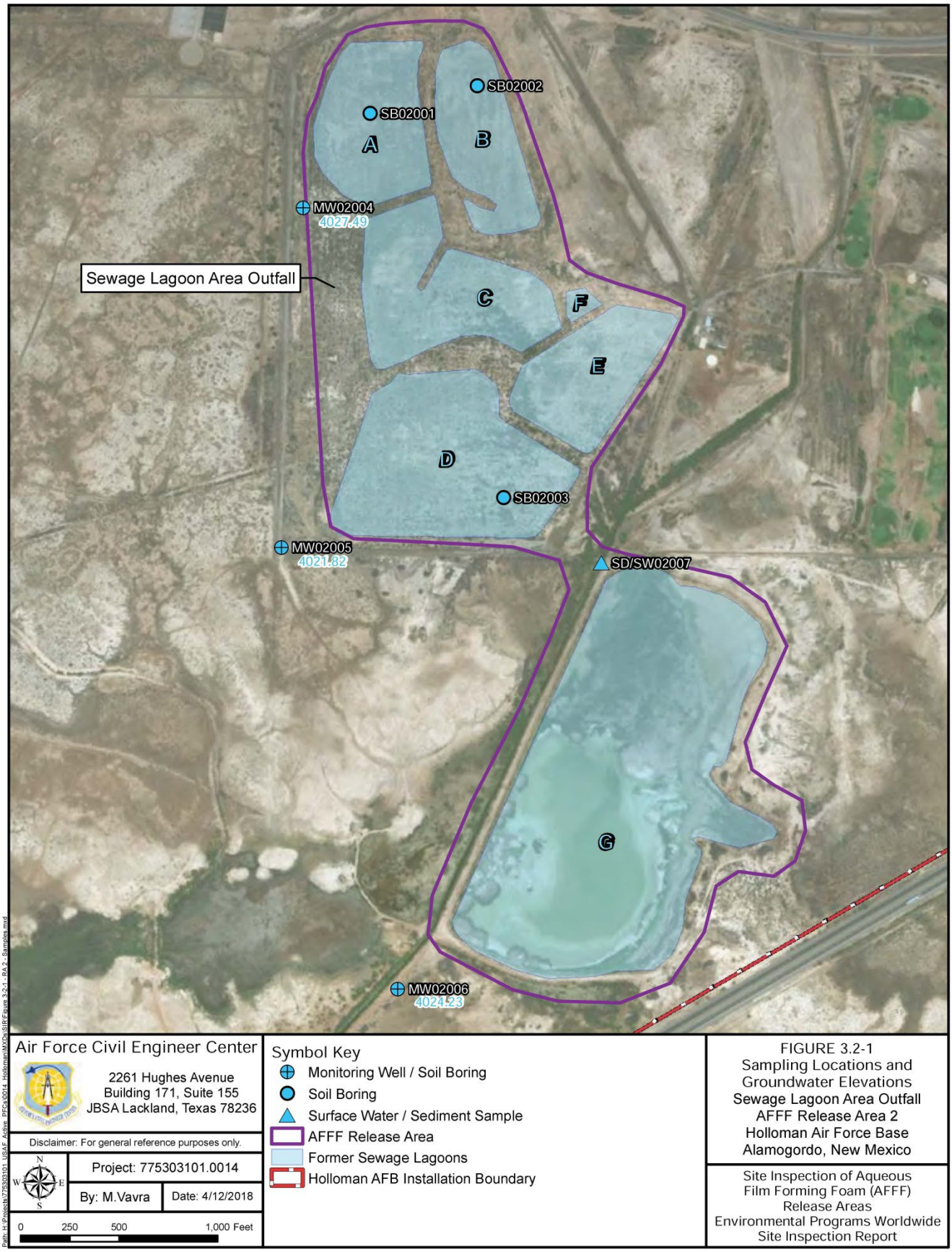
Figure 18

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in USAF Wastewater Effluent Samples

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060



Source: AFW, 2018

NMED PFAS INVESTIGATION, HOLLOMAN AFB

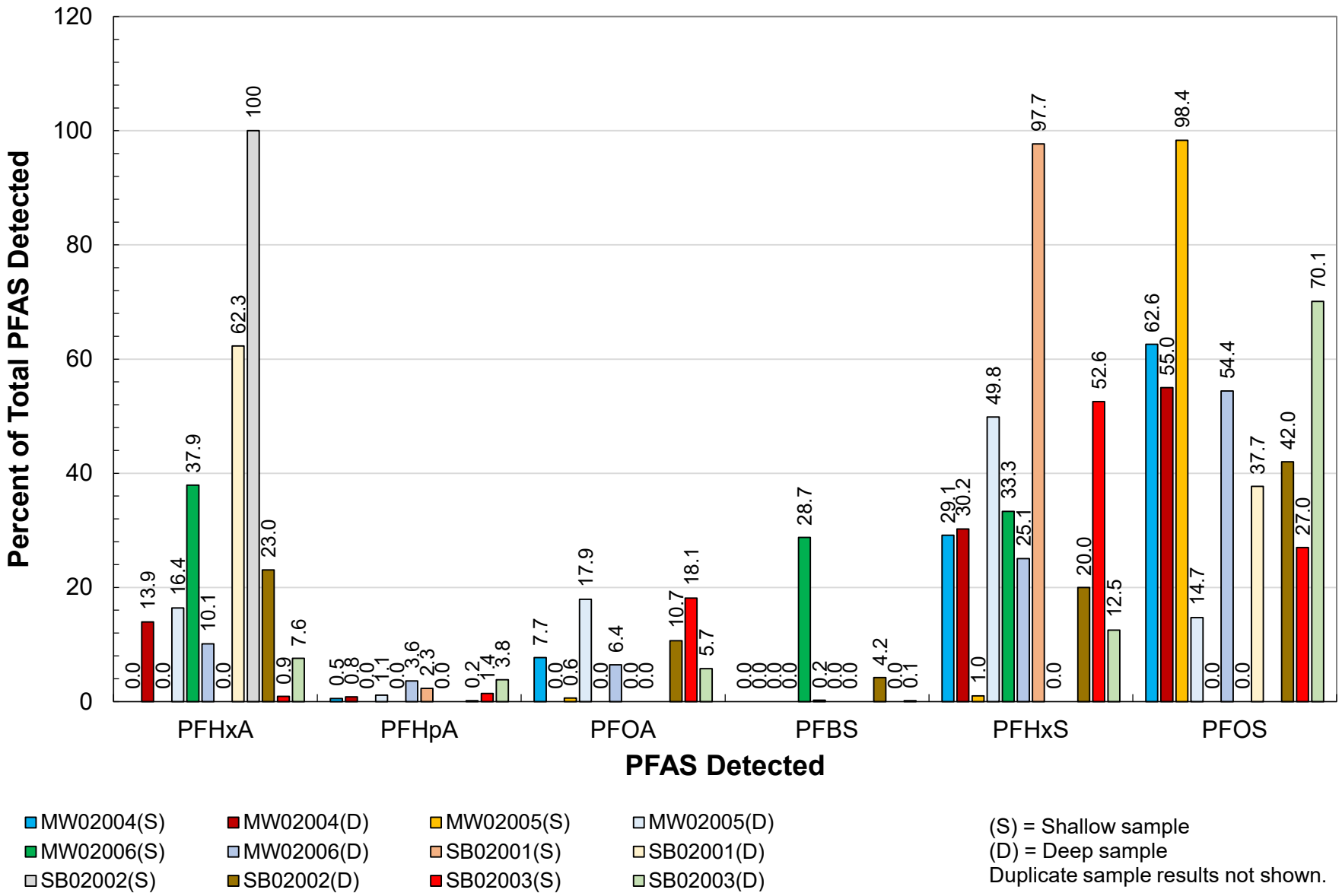
USAF Sample Locations
Sewage Lagoon Area

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

Figure 19

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(S) = Shallow sample
(D) = Deep sample
Duplicate sample results not shown.

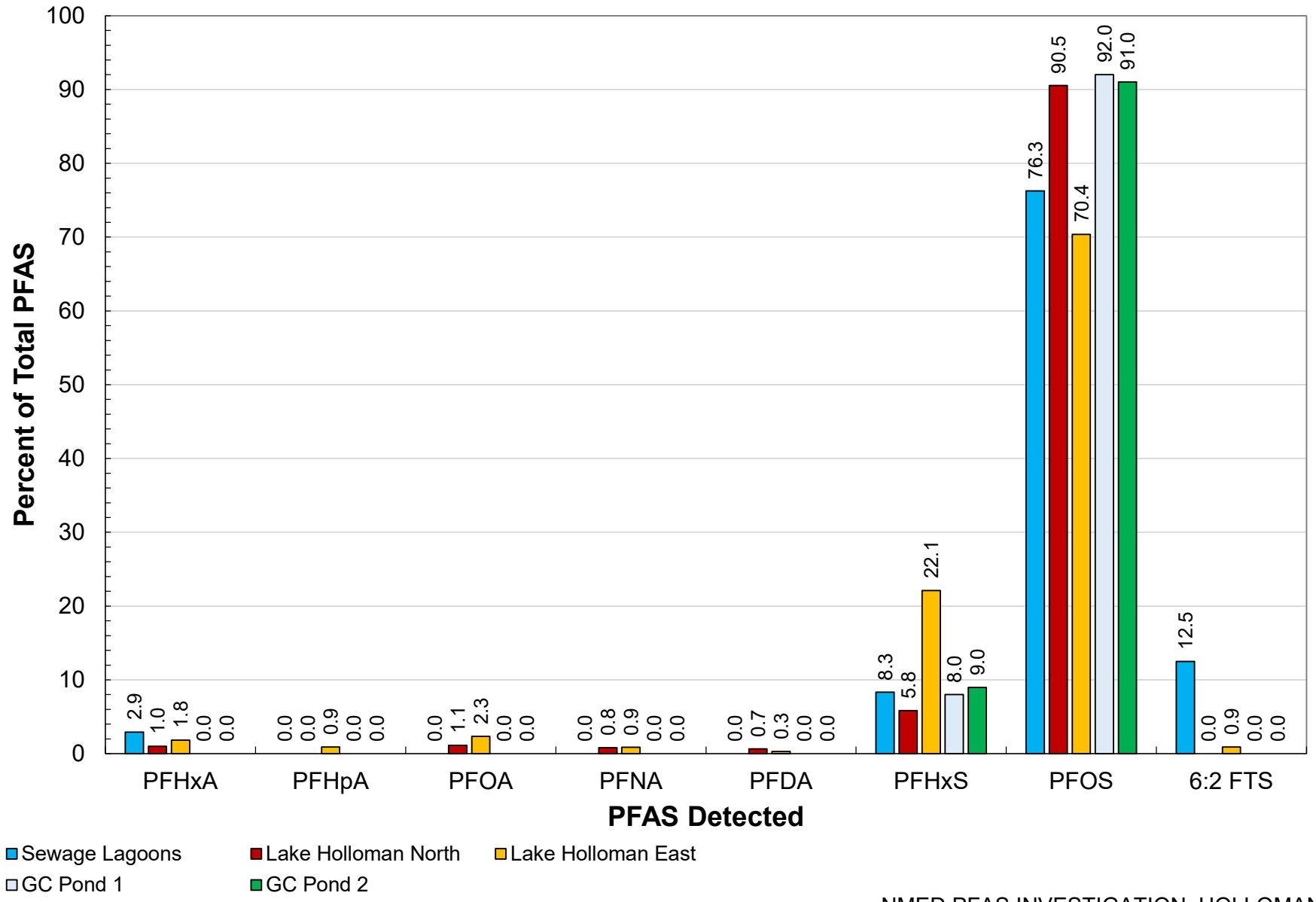
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in USAF Soil Samples from Sewage Lagoon Area

Figure 20

DBS&A
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6/26/2022 DB21.1060



NMED PFAS INVESTIGATION, HOLLOMAN AFB

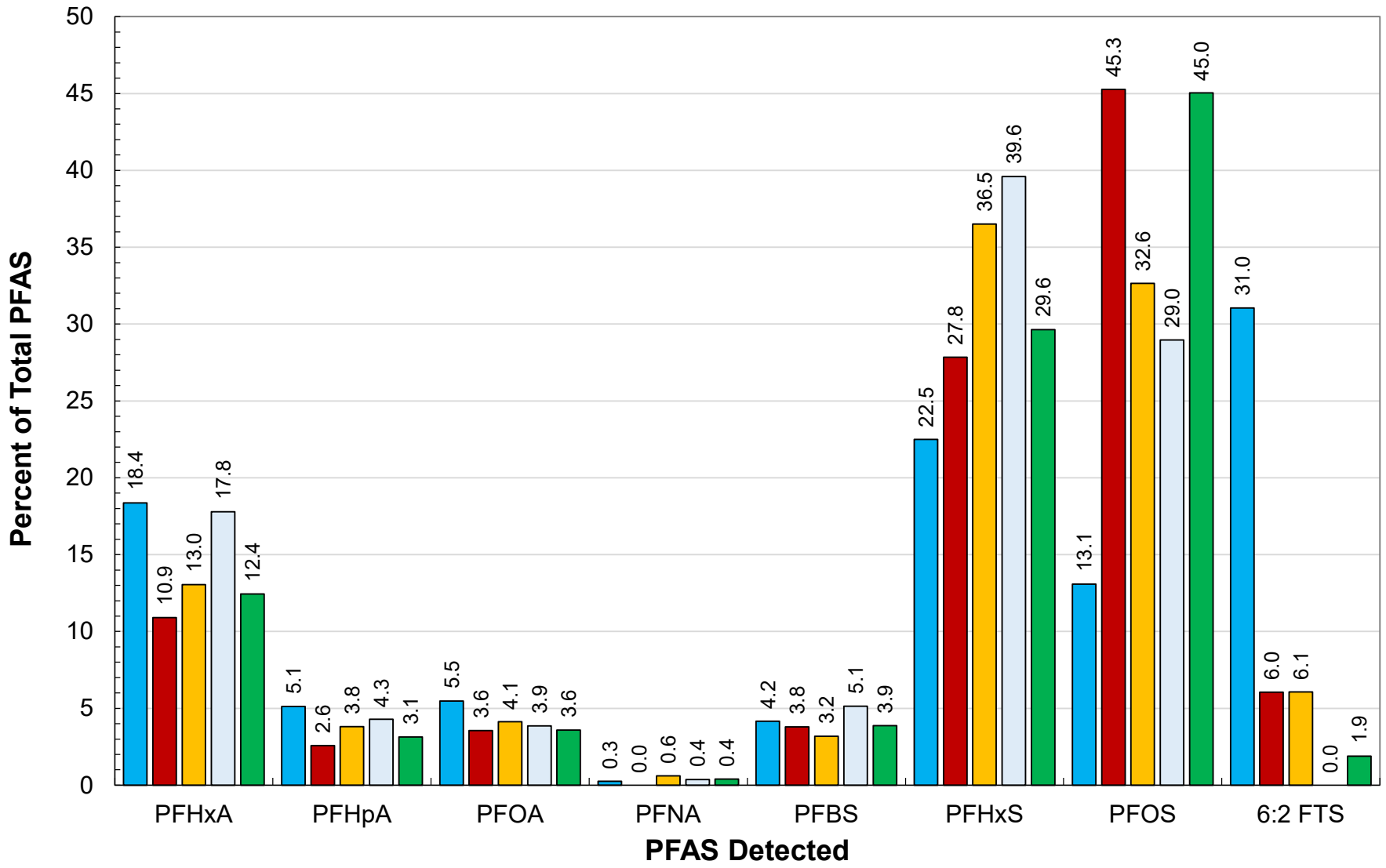
Proportions of Total PFAS Detected in USAF Sediment Samples from Wastewater System Sites

Figure 21

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F22_USAF PFAS SW_WW Sites.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

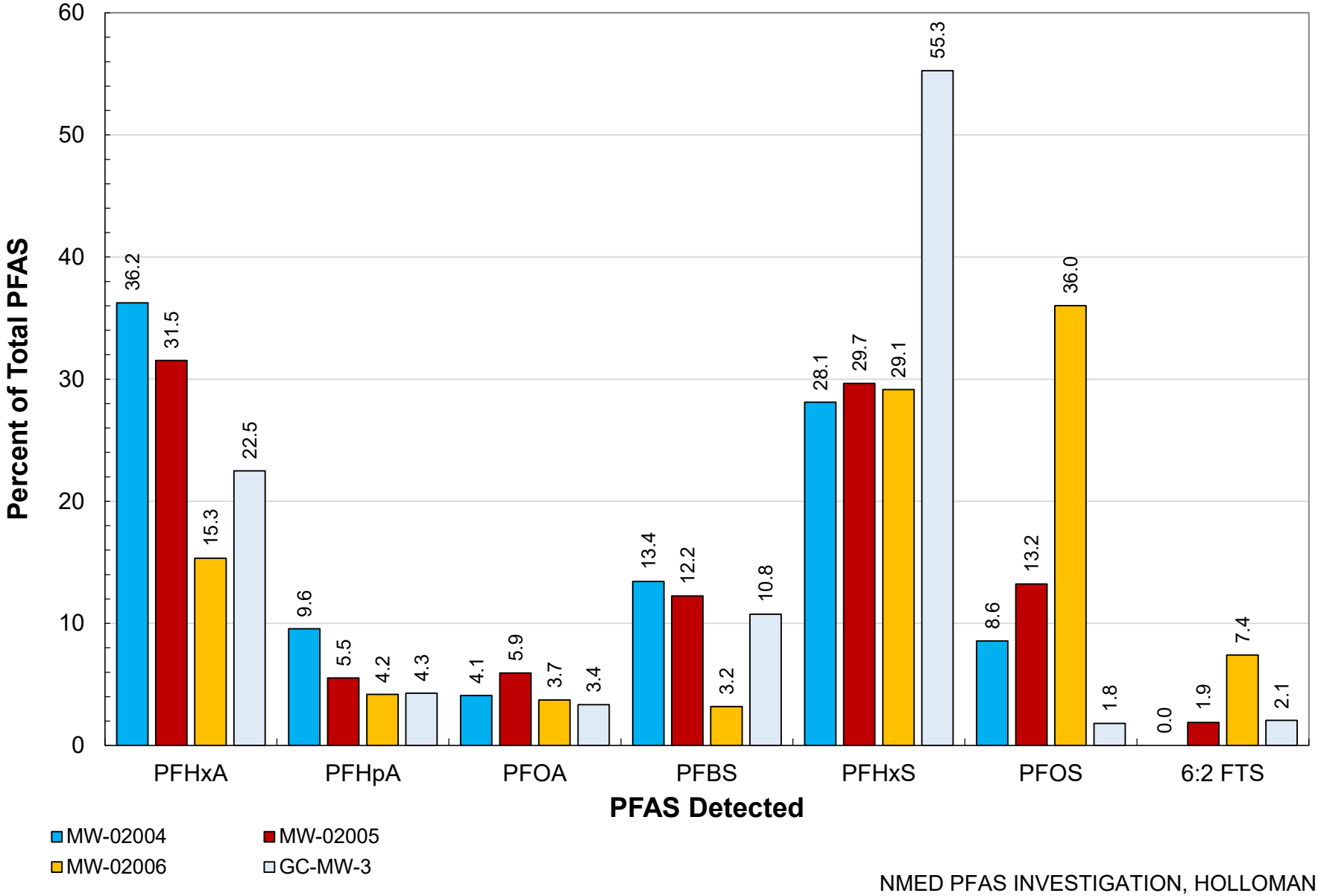
Proportions of Total PFAS Detected in USAF Surface Water Samples from Wastewater System Sites

Figure 22

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F23_USAF PFAS GW_Lagoons.docx



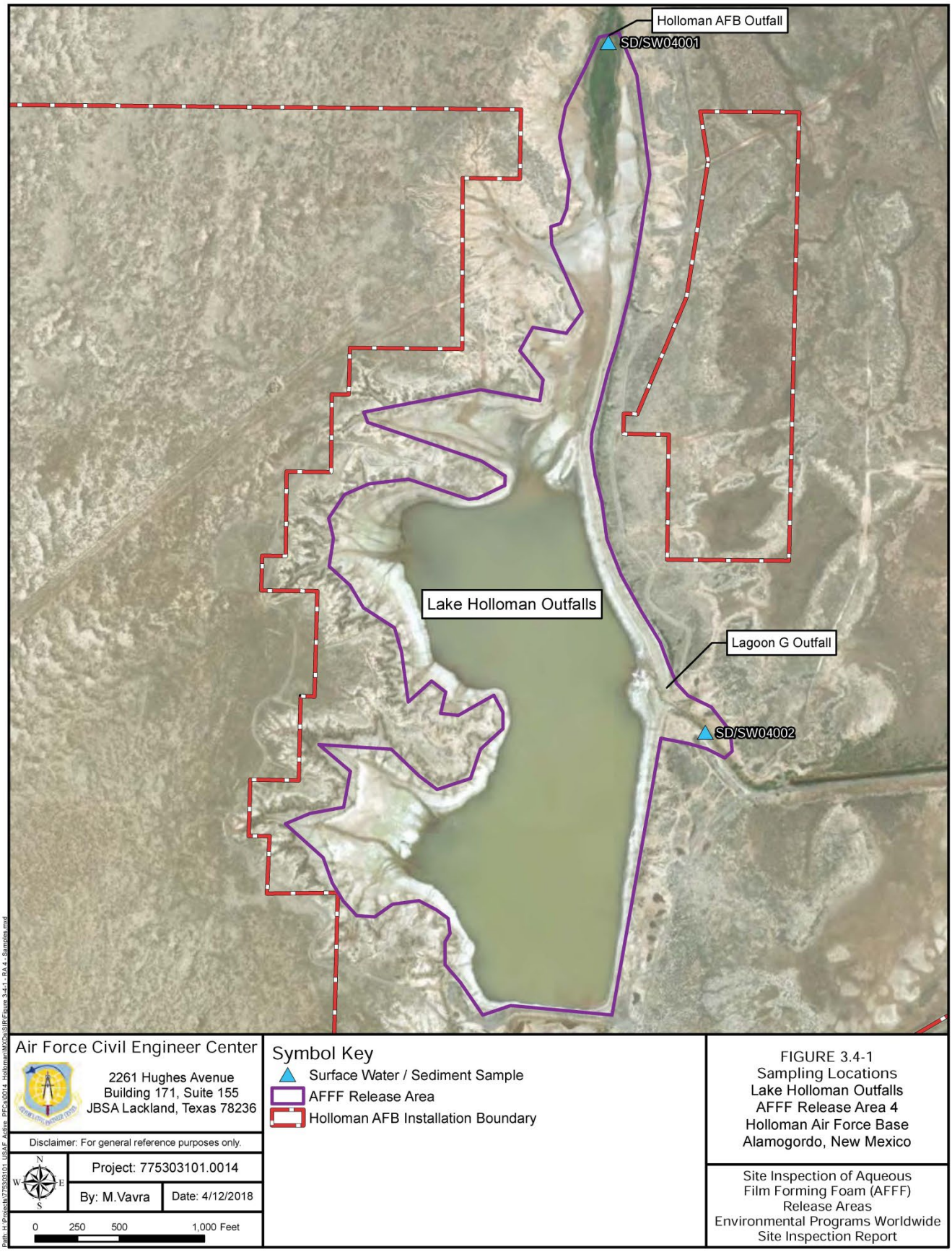
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in USAF Groundwater Samples from Wastewater Treatment Sites

Figure 23

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060



Source: AFW, 2018

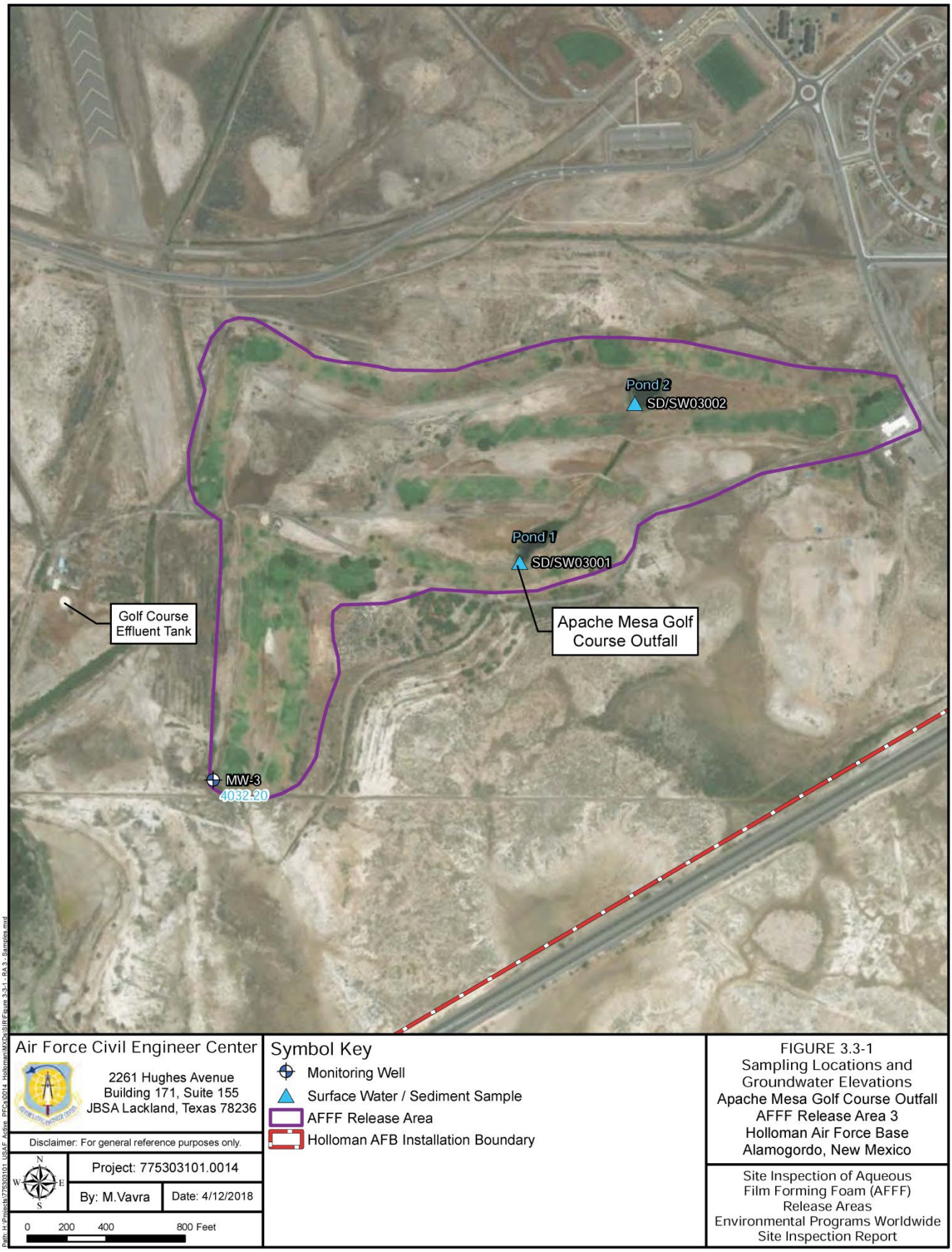
NMED PFAS INVESTIGATION, HOLLOMAN AFB

USAF Sample Locations
Lake Holloman Outfalls

DBS&A
Daniel B. Stephens & Associates, Inc.
6/26/2022 DB21.1060

Figure 24

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F24_Lake Holloman.docx



Air Force Civil Engineer Center

2261 Hughes Avenue
Building 171, Suite 155
JBSA Lackland, Texas 78236

Disclaimer: For general reference purposes only.

Project: 775303101.0014

By: M.Vavra | Date: 4/12/2018

0 200 400 800 Feet

Symbol Key

- Monitoring Well
- Surface Water / Sediment Sample
- AFFF Release Area
- Holloman AFB Installation Boundary

FIGURE 3.3-1
Sampling Locations and Groundwater Elevations
Apache Mesa Golf Course Outfall
AFFF Release Area 3
Holloman Air Force Base
Alamogordo, New Mexico

Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas
Environmental Programs Worldwide
Site Inspection Report

Source: AFW, 2018

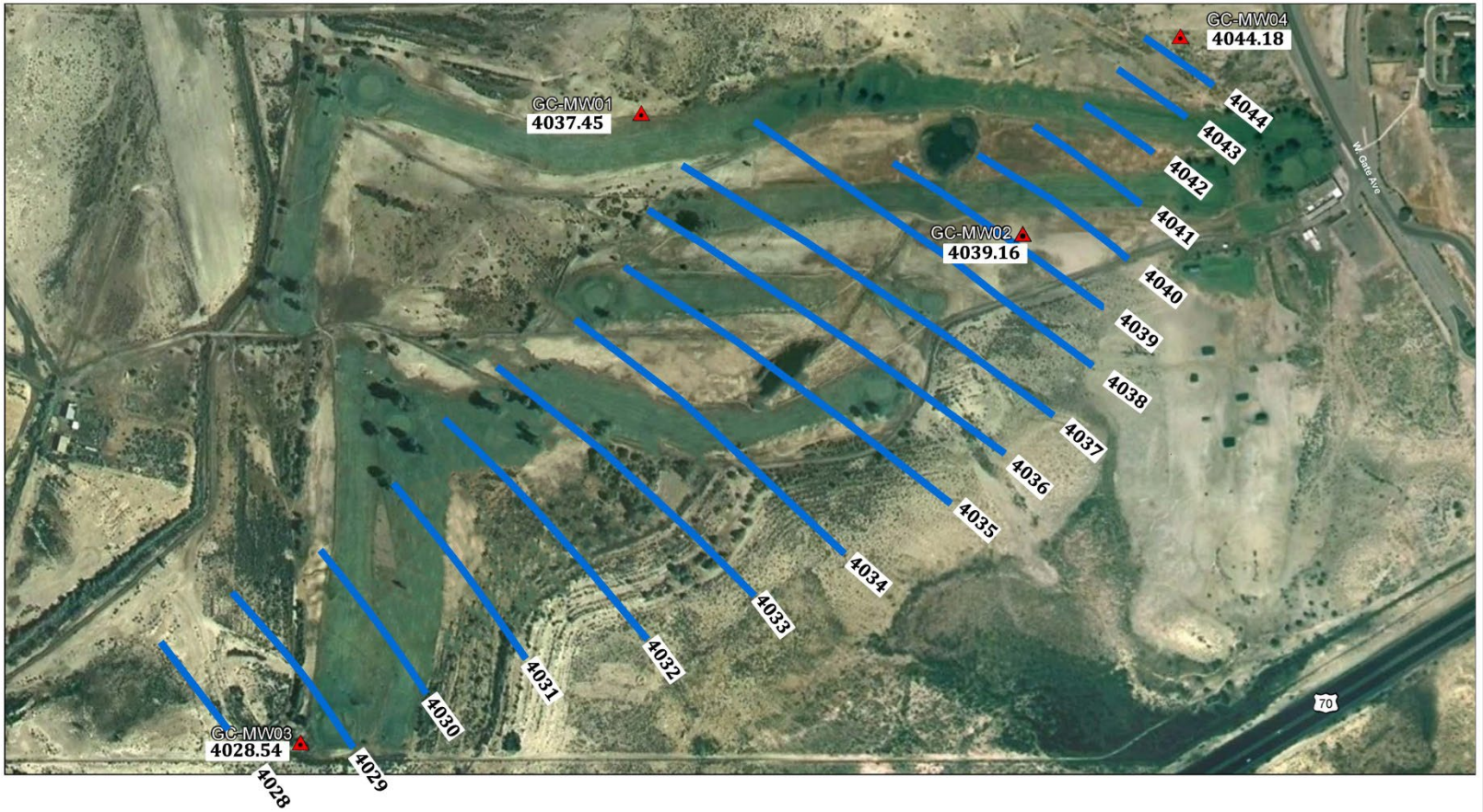
NMED PFAS INVESTIGATION, HOLLOMAN AFB

USAF Sample Locations
Golf Course Outfalls

DBS&A
Daniel B. Stephens & Associates, Inc.
6/8/2022 DB21.1060

Figure 25

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F25_Golf Course.docx



SWIFT RIVER ENVIRONMENTAL SERVICES, LLC
VERSAR

Figure 1
Golf Course Monitoring Well Location Map With Potentiometric Surface January 2022
Quarterly Groundwater Monitoring Report
Quarter 1, 2022
Holloman AFB, New Mexico
Base Map: World Aerial Imagery

Golf Course Monitoring Well (#)
Groundwater Contour (ft)
Contour Interval = 1 Foot
Feet
0 150 300 600

Source: Swift River/Versar, 2022

Figure 26

NMED PFAS INVESTIGATION, HOLLOMAN AFB
Monitor Wells at Holloman AFB Golf Course

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6/26/2022 DB21.1060



Image source: Google Earth Pro, 10/11/2013

N

0 150 300 Feet

Explanation

- Well
- BGNDRF
- Agricultural research area

Note:
Source of location of Well 4A is Draft PFAS Mitigation Plan (PF351), but does not match previous site map or Office of State Engineer well location

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\F27_BRACKISH_GROUNDWATER_NATIONAL_DESALINATION_RESEARCH_FACILITY.MXD

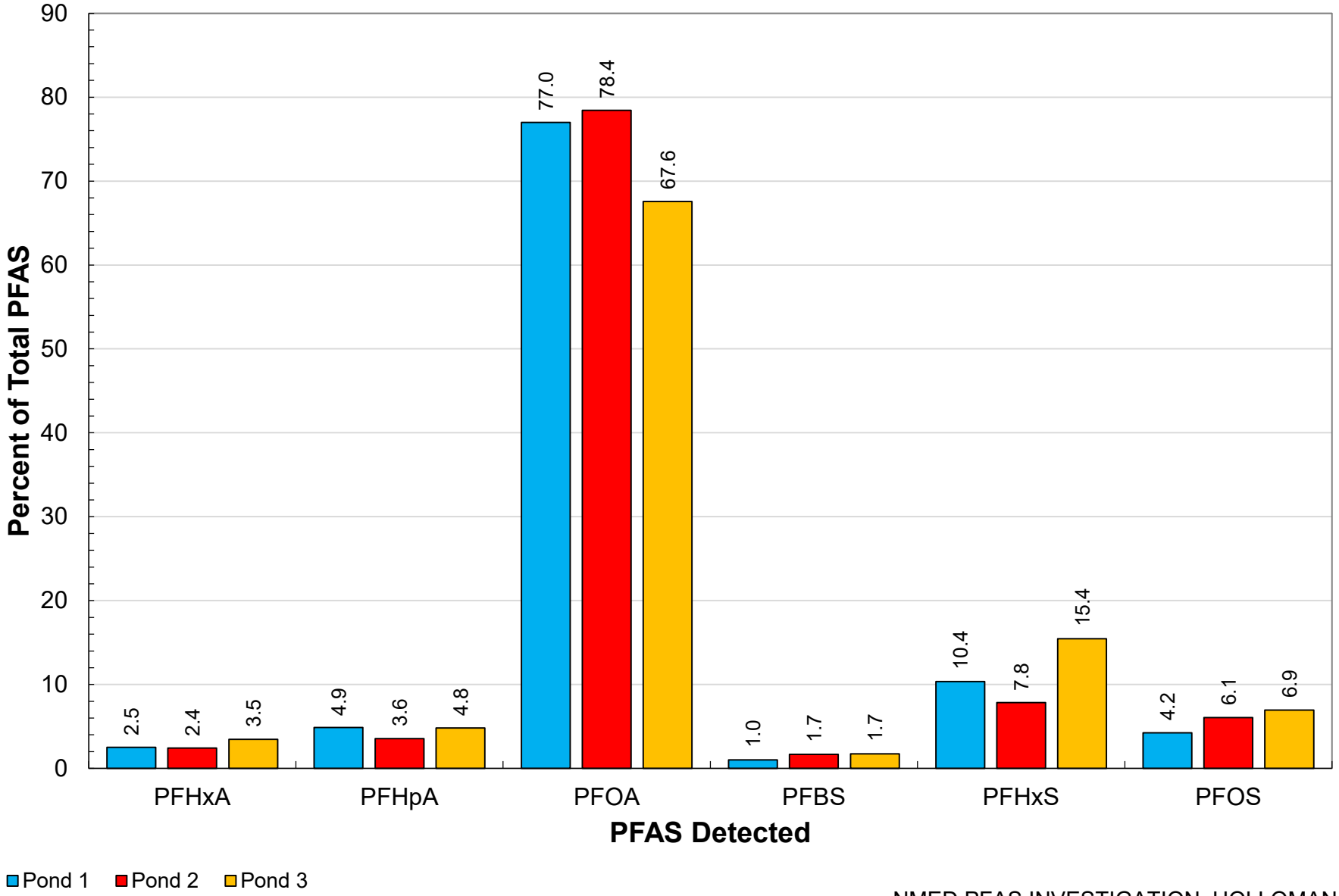
DBS&A
Daniel B. Stephens & Associates, Inc.
6/13/2022 JN DB20.1356.00

NMED PFAS INVESTIGATION, HOLLOMAN AFB

BGNDRF Site Layout

Figure 27

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F28_USBR PFAS SW_EPs.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

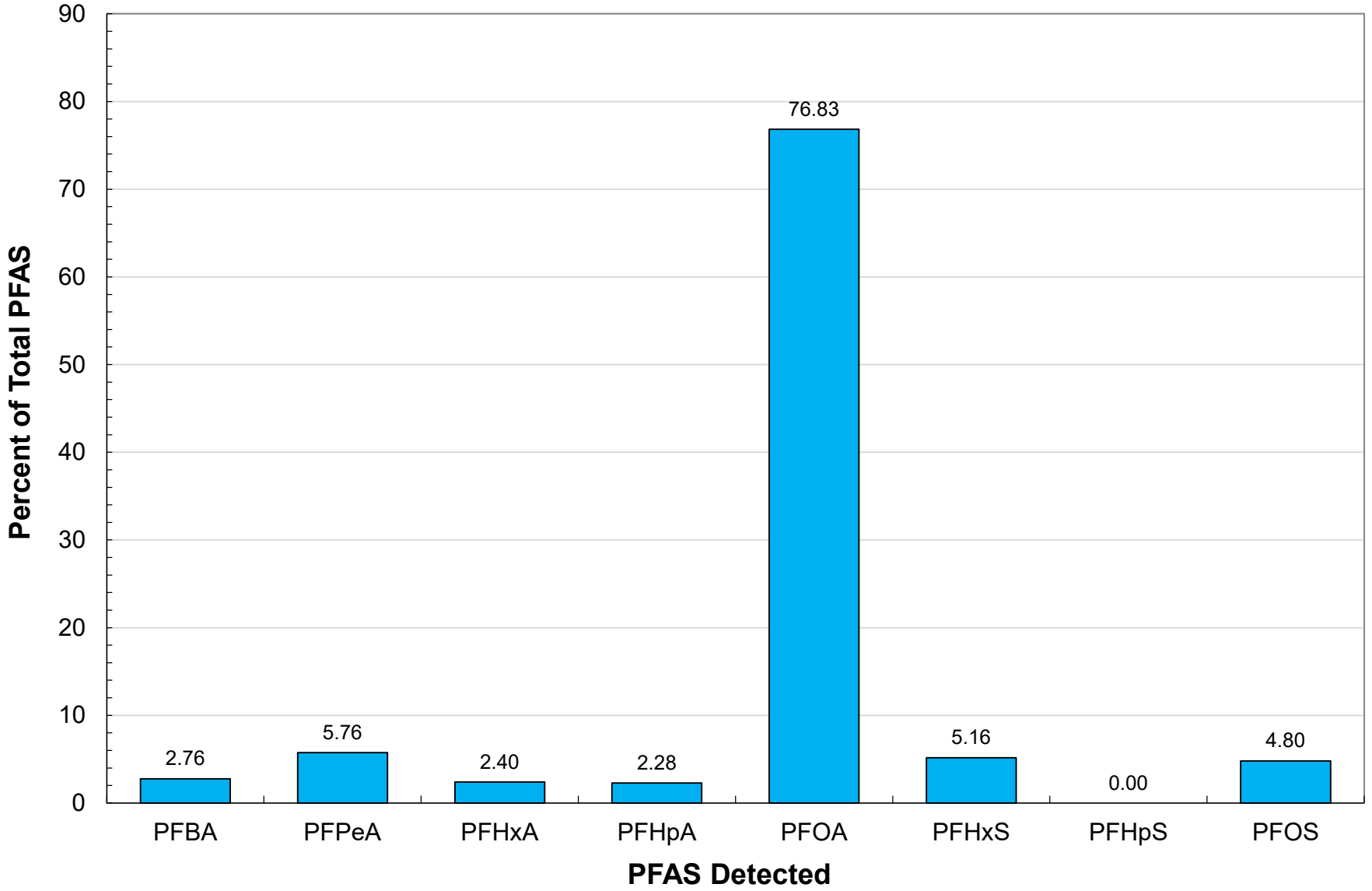
Proportions of Total PFAS Detected in 2017 USBR Water Samples from BGNDRF Evaporation Ponds

Figure 28

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F29_NMDOH PFAS GW_LD4.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Total PFAS Detected in NMDOH Water Sample from Location LD-4

Figure 29

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6/26/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F30_BGNDRF.docx

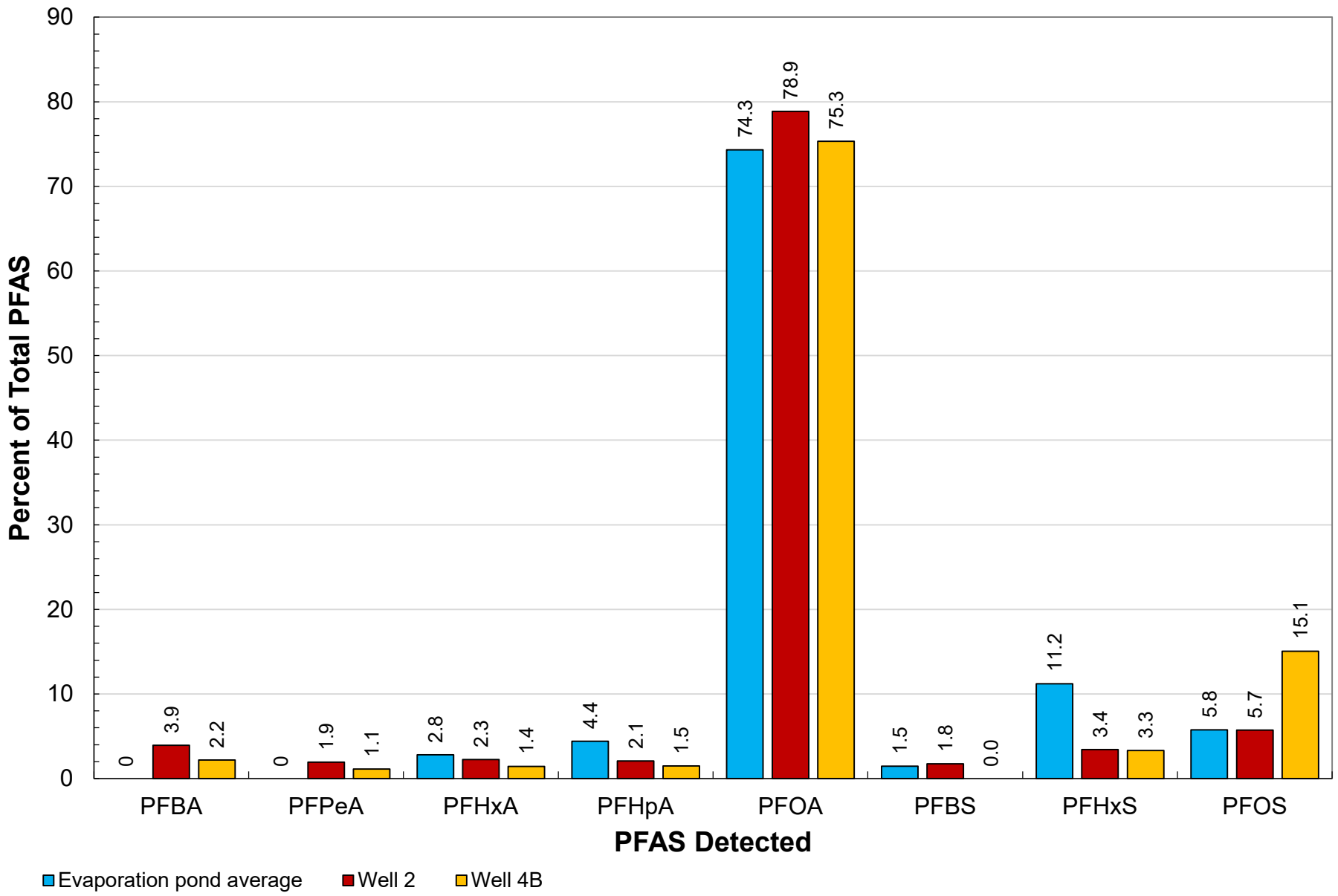


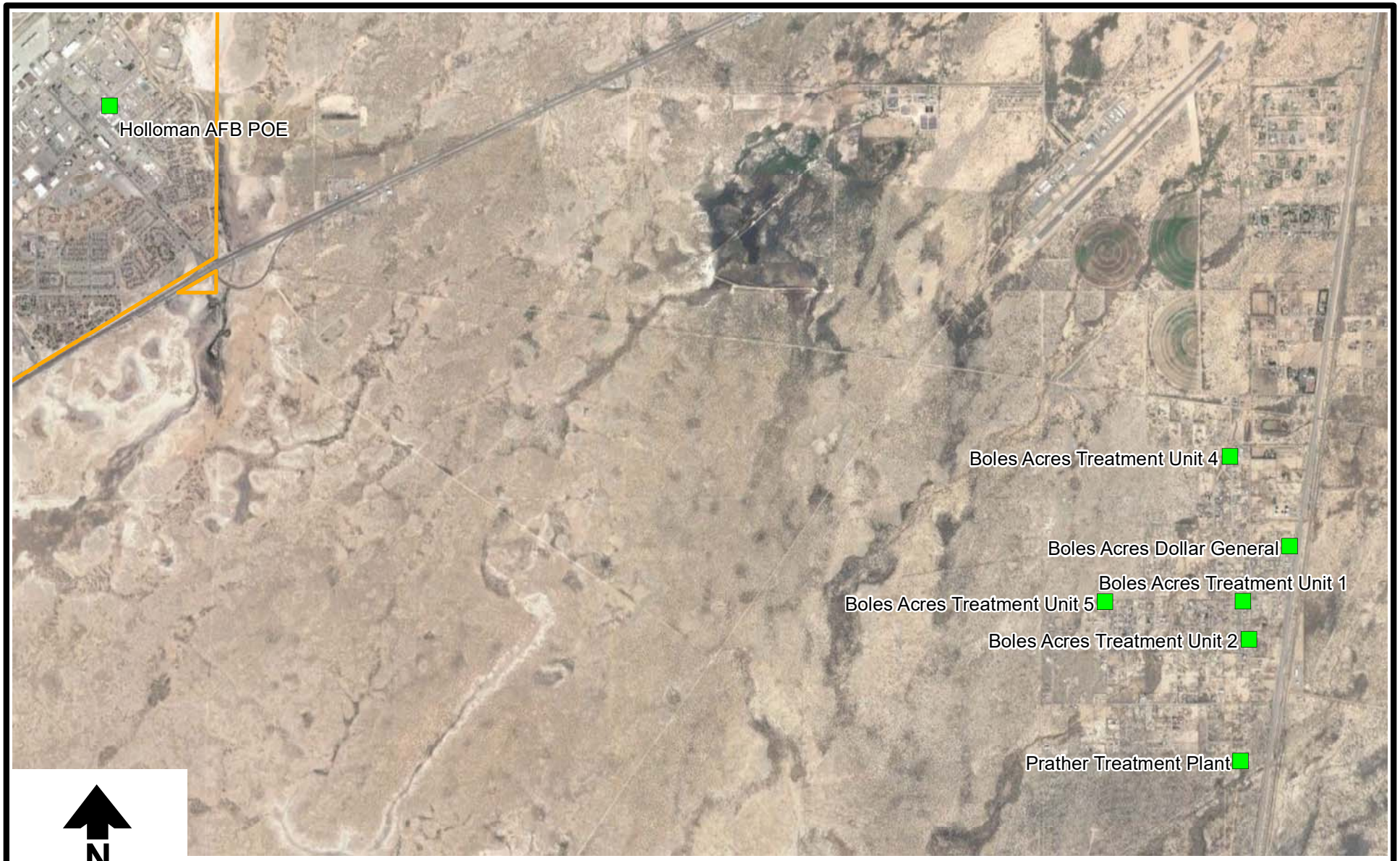
Figure 30

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of PFAS Detected in NMDOH Samples from BGNDRF Supply Wells and USBR Samples from Evaporation Ponds

DBS&A
Daniel B. Stephens & Associates, Inc.
6/26/2022 DB21.1060

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\DOH WATER SUPPLY SAMPLE LOCATIONS.MXD



Source: Google Earth Pro, 5/27/2016

Explanation

Water sample location

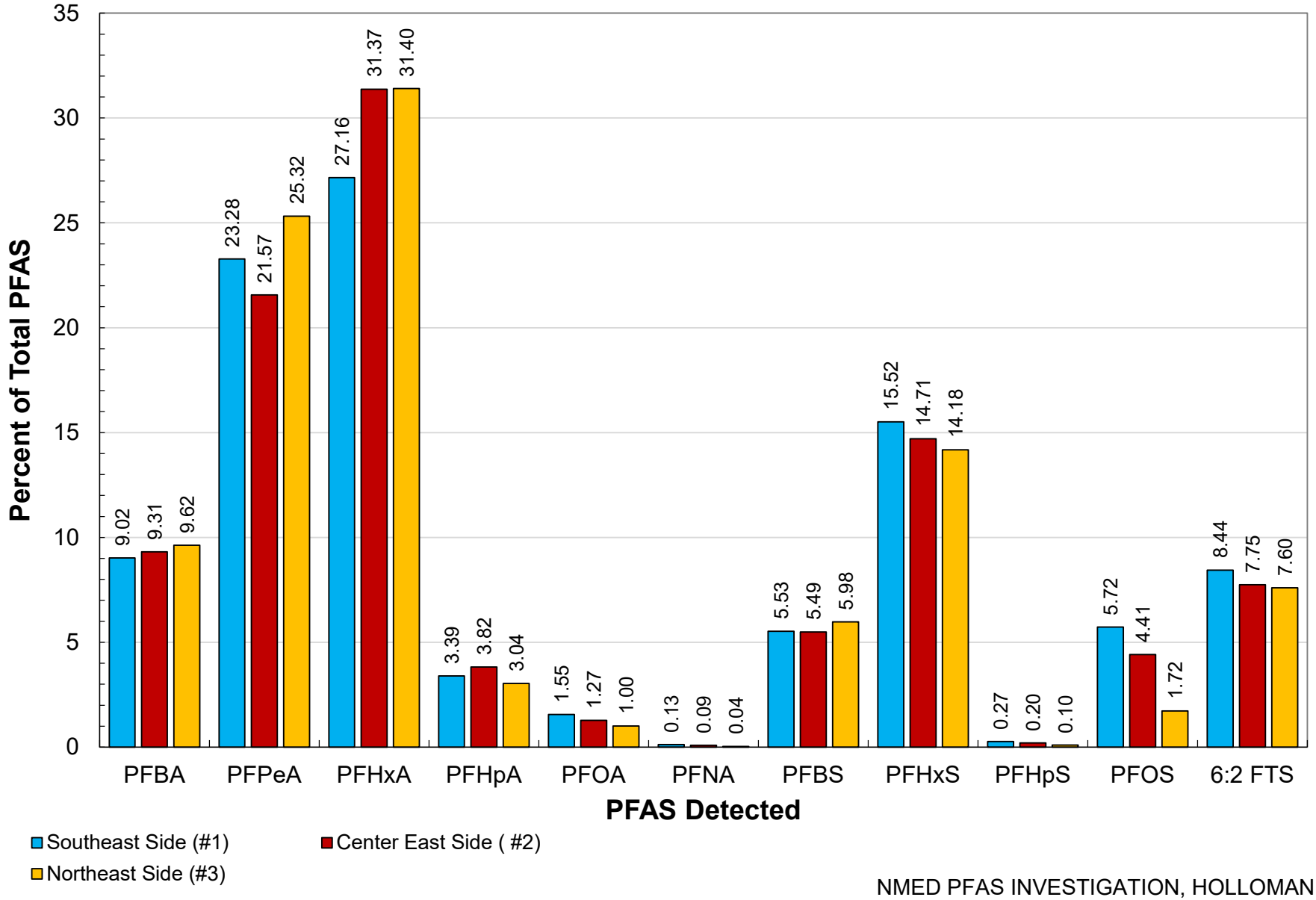
Figure 31

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6/13/2022
DB21.1160

NMED PFAS INVESTIGATION, HOLLOMAN AFB

NMDOH Water Supply Sample Locations

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F32_NMDOH PFAS_Lake Holloman.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

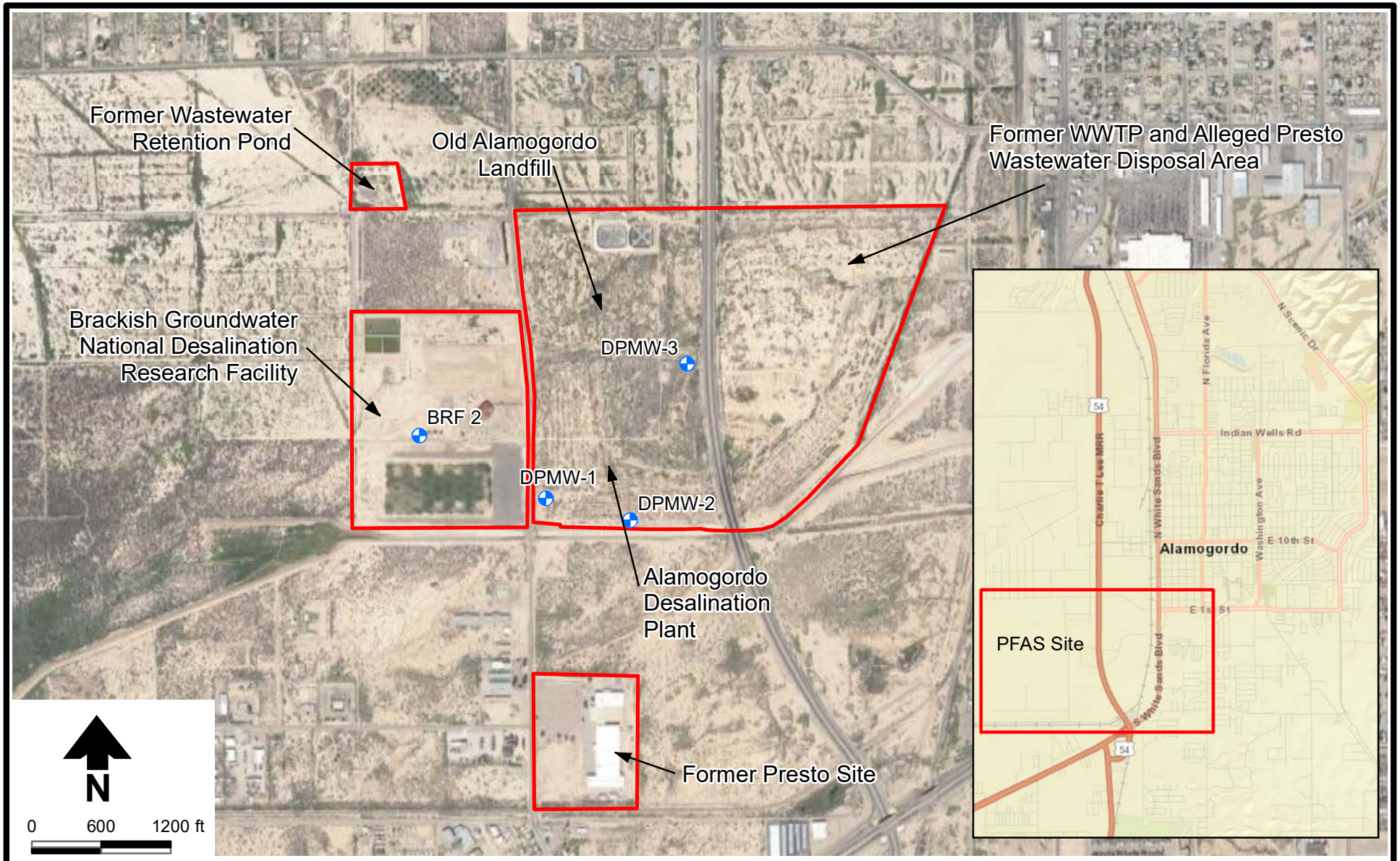
Proportions of Total PFAS Detected in NMDOH Samples from Lake Holloman

Figure 32

DBS&A
Daniel B. Stephens & Associates, Inc.

6/26/2022 DB21.1060

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\WELLS_SAMPLED_BY_NMED_AT_ALAMOGORDO_PFAS_SITE.MXD



Source: Google Earth Pro, 5/27/2016

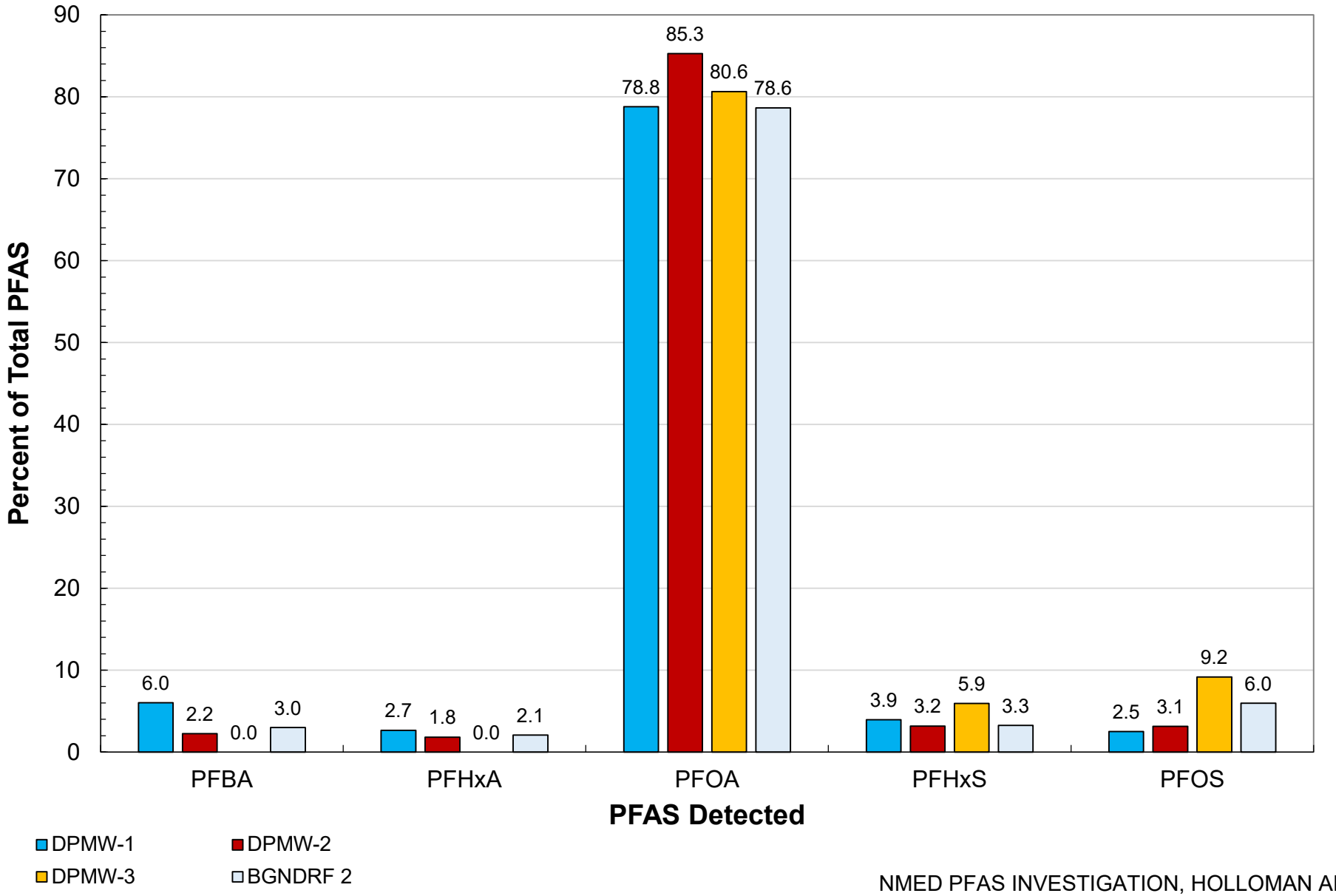
Figure 33

DBS&A
Daniel B. Stephens & Associates, Inc.
6/13/2022
DB21.1160

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Wells Sampled by NMED at Alamogordo PFAS Site

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F34_NMED PFAS DW_APS.docx



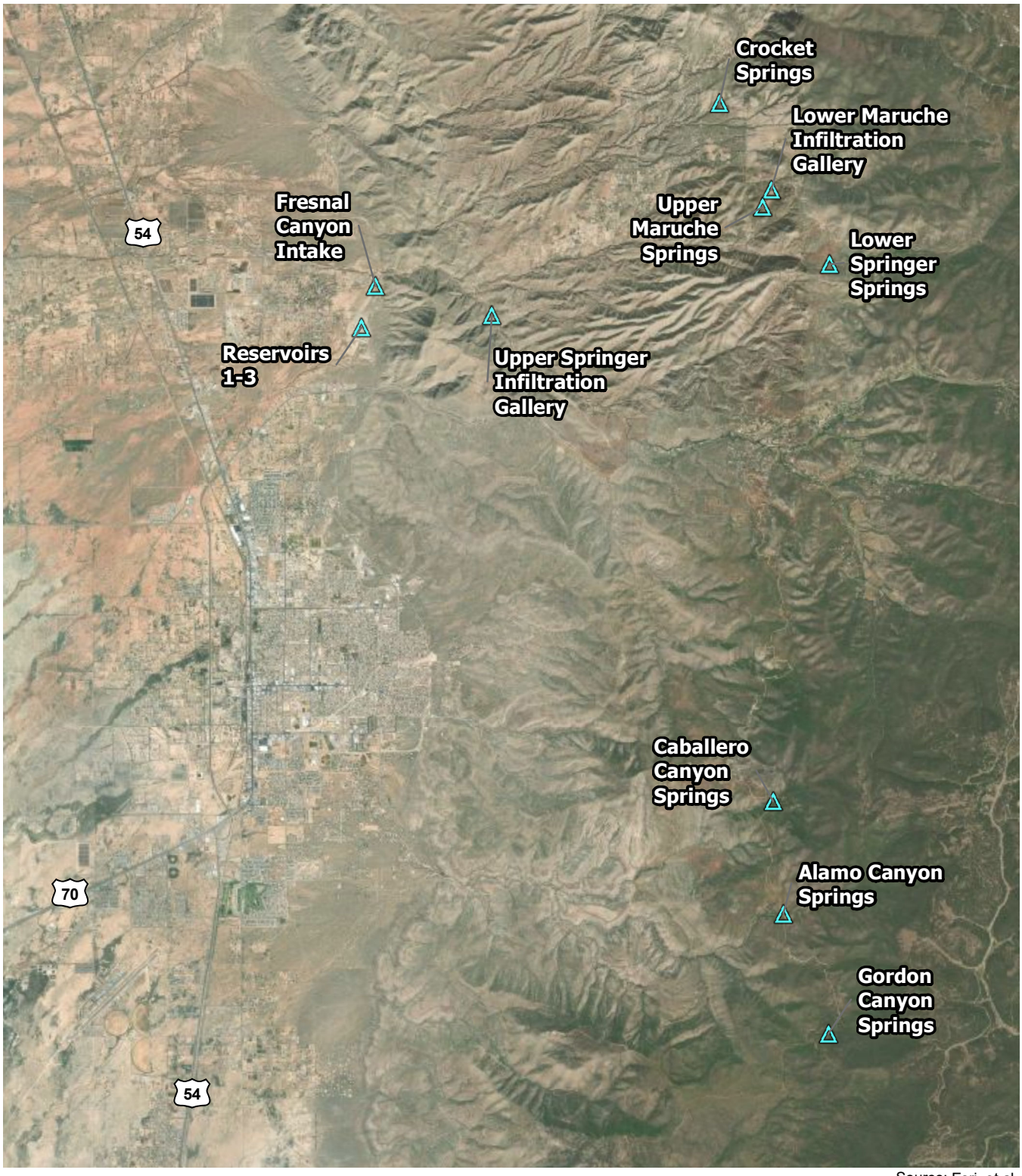
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS Detected in Groundwater Samples from Alamogordo PFAS Site

Figure 34

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060



Source: Esri, et al.

N

Explanation

Holloman AFB Installation boundary

0 1 2 Miles

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\WORKING_PNFHOLLOMAN\SURFACE WATER LOCATIONS SAMPLED BY USGS.MXD

DBS&A

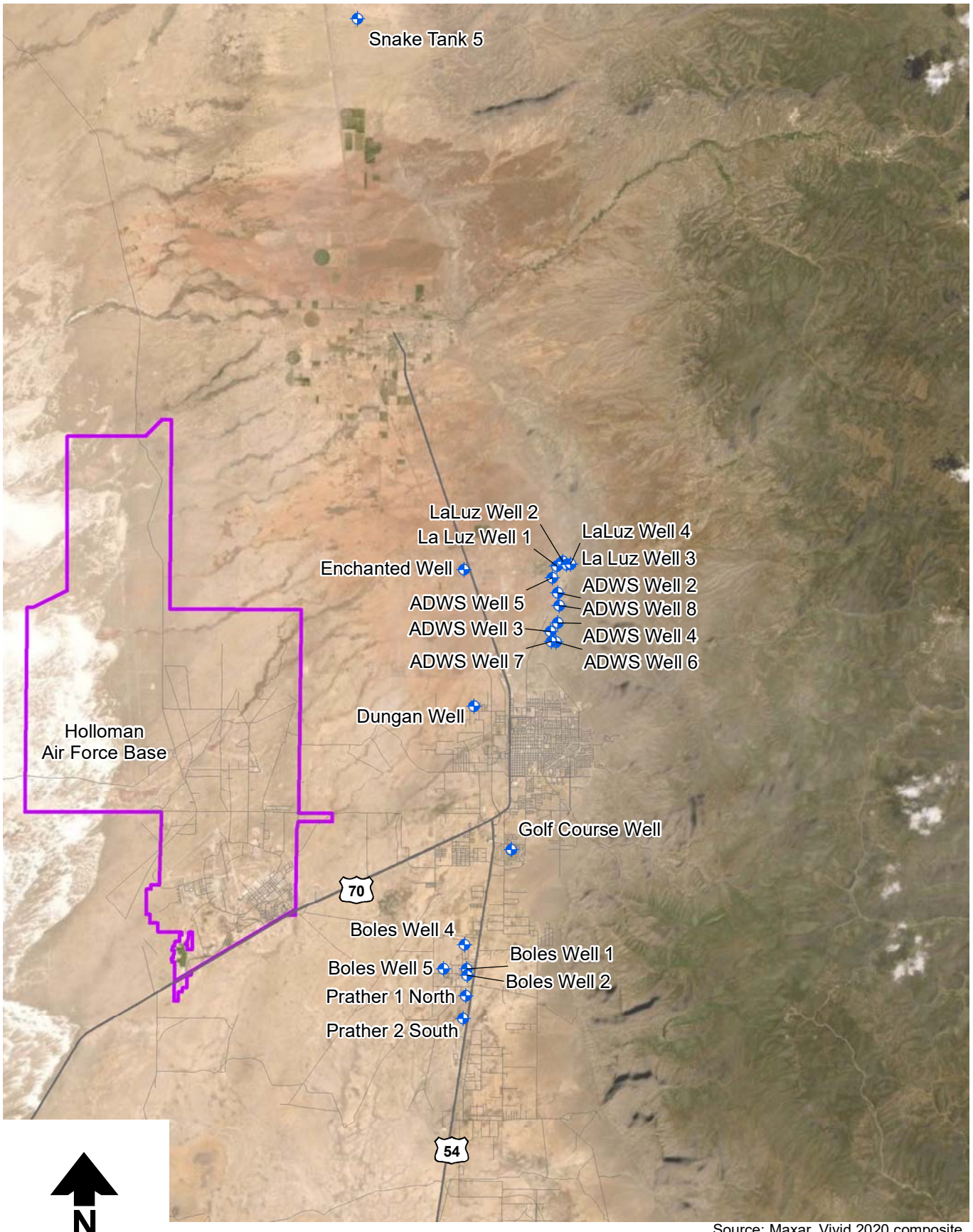
Daniel B. Stephens & Associates, Inc.

6/6/2022 DB21.1060

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Surface Water Locations Sampled by USGS

Figure 35



Source: Maxar, Vivid 2020 composite

Explanation

Sample location

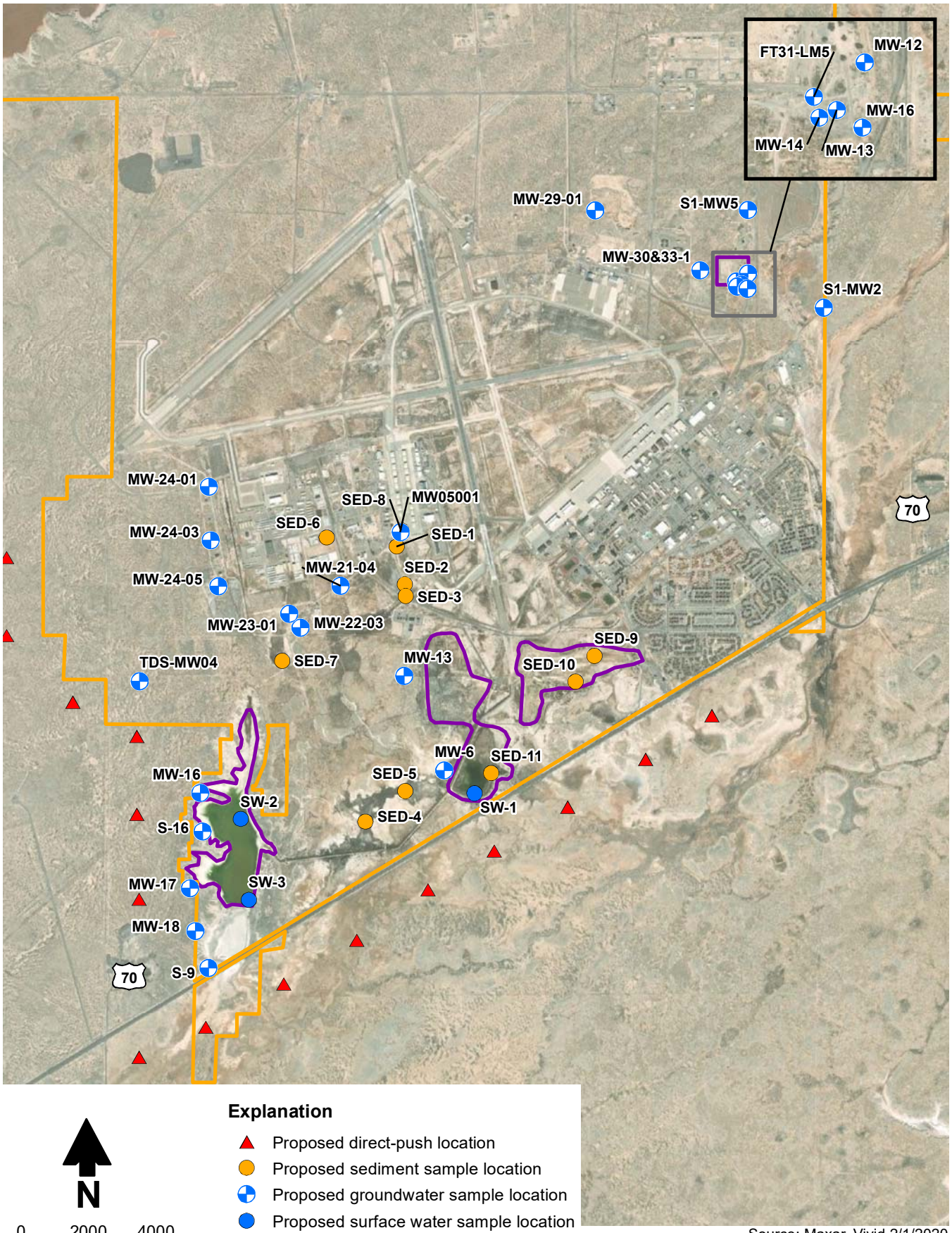
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Groundwater Locations Sampled by USGS

Figure 36

DBS&A
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6/13/2022
DB21.1060

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\GROUNDWATER_LOCATIONS_SAMPLED_BY_USGS.MXD



Source: Maxar, Vivid 2/1/2020

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\PROPOSAL GIS\TEMPLATE_UPDATE\F03_PROPOSED_SAMPLE_LOCATIONS.MXD

DBS&A
Daniel B. Stephens & Associates, Inc.
7/27/2021
JN DB20.1356

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proposed Sample Locations

Figure 37

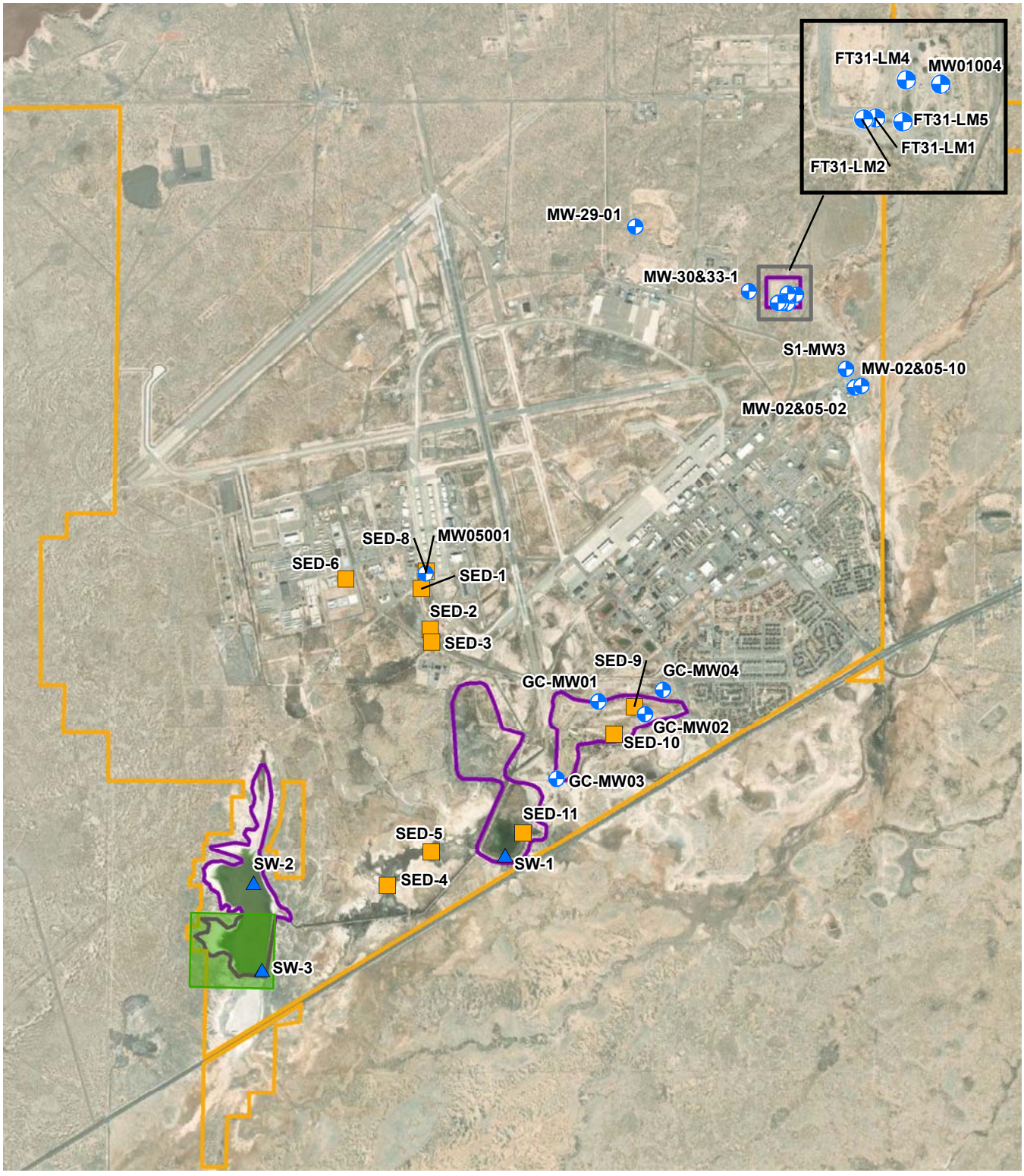


Image source: Maxar, Vivid 1/15/2020

Explanation

- Groundwater sample location
- Surface water sample location
- Sediment sample location
- Holloman AFB Installation boundary
- Biological testing area

N

0 2000 4000 Feet

NMED PFAS INVESTIGATION, HOLLOMAN AFB

DBS&A Sample Locations at Holloman AFB

DBS&A
Daniel B. Stephens & Associates, Inc.
6/13/2022 JN DB20.1356.00

Figure 38

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\CANNON_REPORTIF10_USAF_SAMPLE_LOCS_AT_HOLLOMAN_AFB.MXD

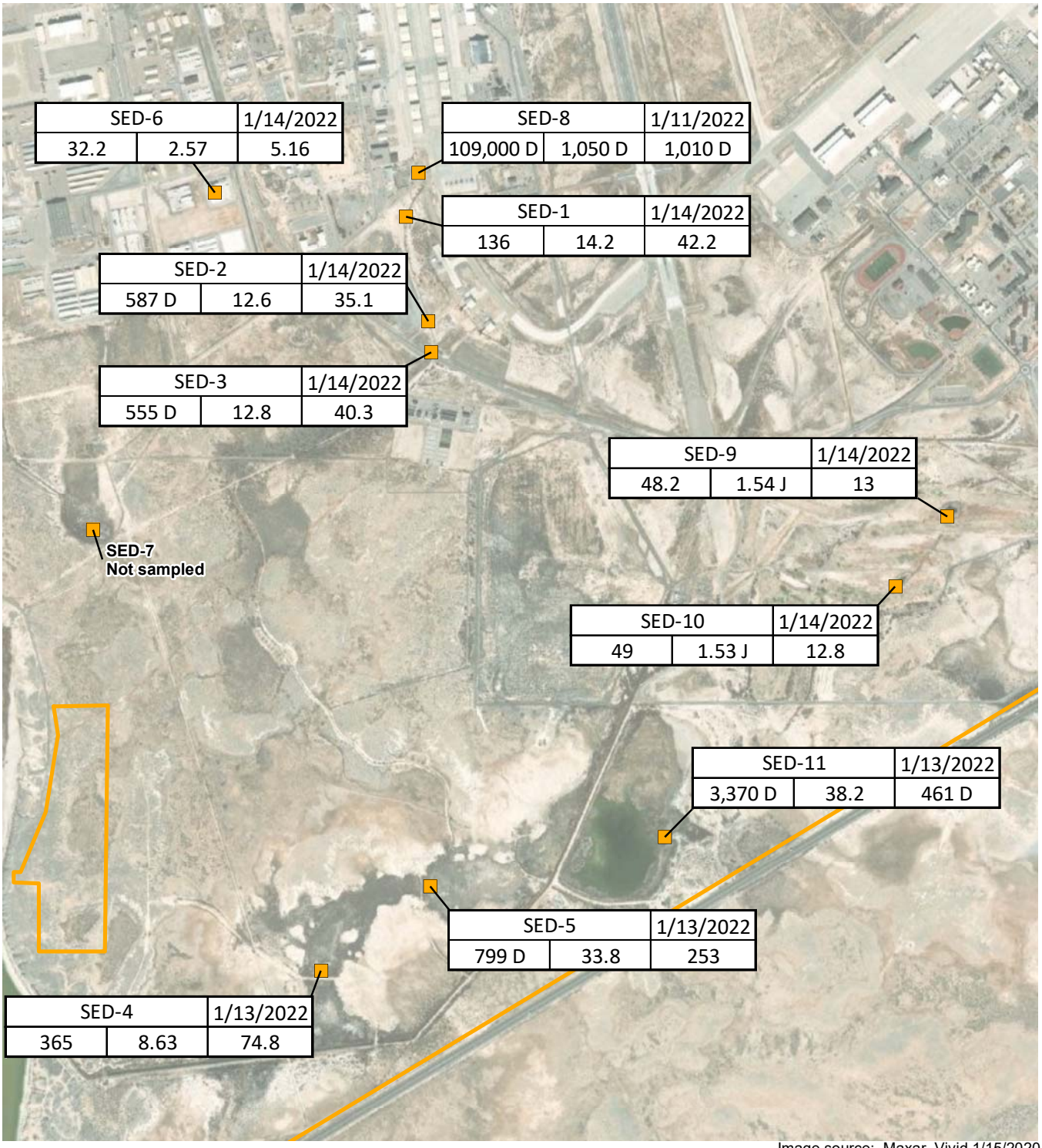


Image source: Maxar, Vivid 1/15/2020

N

0 800 1600
Feet

Notes:
1. Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
2. All results are in nanograms per gram (ng/g)
3. J = Concentration above the level of detection (LOD), but below the LOQ; value is considered an estimate
4. D = Result from diluted sample

Location ID		Sample Date
PFOS	PFOA	PFHxS

Explanation

- Sediment sample location

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\PFOS_PFOA_AND_PFHXS_IN_SEDIMENT.MXD

NMED PFAS INVESTIGATION, HOLLOMAN AFB

PFOS, PFOA & PFHxS in DBS&A Sediment Samples

DBS&A
Daniel B. Stephens & Associates, Inc.
6/13/2022 JN DB21.1060

Figure 39

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F40a_DBSA PFAS SED_EP2.docx

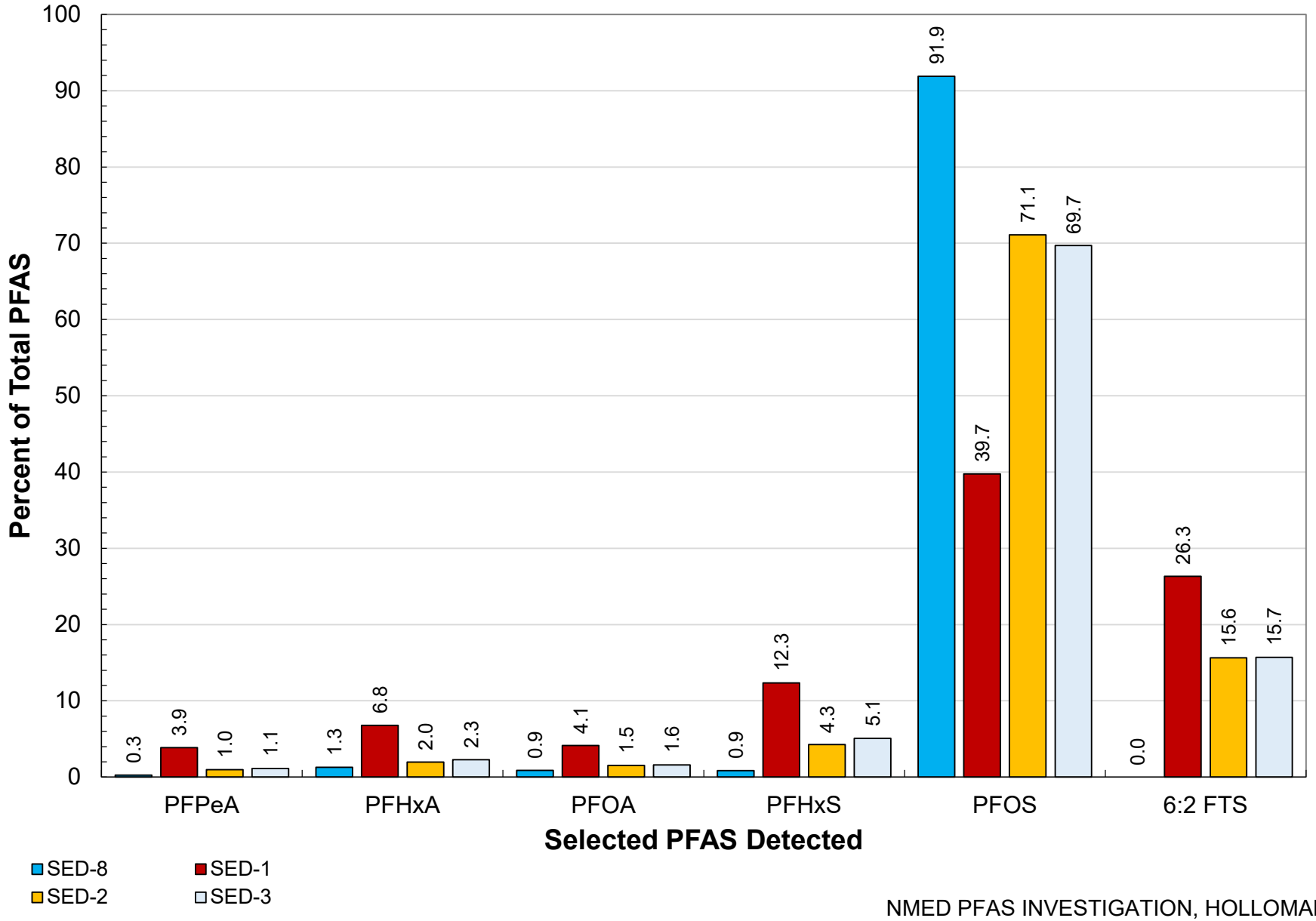


Figure 40a

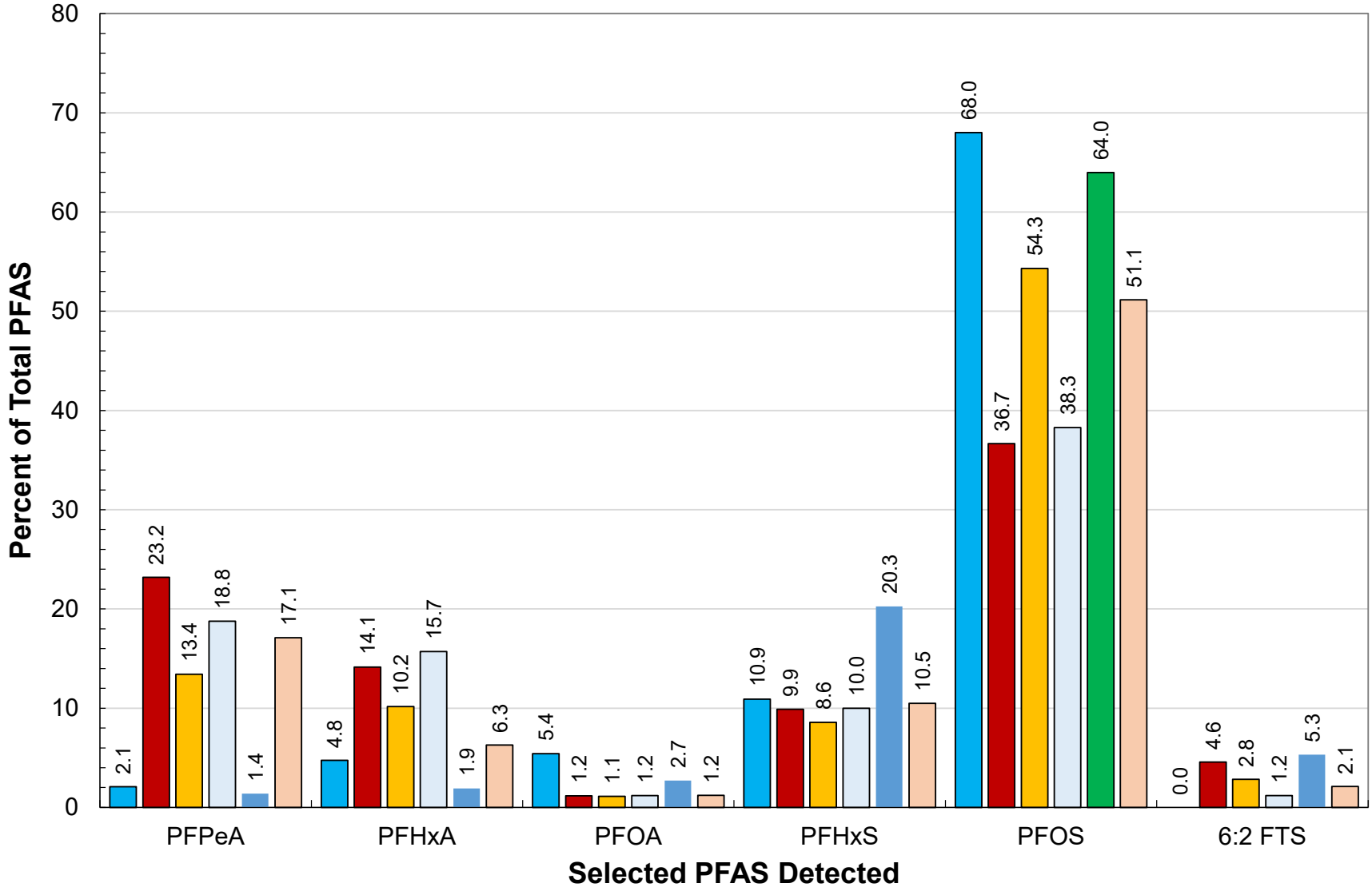
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS in Sediment Samples at and Near Evaporation Pond 2

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F40b_DBSA PFAS SED_Other.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS in Sediment Samples from Other Locations

Figure 40b

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

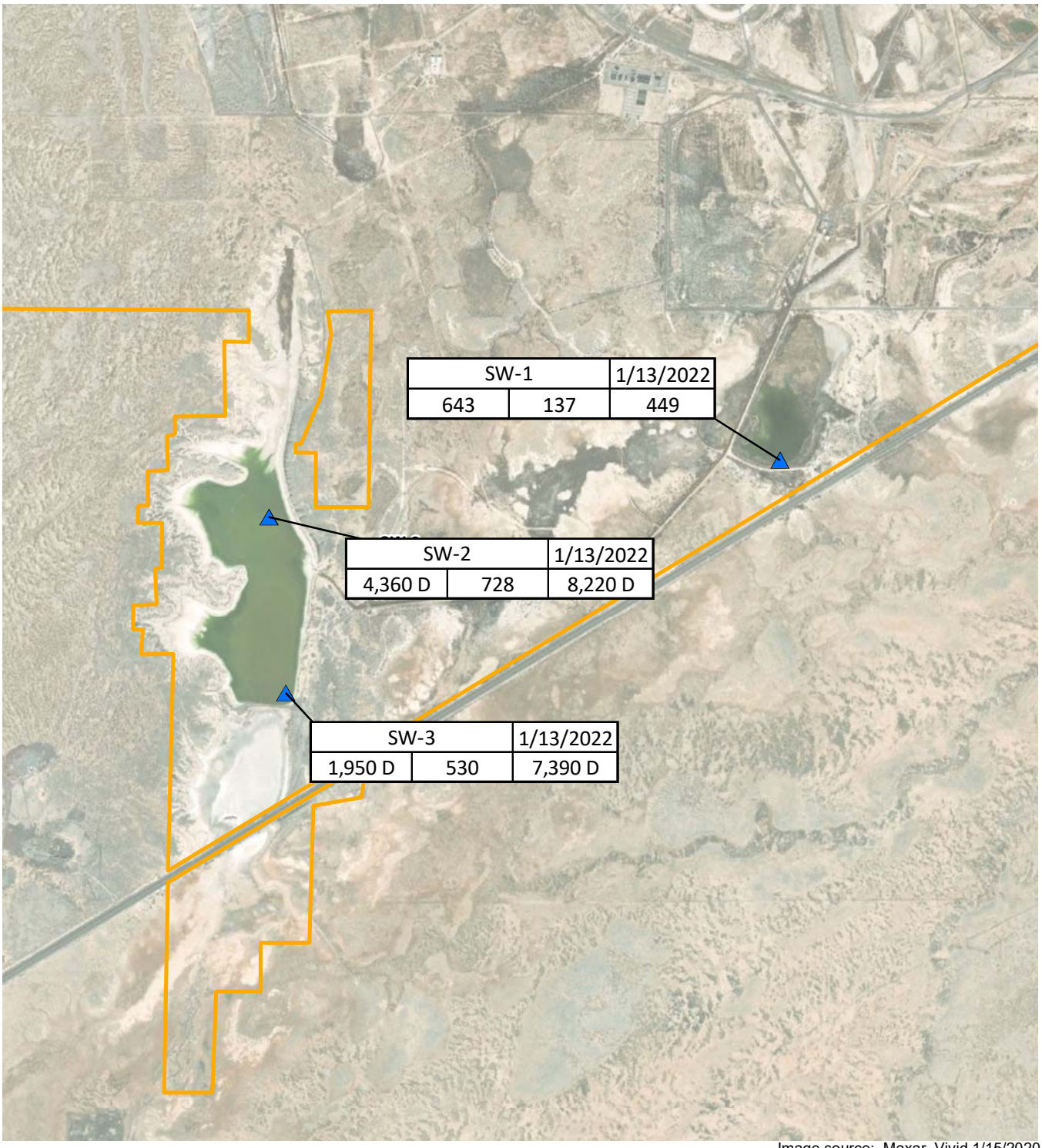


Image source: Maxar, Vivid 1/15/2020

N

0 1000 2000
Feet

Notes:
1. Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
2. All results are in nanograms per gram (ng/L)
3. D = Result from diluted sample

Location ID		Sample Date
PFOS	PFOA	PFHxS

Explanation

▲ Groundwater sample location

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\PFOS_PFOA_AND_PFHXS_IN_SURFACE_WATER.MXD

DBS&A
Daniel B. Stephens & Associates, Inc.
6/13/2022 JN DB21.1060

NMED PFAS INVESTIGATION, HOLLOMAN AFB

PFOS, PFOA, and PFHxS in DBS&A Surface Water Samples

Figure 41

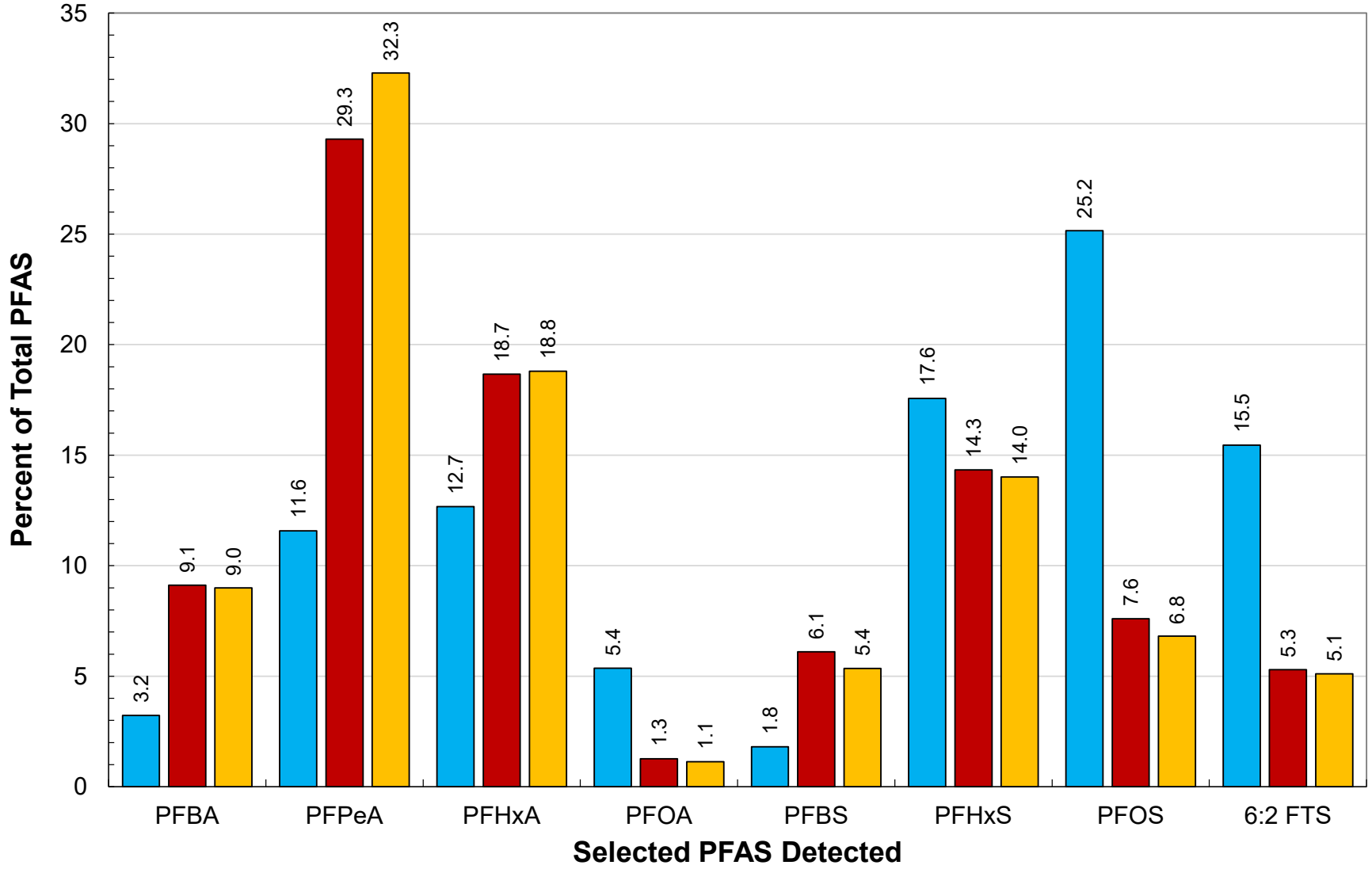


Figure 42

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS Detected in Surface Water Samples, Holloman AFB

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

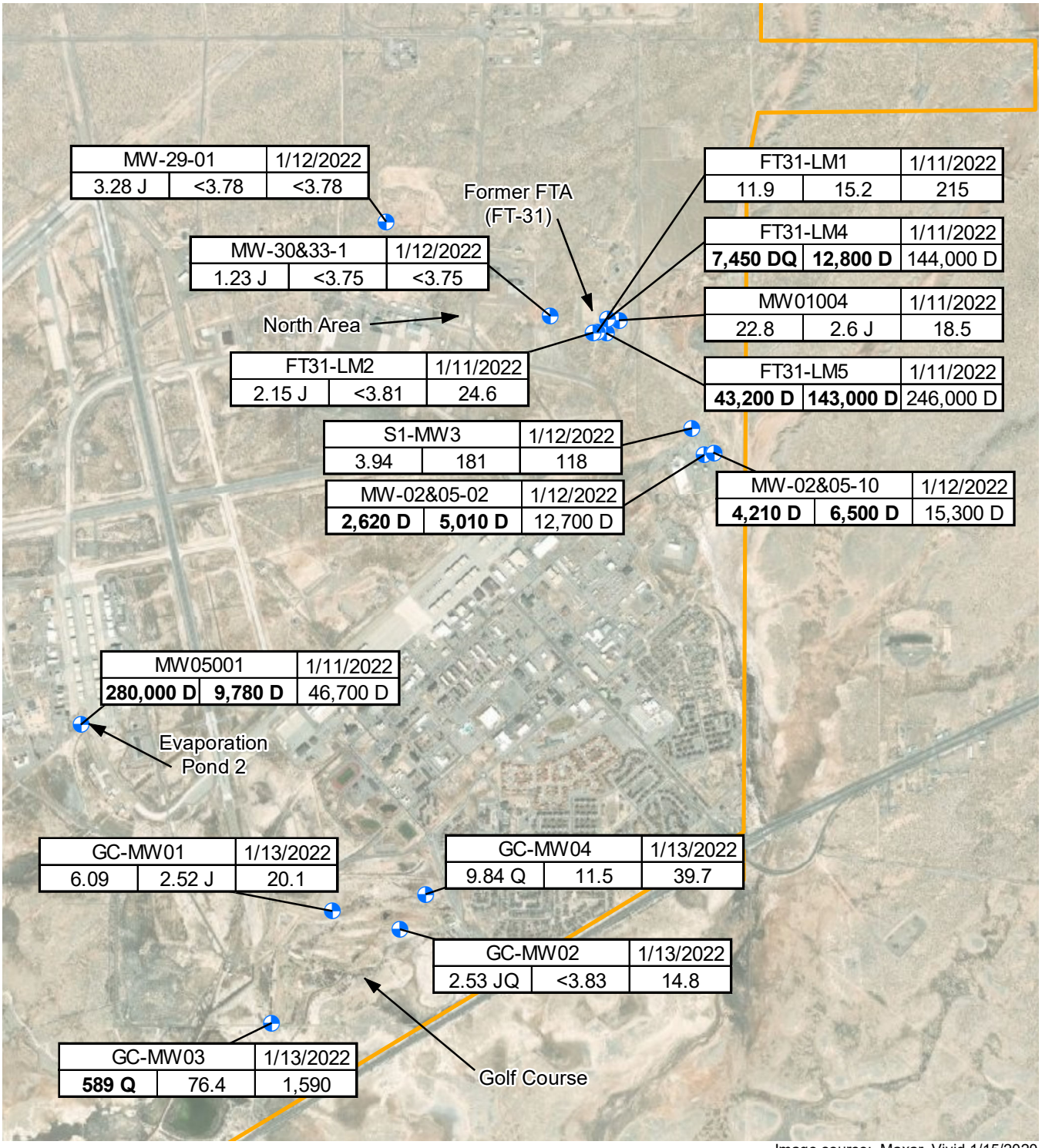


Image source: Maxar, Vivid 1/15/2020

N

0 1400 2800
Feet

Explanation

Groundwater sample location

Notes:
1. Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
2. All results are in nanograms per gram (ng/L)
3. < = Compound not detected at the limit of quantitation (LOQ - the reporting limit)
4. J = Concentration above the level of detection (LOD), but below the LOQ; value is considered an estimate
5. D = Result from diluted sample
6. Q = Ion transition ratio outside acceptance criteria
7. **Bold** iindicates concentration exceeds 2016 lifetime health advisory level of 70 ng/L

Location ID		Sample Date
PFOS	PFOA	PFHxS

NMED PFAS INVESTIGATION, HOLLOMAN AFB

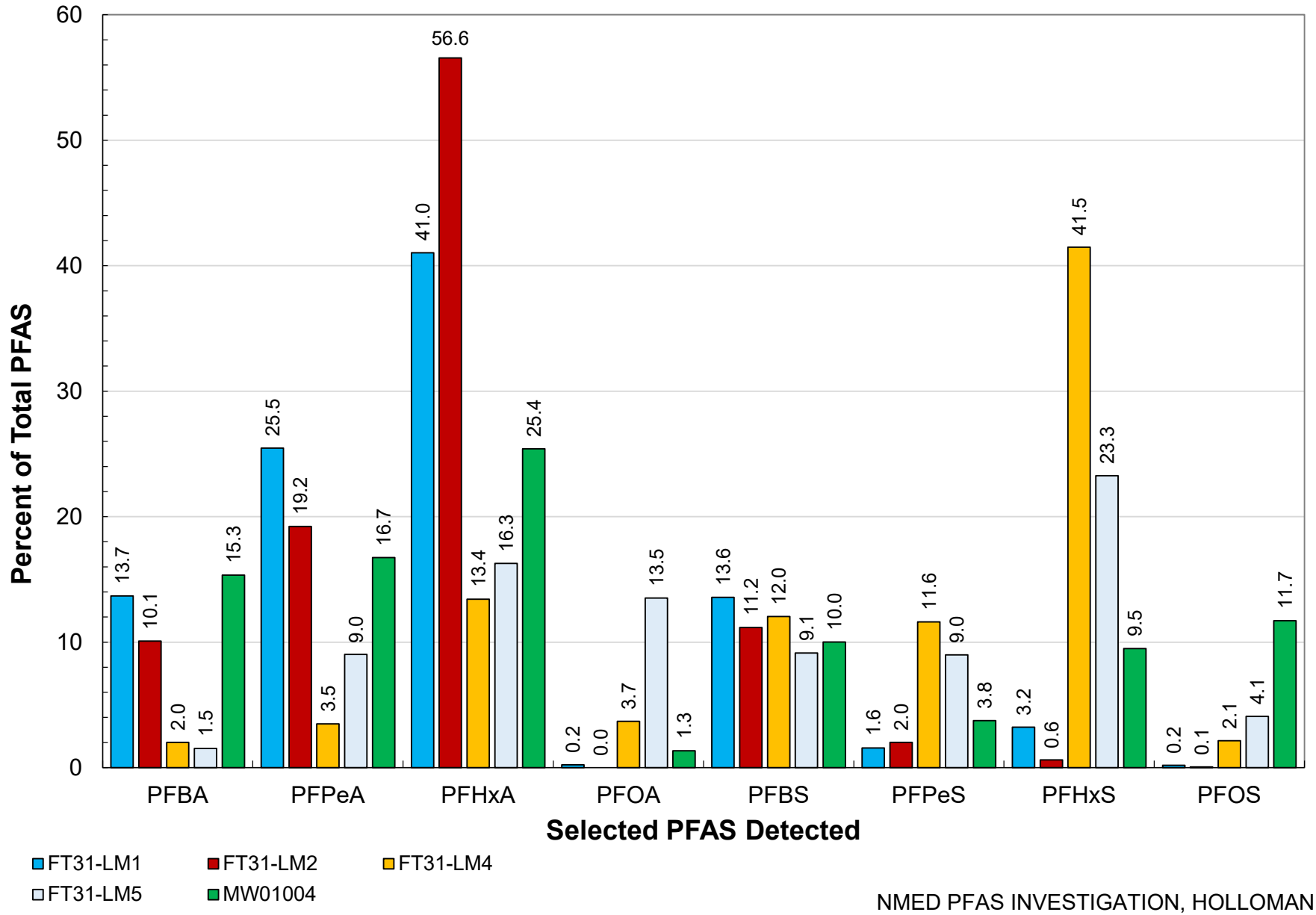
PFOS, PFOA, and PFHxS in DBS&A Groundwater Samples

DBS&A
Daniel B. Stephens & Associates, Inc.
6/29/2022 JN DB21.1060

Figure 43

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\F43_PFOS_PFOA_AND_PFHXS_IN_GROUNDWATER.MXD

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F44_DBSA PFAS GW_FT-31.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS in Groundwater from FT-31 Monitor Wells

Figure 44

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F45_DBSA PFAS GW_EP2 Well.docx

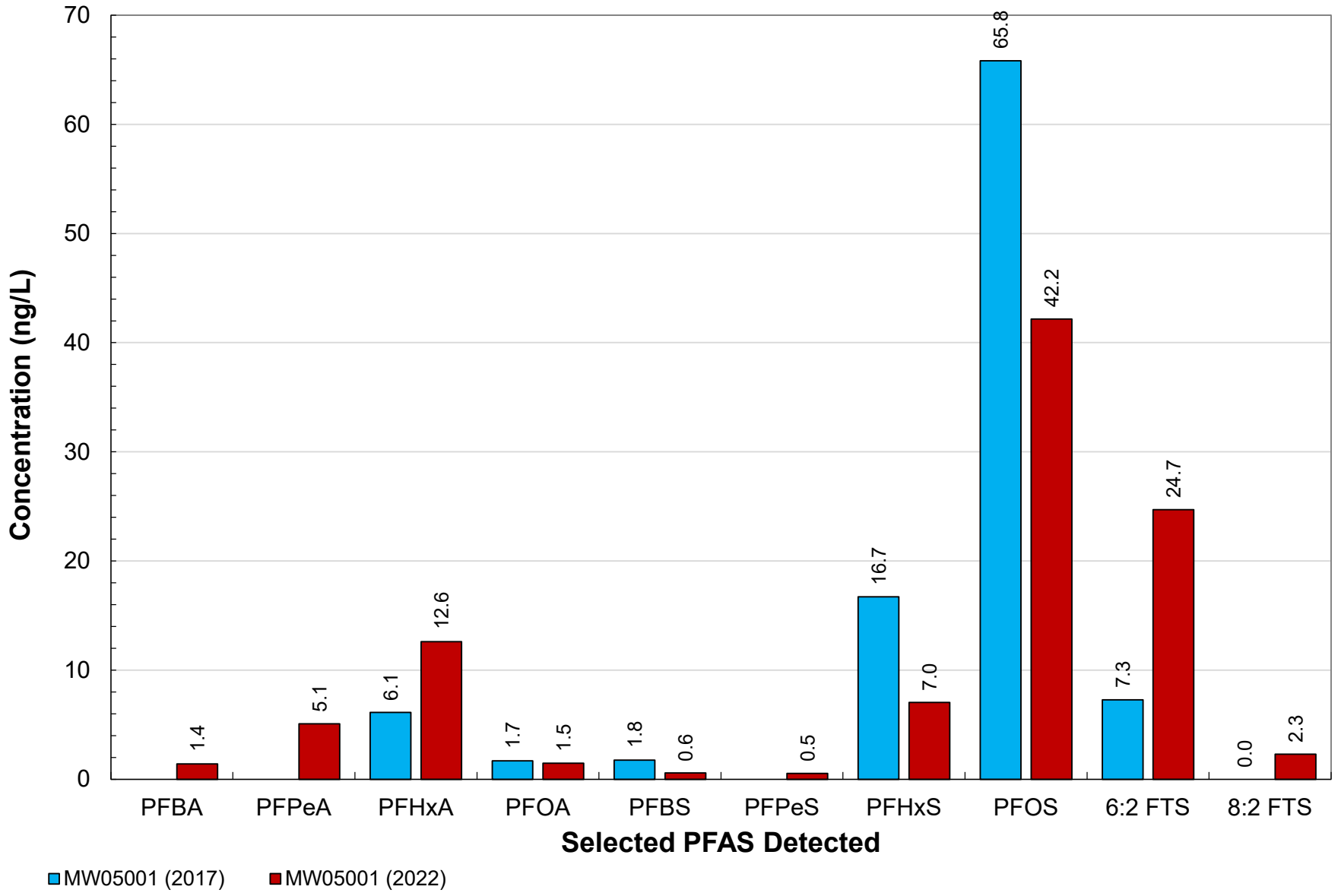


Figure 45

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS in Groundwater from Monitor Well at Evaporation Pond 2

DBS&A
Daniel B. Stephens & Associates, Inc.
6/8/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F46_DBSA PFAS GW_Golf Course.docx

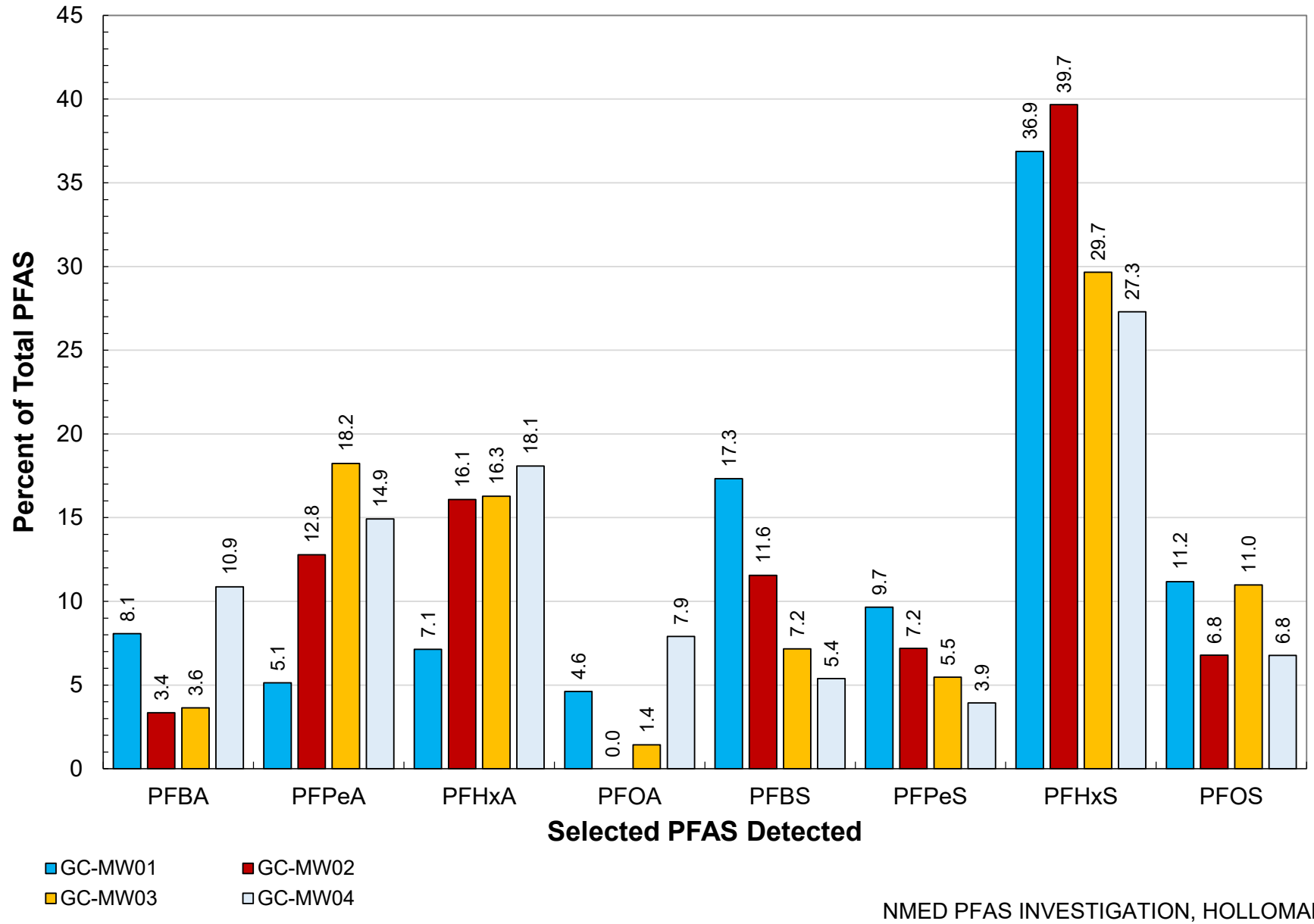


Figure 46

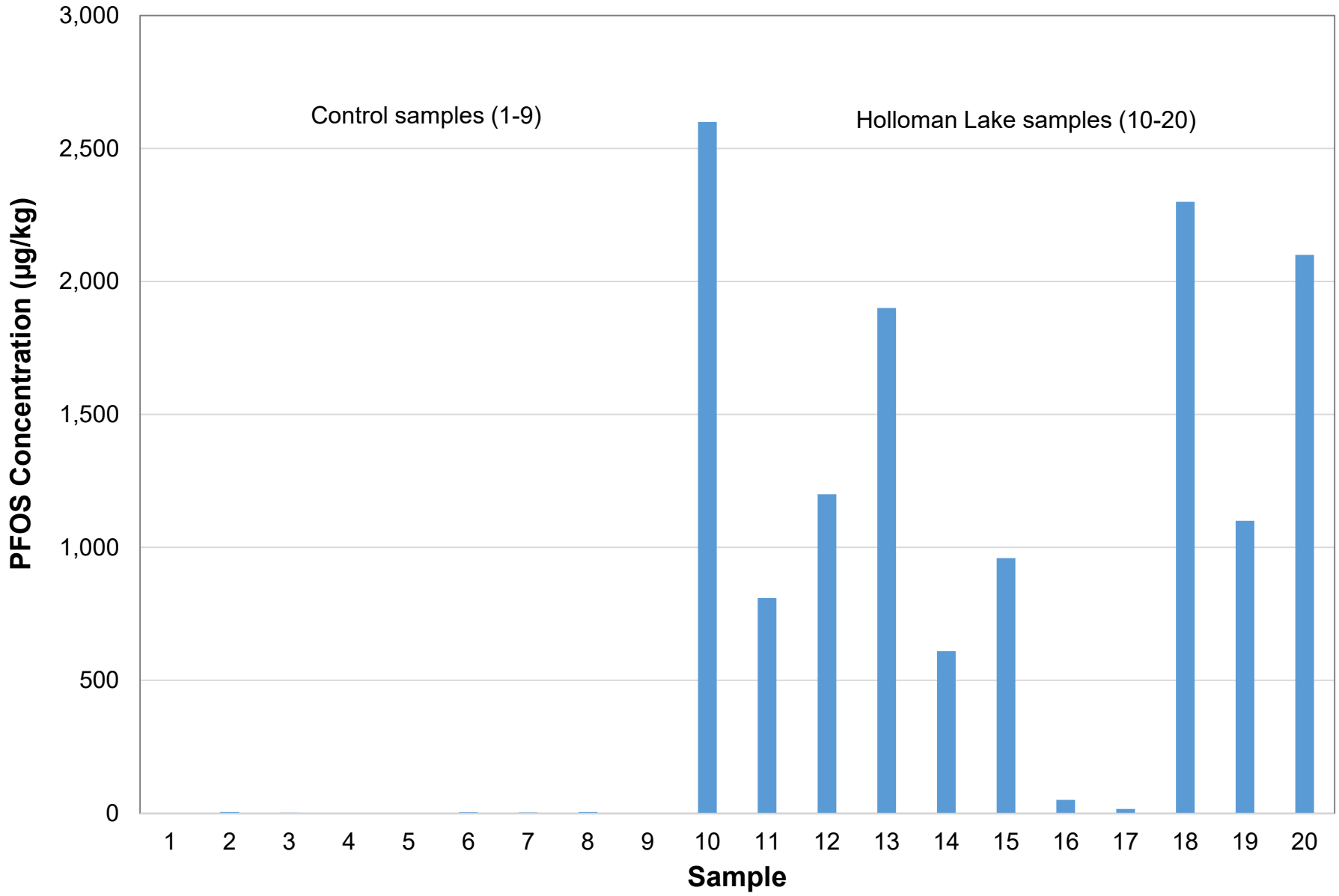
NMED PFAS INVESTIGATION, HOLLOMAN AFB

Proportions of Selected PFAS in Groundwater from Golf Course Monitor Wells

DBS&A
Daniel B. Stephens & Associates, Inc.

6/8/2022 DB21.1060

P:_DB21-1060\Holloman Phase I.6-22\Figures\Word\F47_PFOS Bird Tissue.docx



NMED PFAS INVESTIGATION, HOLLOMAN AFB

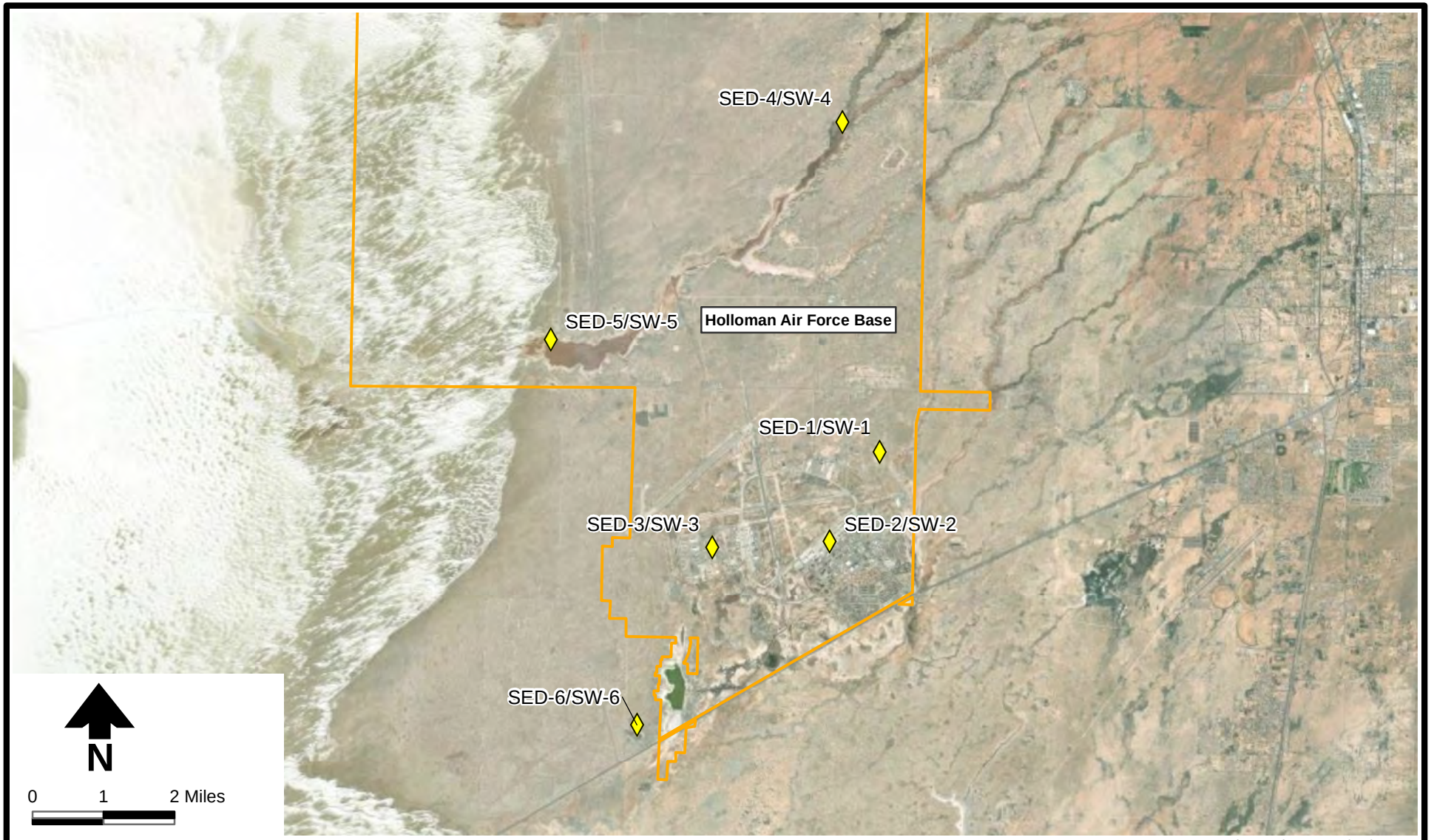
PFOS Concentrations Detected in Control and Holloman Lake Bird Muscle Samples

Figure 47

DBS&A
Daniel B. Stephens & Associates, Inc.

6/29/2022 DB21.1060

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\F47_SEDIMENT_&_SURFACE_WATER_SAMPLE_LOCS_FOR_2023.MXD



Source: Google Earth Pro, 10/14/2016

Explanation

Sample location

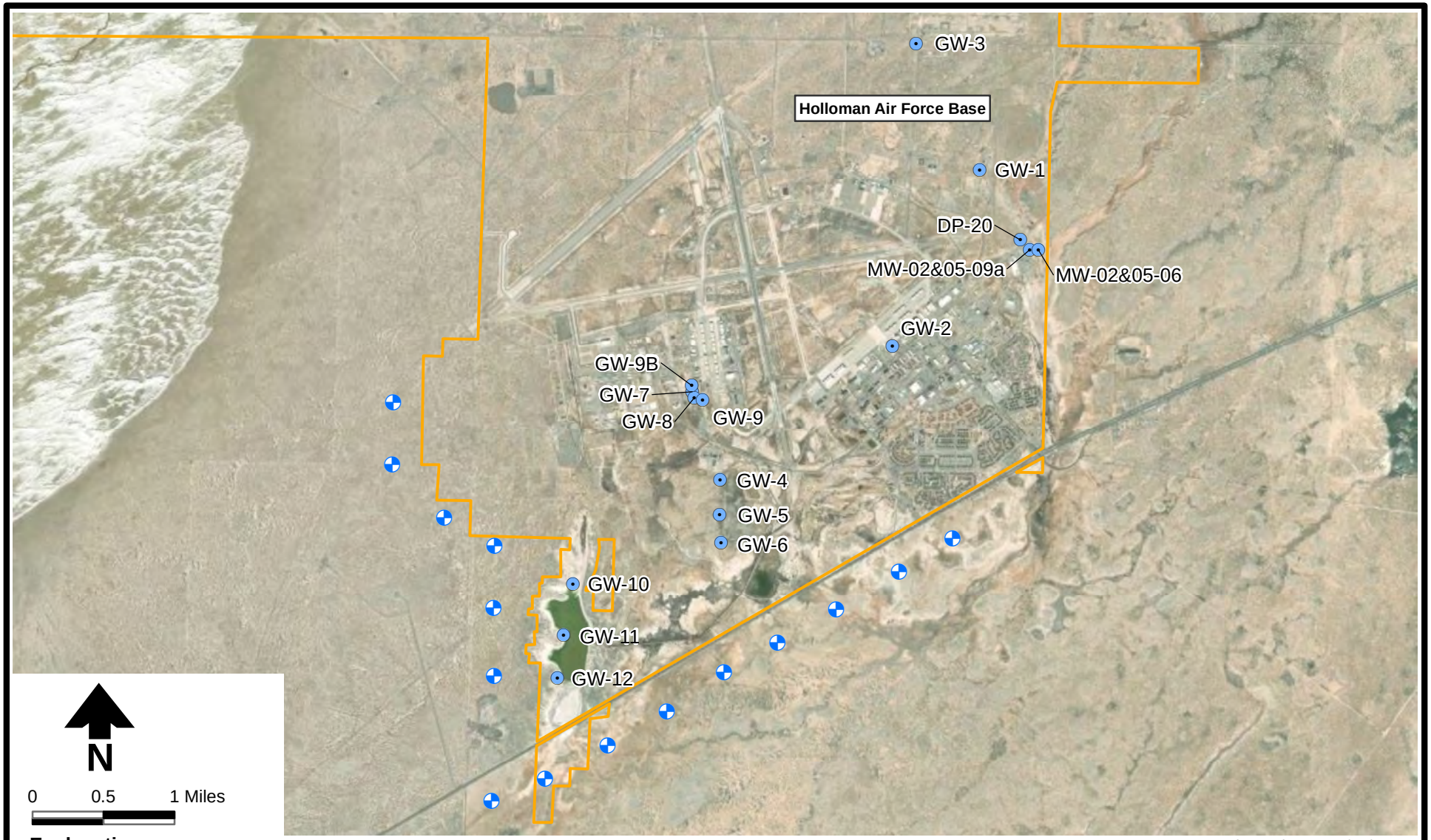
Figure 48

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Sediment and Surface Water Sample Locations for FY 2023

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6/23/2022 DB21.1060

S:\PROJECTS\DB21.1060_NMED_PFAS_INVESTIGATIONS\GIS\MXDS\HOLLOMAN_REPORT\F48_GROUNDWATER_SAMPLE_LOCATIONS_FOR_FY_2023.MXD



Explanation

- Sample location
- Proposed direct-push location

Source: Google Earth Pro, 10/14/2016

Figure 49

NMED PFAS INVESTIGATION, HOLLOMAN AFB

Groundwater Sample Locations for FY 2023

DBS&A
Daniel B. Stephens & Associates, Inc.
6/23/2022 DB21.1060

Tables

Table 1. PFAS Referred to in this Report
Page 1 of 2

PFAS Group	No. of Carbons	Acronym(s)	CAS No.	Chemical Name
PFCA	4	PFBA	375-22-4	Perfluorobutanoic acid
PFCA	5	PFPeA	2706-90-3	Perfluoropentanoic acid
PFCA	6	PFHxA	307-24-4	Perfluorohexanoic acid
PFCA	7	PFHpA	375-85-9	Perfluoroheptanoic acid
PFCA	8	PFOA	335-67-1	Perfluorooctanoic acid
PFCA	9	PFNA	375-95-1	Perfluorononanoic acid
PFCA	10	PFDA	335-76-2	Perfluorodecanoic acid
PFCA	11	PFUnA, PFUnDA	2058-94-8	Perfluoroundecanoic acid
PFCA	12	PFDoA, PFDoDA	307-55-1	Perfluorododecanoic acid
PFCA	13	PFTrDA, PFTriA, PFTrA	72629-94-8	Perfluorotridecanoic acid
PFCA	14	PFTeDA, PFTreA, PFTeA	376-06-7	Perfluorotetradecanoic acid
PFSA	4	PFBS	375-73-5	Perfluorobutane sulfonic acid
PFSA	5	PFPeS	2706-91-4	Perfluoropentane sulfonic acid
PFSA	6	PFHxS	355-46-4	Perfluorohexane sulfonic acid
PFSA	7	PFHpS	375-92-8	Perfluoroheptane sulfonic acid
PFSA	8	PFOS	1763-23-1	Perfluorooctane sulfonic acid
PFSA	9	PFNS	68259-12-1	Perfluorononane sulfonic acid
PFSA	10	PFDS	335-77-3	Perfluorodecane sulfonic acid
FASA	8	PFOSA	754-91-6	Perfluorooctane sulfonamide
FTSA		4:2 FTS, 4:2 FTSA	757124-72-4	4:2 fluorotelomer sulphonic acid
FTSA	8	6:2 FTS, 6:2 FTSA	27619-97-2	6:2 Fluorotelomer sulphonic acid
FTSA	10	8:2 FTS, 8:2 FTSA	39108-34-4	8:2 Fluorotelomer sulphonic acid
FASAA	11	NMeFOSAA, MeFOSAA	2355-31-9	N-methyl perfluorooctane sulfonamido acetic acid
FASAA	12	NEtFOSAA, NEtFOSA	2991-50-6	N-ethyl perfluorooctane sulfonamido acetic acid
PFECA		HFPO-DA (Gen X)	13252-13-6	Hexafluoropropylene oxide dimer acid
PFECA		PFMPA	377-73-1	Perfluoro-3-methoxypropanoic acid
PFECA		PFMBA	863090-89-5	Perfluoro-4-methoxybutanoic acid
PFECA		NFDHA	151772-58-6	Perfluoro-3,6-dioxaheptanoic acid
PFESA		11Cl-PF3OUdS	763051-92-9	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid

Notes are provided at the end of the table.

Table 1. PFAS Referred to in this Report
Page 2 of 2

PFAS Group	No. of Carbons	Acronym(s)	CAS No.	Chemical Name
PFESA		9Cl-PF3ONS	756426-58-1	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid
PFESA		PFEESA	113507-82-7	Perfluoro(2-ethoxyethane) sulfonic acid
PFEA		ADONA (Gen X)	919005-14-4	Ammonium 4,8-dioxa-3H-perfluorononanoate

Sources: ITRC, 2021, Table 4-1; U.S. EPA, 2021b
CAS = Chemical Abstract Service
PFAS = Per- and polyfluoroalkyl substances
PFCA = Perflouoroalkyl carboxylic acid
PFSA = Perfluoroalkane sulfonic acid
FASA = Perfluoroalkane sulfonamide
FTSA = Fluorotelomer sulfonic acid
FASAA = Perfluorooctane sulfonamido acetic acid
PFECA = Perfluoroalkyl ether carboxylic acid
PFESA = Perfluoroalkyl ether sulfonic acid
PFEA = Polyfluoroalkyl ether acid

Table 2a. Summary of Slug Test Results
Page 1 of 2

ERP Site No. [a]	ERP Site Name [a]	Test Type	Number of Wells	Hydraulic Conductivity (cm/s)			Source Doc
				Minimum	Maximum	Geometric Mean	
LF-01	Main Base Landfill	RH	5	1.00×10^{-5}	1.00×10^{-4}	3.13×10^{-5}	1
SS-02 & SS-05	Sites 2&5--POL Spill Sites Nos. 1 and 2	RH	6	4.23×10^{-4}	1.52×10^{-3}	9.15×10^{-4}	2
OT-04	Acid Trailer Burial Site	RH	4	5.37×10^{-4}	1.12×10^{-3}	4.72×10^{-4}	2
SD-08	Refuse Collection Truck Washrack	RH	3	1.52×10^{-3}	6.62×10^{-3}	2.85×10^{-3}	2
SS-09	Waste POL Drum Storage/Spill Area	RH	4	5.09×10^{-4}	1.54×10^{-3}	9.49×10^{-4}	2
LF-10	Old Base Landfill	RH	7	9.00×10^{-5}	2.00×10^{-4}	2.44×10^{-4}	1
OT-14	Former Entomology Shop Area	RH	4	3.19×10^{-3}	8.09×10^{-3}	4.29×10^{-3}	2
OT-16	Existing Entomology Shop Area	RH	4	8.39×10^{-4}	5.16×10^{-3}	2.53×10^{-3}	2
SS-17	BX Service Station	RH	9	2.00×10^{-5}	6.00×10^{-4}	7.67×10^{-5}	1
LF-19	Golf Course Landfill	RH	3	7.21×10^{-4}	1.13×10^{-3}	9.16×10^{-4}	2
LF-21	West Area Landfill No. 2	RH	4	3.98×10^{-4}	3.61×10^{-3}	1.48×10^{-3}	2
LF-22	West Area Landfill No. 1	RH	4	4.51×10^{-4}	1.63×10^{-3}	8.69×10^{-4}	2
LF-23	MOBSS Landfill	RH	4	7.86×10^{-4}	1.65×10^{-3}	1.04×10^{-3}	2
OT-24	Former Equipment Maintenance Area	RH	6	9.38×10^{-4}	2.21×10^{-3}	1.23×10^{-3}	2
SS-26	Possible Missile Fuel Spill Site	RH	4	1.05×10^{-3}	2.04×10^{-3}	1.64×10^{-3}	2
SD-28	Former North Area Washrack	RH	3	1.04×10^{-3}	5.63×10^{-3}	2.42×10^{-3}	2
LF-29	Former Army Landfill	RH	3	4.23×10^{-4}	2.04×10^{-3}	8.00×10^{-4}	2
DP-30 & SD-33	Grease Trap & Cooking Grease Disposal Pits	RH	4	1.52×10^{-4}	2.94×10^{-3}	5.90×10^{-4}	2
FT-31	Former Fire Training Area	RH	12	1.00×10^{-5}	1.17×10^{-3}	4.02×10^{-4}	1
SS-36	Unconventional Fuels Area Spill Site	RH	5	4.19×10^{-4}	1.54×10^{-3}	8.28×10^{-4}	2

Notes are provided at the end of the table.

Table 2a. Summary of Slug Test Results
Page 2 of 2

ERP Site No. [a]	ERP Site Name [a]	Test Type	Number of Wells	Hydraulic Conductivity (cm/s)			Source Doc
				Minimum	Maximum	Geometric Mean	
OT-37	Early Missile Testing Site	RH	6	4.07×10^{-4}	4.97×10^{-3}	1.21×10^{-3}	2
OT-38	Sled Test Maintenance Area	RH	3	1.45×10^{-3}	6.17×10^{-3}	3.26×10^{-3}	2
SS-39	Missile Fuel Spill Area	RH	4	6.76×10^{-4}	2.03×10^{-3}	6.74×10^{-4}	2
OT-41	Coco Blockhouse Borehole Disposal Site	RH	4	1.36×10^{-3}	2.09×10^{-3}	1.79×10^{-3}	2
OT-44	Aircraft Maintenance Hangar	RH	5	1.00×10^{-4}	1.00×10^{-3}	2.61×10^{-4}	1
OT-45	Old Age Refueling Station	RH	7	4.00×10^{-5}	7.00×10^{-4}	2.03×10^{-4}	1
SS-46	JP-4 Underground Waste Tank	RH	4	9.00×10^{-5}	2.00×10^{-4}	1.13×10^{-4}	1
SD-47	POL Washrack Discharge Area	RH	6	4.00×10^{-5}	3.00×10^{-4}	1.12×10^{-4}	1
SS-48	Military Gas Station	RH	7	2.00×10^{-4}	1.00×10^{-3}	3.17×10^{-4}	1
WP-49	Sewage Lagoons/Lake Holloman	FH	9	3.30×10^{-5}	4.00×10^{-3}	9.33×10^{-4}	3
LF-58	Incinerator Landfill	RH	4	3.63×10^{-4}	1.60×10^{-3}	9.86×10^{-4}	4

Sources: 1. Walk, Haydel & Associates, 1989
2. Radian, 1992
3. Radian, 1989
4. FWEC and Radian, 1995

ERP = Environmental Restoration Program
cm/s = Centimeters per second
RH = Rising head
FH = Falling head

Table 2b. Results of Constant Rate Aquifer Tests at Sewage Lagoons

Well ID	Well Type	Screen Interval (feet bgs)	Pumping Rate (gpm)	Duration (minutes)	Transmissivity (gpd/ft)	Storage Coefficient	Hydraulic Conductivity	
							(gpd/ft^2)	(cm/s)
P-1	Pumping	57–67	2	130	126	NR	12.6	5.95×10^{-4}
S-12	Observation	4–9			ND	ND	ND	ND
D-3	Observation	58–68			377	0.00005	37.7	1.78×10^{-3}
P-2	Pumping	42–52	5	420	106	NR	10.6	5.00×10^{-4}
S-13	Observation	4–13			ND	ND	ND	ND
S-14	Observation	29–34			ND	ND	ND	ND
D-4	Observation	39–49			330	0.0002	33	1.56×10^{-3}

Source: Radian, 1989, Table 4-5 and 4-6
bgs = Below ground surface
gpm = Gallons per minute
gpd/ft = Gallons per day per foot
gpd/ft^2 = Gallons per day per square foot
cm/s = Centimeters per second
ND = Not determined
NR = Not reported

Table 3. PFAS Methods and Analytes
Page 1 of 2

Acronym(s) [a]	2013 UCMR3	2017 USAF	2017 BoR	2019 NMED	2019 DoH	2020 NMED	2020 USGS	2022 DBS&A
Source	*NMED, 2020*	*AFW, 2018 PF29*	*BOR, 2022 PF327*	*NMED, 2019 PF143d*	*NMED, 2019 PF143d*	*NMED, 2021 PF353*	*USGS, 2022*	*DBS&A (this report)*
EPA Test Method	*537*	*537 M*	*NR*	*537 M*	*537 M-ID*	*537 M-ID*	*NR*	*533 & 537*
PFBA					✓	✓	✓	✓
PFPeA					✓	✓	✓	✓
PFHxA		✓	✓	✓	✓	✓	✓	✓
PFHpA	✓	✓	✓	✓	✓	✓	✓	✓
PFOA	✓	✓	✓	✓	✓	✓	✓	✓
PFNA	✓	✓	✓	✓	✓	✓	✓	✓
PFDA		✓	✓	✓	✓	✓	✓	✓
PFUnA, PFUnDA		✓	✓	✓	✓	✓	✓	✓
PFDoA, PFDoDA		✓	✓	✓	✓	✓	✓	✓
PFTrDA, PFTriA, PFTrA		✓	✓	✓	✓	✓	✓	✓
PFTeDA, PFTreA, PFTeA		✓	✓	✓	✓	✓	✓	✓
PFBS	✓	✓	✓	✓	✓	✓	✓	✓
PFPeS						✓	✓	✓
PFHxS	✓	✓	✓	✓	✓	✓	✓	✓
PFHpS					✓	✓	✓	✓
PFOS	✓	✓	✓	✓	✓	✓	✓	✓
PFNS						✓	✓	
PFDS					✓	✓	✓	
PFOSA					✓	✓	✓	
4:2 FTS, 4:2 FTSA						✓	✓	✓
6:2 FTS, 6:2 FTSA		✓			✓	✓	✓	✓
8:2 FTS, 8:2 FTSA		✓			✓	✓	✓	✓
10:2 FTS, 10:2 FTSA						✓		
NMeFOSA						✓		
NEtFOSA						✓		
NMeFOSAA, MeFOSAA		✓	✓	✓	✓	✓	✓	✓
NEtFOSAA, EtFOSAA		✓	✓	✓	✓	✓	✓	✓
NMeFOSE						✓		

Notes are provided at the end of the table.

Table 3. PFAS Methods and Analytes
Page 2 of 2

Acronym(s) [a]	2013 UCMR3	2017 USAF	2017 BoR	2019 NMED	2019 DoH	2020 NMED	2020 USGS	2022 DBS&A
Source	*NMED, 2020*	*AFW, 2018 PF29*	*BOR, 2022 PF327*	*NMED, 2019 PF143d*	*NMED, 2019 PF143d*	*NMED, 2021 PF353*	*USGS, 2022*	*DBS&A (this report)*
EPA Test Method	*537*	*537 M*	*NR*	*537 M*	*537 M-ID*	*537 M-ID*	*NR*	*533 & 537*
NEtFOSE						✓		
HFPO-DA (Gen X)						✓	✓	✓
PFMPA								✓
PFMBA								✓
NFDHA								✓
11Cl-PF3OUdS							✓	✓
9Cl-PF3ONS							✓	✓
PFEESA								✓
ADONA (Gen X)						✓	✓	✓
F-53B Major						✓		
F-53B Minor						✓		

[a] Refer to Table 1 for list of PFAS analytes
UCMR3 (Third Unregulated Contaminant Rule)
M = Modified
ID = Isotope dilution
NR = Not reported

Table 4. PFAS in Water Samples Collected from City of Alamogordo Domestic Water System

Location ID [a]	Facility ID	Sample Point ID	Sample Date	Sample Type	Concentration (ng/L)					
					PFOA	PFOS	PFBS	PFHpA	PFHxS	PFNA
Alamo Canyon Treatment Plant	90070	SP133190701	12/16/2013	Surface water	<20	<40	<90	<10	<30	<20
Alamo Canyon Treatment Plant	90070	SP133190701	1/16/2014	Surface water	<20	<40	<90	<10	<30	<20
Alamo Canyon Treatment Plant	90070	SP133190701	4/17/2014	Surface water	<20	<40	<90	<10	<30	<20
Alamo Canyon Treatment Plant	90070	SP133190701	7/23/2014	Surface water	<20	<40	<90	<10	<30	<20
Green Tank Treatment Plant	90071	SP133190711	1/16/2014	Surface water	<20	<40	<90	<10	<30	<20
Green Tank Treatment Plant	90071	SP133190711	4/17/2014	Surface water	<20	<40	<90	<10	<30	<20
Green Tank Treatment Plant	90071	SP133190711	7/23/2014	Surface water	<20	<40	<90	<10	<30	<20
Golf Course Well	19077	SP133190771	10/24/2013	Groundwater	<20	<40	<90	<10	<30	<20
Golf Course Well	19077	SP133190771	4/17/2014	Groundwater	<20	<40	<90	<10	<30	<20
La Luz Treatment Plant	90069	SP133190691	10/24/2013	Surface water	<20	<40	<90	<10	<30	<20
La Luz Treatment Plant	90069	SP133190691	1/16/2014	Surface water	<20	<40	<90	<10	<30	<20
La Luz Treatment Plant	90069	SP133190691	4/17/2014	Surface water	<20	<40	<90	<10	<30	<20
La Luz Treatment Plant	90069	SP133190691	7/28/2014	Surface water	<20	<40	<90	<10	<30	<20
Prather Treatment Plant	19089	SP133190891	4/17/2014	Surface water	<20	<40	<90	<10	<30	<20
Prather Treatment Plant	19089	SP133190891	10/24/2014	Surface water	<20	<40	<90	<10	<30	<20

Source: Data obtained from NMED PFAS Data webpage; EPA released the UCMR 3 results in January 2017; NMED posted the data to its website on January 8, 2020.

[a] Location ID and location information based on Facility id and Sample Point id from New Mexico Drinking Water Watch website.

Refer to Table 1 for list of PFAS analytes

ng/L = Nanograms per liter

Table 5. PFAS in USAF Soil Samples from Holloman AFB
Page 1 of 2

Analyte	Concentration (ng/L)								
	Fire Training Area 31				Sewage Lagoons			Golf Course	Evaporation Pond 2
Location ID	*FT31-LM4*	*FT31-LM4*	*FT31-LM5*	*MW01004*	*MW02004*	*MW02005*	*MW02006*	*MW-3*	*MW05001*
Sample ID	*N01-GW-003*	*NFD-GW-003*	*N01-GW-001*	*N01-GW-002*	*N02-GW-001*	*N02-GW-002*	*N02-GW-003*	*N03-GW-001*	*N05-GW-001*
Sample Date	*11/6/2017*	*11/6/2017*	*11/6/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*
Sample Depth (feet)	*26.0-26.0*	*26.0-26.0*	*31.0-31.3*	*26.0-26.0*	*16.0-16.0*	*14.5-14.5*	*13.0-13.0*	*14.0-14.0*	*27.5-27.5*
Sample Type	*N*	*FD*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
PFHxA	30,300	25,300	672,000	817	1,020	775	3,520	598	96,700
PFHpA	4,560	3,790	66,100	<120	269	136	963	114	10,100 J
PFOA	6,090	5,110	254,000	746	115 J	146	854	89.1	26,600
PFNA	<800	<800	<8,000	<67	<67	<6.7	228	<12	<8,000
PFDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFUnA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFDoA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFTrDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFTeDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFBS	26,600	21,700	226,000	<120	378	301	732	286	27,700
PFHxS	88,300	71,900	859,000	1,220	791	729	6,690	1,470	264,000
PFOS	1,950 J	1,620 J	48,400	1,280	241	325	8,270	48	1,040,000
6:2 FTS	11,300	9,280	329,000	271 J	<330	46.5	1,700	54.6 J	115,000
8:2 FTS	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000

Notes are provided at the end of the table.

Table 5. PFAS in USAF Soil Samples from Holloman AFB
Page 2 of 2

Analyte	Concentration (ng/L)								
	Fire Training Area 31				Sewage Lagoons			Golf Course	Evaporation Pond 2
Location ID	*FT31-LM4*	*FT31-LM4*	*FT31-LM5*	*MW01004*	*MW02004*	*MW02005*	*MW02006*	*MW-3*	*MW05001*
Sample ID	*N01-GW-003*	*NFD-GW-003*	*N01-GW-001*	*N01-GW-002*	*N02-GW-001*	*N02-GW-002*	*N02-GW-003*	*N03-GW-001*	*N05-GW-001*
Sample Date	*11/6/2017*	*11/6/2017*	*11/6/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*	*11/5/2017*
Sample Depth (feet)	*26.0-26.0*	*26.0-26.0*	*31.0-31.3*	*26.0-26.0*	*16.0-16.0*	*14.5-14.5*	*13.0-13.0*	*14.0-14.0*	*27.5-27.5*
Sample Type	*N*	*FD*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
NMeFOSAA	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000
NEtFOSAA	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000
PFOS+PFOA	8,040	6,730	302,400	2,026	356	471	9,124	137.1	1,066,600

Source: AFW, 2018
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
N = Normal environmental sample
FD = Field duplicate
J = Reported concentration is considered an estimate

Table 6. PFAS in USAF Groundwater Samples from Holloman AFB
Page 1 of 2

Analyte	Concentration (ng/L)								
	Fire Training Area 31				Sewage Lagoons			Golf Course	Evap Pond 2
Location ID	FT31-LM4	FT31-LM4	FT31-LM5	MW01004	MW02004	MW02005	MW02006	MW-3	MW05001
Sample Date	11/6/2017	11/6/2017	11/6/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017
Sample depth (feet)	26.0-26.0	26.0-26.0	31.0-31.3	26.0-26.0	16.0-16.0	14.5-14.5	13.0-13.0	14.0-14.0	27.5-27.5
Sample Type	N	FD	N	N	N	N	N	N	N
PFHxA	30,300	25,300	672,000	817	1,020	775	3,520	598	96,700
PFHpA	4,560	3,790	66,100	<120	269	136	963	114	10,100 J
PFOA	6,090	5,110	254,000	746	115 J	146	854	89.1	26,600
PFNA	<800	<800	<8,000	<67	<67	<6.7	228	<12	<8,000
PFDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFUnA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFDoA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFTrDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFTeDA	<1,500	<1,500	<15,000	<120	<120	<12	<120	<23	<15,000
PFBS	26,600	21,700	226,000	<120	378	301	732	286	27,700
PFHxS	88,300	71,900	859,000	1,220	791	729	6,690	1,470	264,000
PFOS	1,950 J	1,620 J	48,400	1,280	241	325	8,270	48	1,040,000
6:2 FTS	11,300	9,280	329,000	271 J	<330	46.5	1,700	54.6 J	115,000

Source: AFW, 2018
Refer to Table 1 for analyte names.
ng/L = Nanograms per liter
N = Normal environmental sample
FD = Field duplicate sample
J = Concentration is below the level of quantification (LOQ) and is considered an estimate.

Table 6. PFAS in USAF Groundwater Samples from Holloman AFB
Page 2 of 2

Analyte	Concentration (ng/L)								
	Fire Training Area 31				Sewage Lagoons			Golf Course	Evap Pond 2
Location ID	FT31-LM4	FT31-LM4	FT31-LM5	MW01004	MW02004	MW02005	MW02006	MW-3	MW05001
Sample Date	11/6/2017	11/6/2017	11/6/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017
Sample depth (feet)	26.0-26.0	26.0-26.0	31.0-31.3	26.0-26.0	16.0-16.0	14.5-14.5	13.0-13.0	14.0-14.0	27.5-27.5
Sample Type	N	FD	N	N	N	N	N	N	N
8:2 FTS	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000
NMeFOSAA	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000
NEtFOSAA	<4,000	<4,000	<40,000	<330	<330	<33	<310	<62	<40,000
PFOS+PFOA	8,040	6,730	302,400	2,026	356	471	9124	137.1	1,066,600

Source: AFW, 2018
Refer to Table 1 for analyte names.
ng/L = Nanograms per liter
N = Normal environmental sample
FD = Field duplicate sample
J = Concentration is below the level of quantification (LOQ) and is considered an estimate.

Table 7. PFAS in Wastewater Effluent Samples from Holloman AFB

Analyte	Concentration (ng/L)			
	EF03003	EF03003	WWTP	WWTP
Sample Date	11/6/2017	11/6/2017	10/12/2021	10/12/2021
Sample Type	N	FD	N	N
Laboratory	Accutest	Accutest	Pace	Vista
PFHxA	229	224	630	603
PFHpA	60.2	51.4	100	101
PFOA	73.8	65.3	96	99.3
PFNA	6.48 J	5.97 J	<18	5.05
PFDA	<12	<12	<18	<1.48
PFUnA	<12	<12	<18	<1.48
PFDoA	<12	<12	<18	1.55 J
PFTrDA	<12	<12	<18	<1.48
PFTeDA	<12	<12	<18	<1.48
PFBS	89.6	95.4	64	66.4
PFHxS	602	541	440	377
PFOS	776	721	360	333
6:2 FTS	118	103	NT	NT
8:2 FTS	<33	<31	NT	NT
NMEFOSAA	<33	<31	<18	<1.48
NETFOSAA	<33	<31	<18	<1.48
HFPO-DA (Gen X)	NT	NT	<73	<1.48
11Cl-PF3OUdS	NT	NT	<18	<1.48
9Cl-PF3ONS	NT	NT	<18	<1.48
ADONA	NT	NT	<18	<1.48
PFOS+PFOA	849.8	786.3	456	432.3

Sources: AFW, 2018; Swift River/Versar, 2022
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
NT = Sample not tested for this analyte
J = Considered an estimate; detected above method detection limit, but below the quantitation level
N = Normal environmental sample
FD = Field duplicate sample

Table 8. PFAS in USAF Sediment Samples from Holloman AFB

Analyte	Concentration (µg/kg)					
	Sewage Lagoons	HAFB Oufall to Lake Holloman	Lagoon G Outfall to Lake Holloman		Golf Course Pond 1	Golf Course Pond 2
Location ID	SD/SW02007	SD/SW04001	SD/SW04002	SD/SW04002	SD/SW03001	SD/SW03002
Sample ID	N02-SD-001	N04-SD-001	N04-SD-002	NFD-SD-001	N03-SD-001	N03-SD-002
Sample Date	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017
Sample Depth (feet)	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5
Sample Type	N	N	N	FD	N	N
PFHxA	2.87 J	2.06 J	13.6	18.2	<3.4	<8.4
PFHpA	<3.4	<2.5	6.64	8.12	<3.4	<8.4
PFOA	<3.4	2.34 J	17.3	17.7	<3.4	<8.4
PFNA	<3.4	1.68 J	6.43	6.20	<3.4	<8.4
PFDA	<3.4	1.33 J	2.21 J	2.04 J	<3.4	<8.4
PFUnA	<3.4	<2.5	<2.2	<2.1	<3.4	<8.4
PFDoA	<3.4	<2.5	<2.2	<2.1	<3.4	<8.4
PFTrDA	<3.4	<2.5	<2.2	<2.1	<3.4	<8.4
PFTeDA	<3.4	<2.5	<2.2	<2.1	<3.4	<8.4
PFBS	<3.4	<2.5	2.58 J	3.40 J	<3.4	<8.4
PFHxS	8.13	11.9	163	172	3.20	19.9
PFOS	74.5	185	519	507	36.8	202
6:2 FTS	12.2	<10	6.69 J	8.54 J	<14	<3.4
8:2 FTS	<14	<10	<8.7	<8.5	<14	<3.4
NMEFOSAA	<14	<10	<8.7	<8.5	<14	<3.4
NETFOSAA	<14	<10	<8.7	<8.5	<14	<3.4
PFOS+PFOA	74.5	187.34	536.3	524.7	36.8	202

Source: AFW, 2018
Refer to Table 1 for list of PFAS analytes
µg/kg = Micrograms per kilogram
N = Normal environmental sample
FD = Field duplicate sample
J = Concentration is below the level of quantification (LOQ) and is considered an estimate.

Table 9. PFAS in USAF Surface Water Samples from Holloman AFB
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Analyte	Concentration (ng/L)					
AFFF Release Area	Sewage Lagoons	HAFB Outfall to Lake Holloman	Lagoon G Outfall to Lake Holloman		Golf Course Pond 1	Golf Course Pond 2
Location ID	SD/SW02007	SD/SW04001	SD/SW04002	SD/SW04002	SD/SW03001	SD/SW03002
Sample Date	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017
Sample Depth (feet)	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5
Sample Type	N	N	N	FD	N	N
PFHxA	3,160	229	979	1,150	337	539
PFHpA	881	54.2	286	332	84.9	130
PFOA	941	74.6	310	378	97	117
PFNA	44.2 J	<13	45.6 J	51.2 J	10.6 J	11.0 J
PFDA	<120	<25	<120	<120	<25	<25
PFUnA	<120	<25	<120	<120	<25	<25
PFDoA	<120	<25	<120	<120	<25	<25
PFTrDA	<120	<25	<120	<120	<25	<25
PFTeDA	<120	<25	<120	<120	<25	<25
PFBS	716	79.8	239	262	105	156
PFHxS	3,870	585	2740	3080	803	1200
PFOS	2,250	951	2,450	2,810	1,220	878
6:2 FTS	5,340	127	455	522	51.3 J	<67
8:2 FTS	<330	<67	<330	<330	<67	<67

Source: AFW, 2018
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
N = Normal environmental sample
FD = Field duplicate sample
J = Concentration is below the level of quantification (LOQ) and is considered an estimate.

Table 9. PFAS in USAF Surface Water Samples from Holloman AFB
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Analyte	Concentration (ng/L)					
AFFF Release Area	Sewage Lagoons	HAFB Outfall to Lake Holloman	Lagoon G Outfall to Lake Holloman		Golf Course Pond 1	Golf Course Pond 2
Location ID	SD/SW02007	SD/SW04001	SD/SW04002	SD/SW04002	SD/SW03001	SD/SW03002
Sample Date	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017
Sample Depth (feet)	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5	0.0–0.5
Sample Type	N	N	N	FD	N	N
NMEFOSAA	<330	<67	<330	<330	<67	<67
NETFOSAA	<330	<67	<330	<330	<67	<67
PFOS+PFOA	3,191	1,025.6	2,760	3,188	1,317	995

Source: AFW, 2018
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
N = Normal environmental sample
FD = Field duplicate sample
J = Concentration is below the level of quantification (LOQ) and is considered an estimate.

Table 10. PFAS in Groundwater Samples from Golf Course Monitor Wells

Analyte	Concentration (ng/L)																	
	GC-MW1	GC-MW1	GC-MW1A	GC-MW2	GC-MW2	GC-MW3	GC-MW3	GC-MW3	GC-MW3	GC-MW3	GC-MW3A	GC-MW3	GC-MW3	GC-MW3	GC-MW3A	GC-MW4	GC-MW4C	GC-MW4
Sample Date	12/17/2020	3/8/2021	3/8/2021	12/17/2020	3/8/2021	11/5/2017	12/17/2020	3/8/2021	7/21/2021	8/9/2021	8/9/2021	10/12/2021	10/12/2021	1/19/2022	1/19/2022	12/17/2020	12/17/2020	3/8/2021
Sample Type	NE	NE	FD	NE	NE	NE	NE	NE	NE	NE	FD	NE	NE	NE	FD	NE	FD	NE
Laboratory	Pace	Pace	Pace	Pace	Pace	Accutest	Pace	Pace	Pace	Pace	Pace	Pace	Vista	Pace	Pace	Pace	Pace	Pace
PFHxA	NT	NT	NT	NT	NT	598	NT	NT	680	NT	NT	920	840	650	730	NT	NT	NT
PFHpA	NT	NT	NT	NT	NT	114	NT	NT	150	NT	NT	200	261	150	160	NT	NT	NT
PFOA	3.5	<2.0	<2.0	<2.0	<2.0	89.1	42	30.8	61	78.5	87.1	76	90.7	67	71	7.5	7.1	3.6
PFNA	NT	NT	NT	NT	NT	<12	NT	NT	1.3 J	NT	NT	<36	1.32 J	1.4 J	1.7 J	NT	NT	NT
PFDA	NT	NT	NT	NT	NT	<23	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
PFUnDA	NT	NT	NT	NT	NT	<23	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
PFDoA	NT	NT	NT	NT	NT	<23	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
PFTrDA	NT	NT	NT	NT	NT	<23	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
PFTeDA	NT	NT	NT	NT	NT	<23	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
PFBS	NT	NT	NT	NT	NT	286	NT	NT	340	NT	NT	430	359	290	340	NT	NT	NT
PFHxS	18	11.4	10	68	29.8	1,470	920	773	1,000	1,580	1,790	1,700	1,300	1,200	1,400	36	27	17.8
PFOS	8.4	3.99	7.27	<1.9	<2.0	48	430	229	320	380	404	370	365	390	500	4.9	4.6	<2.0
6:2 FTS	NT	NT	NT	NT	NT	54.6 J	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
8:2 FTS	NT	NT	NT	NT	NT	<62	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MeFOSAA	NT	NT	NT	NT	NT	<62	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
EtFOSAA	NT	NT	NT	NT	NT	<62	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
HFPO-DA (Gen X)	NT	NT	NT	NT	NT	NT	NT	NT	<7.1	NT	NT	<150	<1.94	<8.2	<7.1	NT	NT	NT
11Cl-PF3OUdS	NT	NT	NT	NT	NT	NT	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
9Cl-PF3ONS	NT	NT	NT	NT	NT	NT	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT
ADONA	NT	NT	NT	NT	NT	NT	NT	NT	<1.8	NT	NT	<36	<1.94	<2.1	<1.8	NT	NT	NT

Sources: Swift River/Versar, 2021a, 2021b, 2021c, 2021d, and 2021e
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
NT = Sample not tested for this analyte
J = Analyte detected at concentration above method detection limit, but below the quantitation level and is considered an estimate
NE = Normal environmental sample
FD = Field duplicate sample

Table 11. Information on BGNDRF Brackish Water Wells

Well No.	OSE POD No.	Data Source	Date Completed	Well Depth (feet bgs)	Depth to Water at Completion (feet bgs)	Casing Diameter (inches)	Average TDS Concentration, 2016-2021 (mg/L)	Average Temperature, 2016-2021 (°C)
1 [a]	T 04428	1,2	11/1/2003	1,345	137	6.625	1,313.5	36.1
2	T 04428 S	1	11/4/2003	195	54	NA	5,353.6	23.5
3	T 04428 S-3	1,2	8/11/2005	225	65	NA	3,410.8	23.0
4A	T 04428 S-4	1	11/25/2003	215	60	NA	NA	NA
4B	T 00051 S-2	1	1/31/2008	185	58	10	3,976.0	22.6
NA	T 04448	2	4/9/2004	223	53	6.625	NA	NA

Sources: 1. New Mexico Office of the State Engineer (OSE), Point of Diversion (POD) Summary Reports
2. OSE Well Records

Total dissolved solids (TDS) and temperature from USBR, 2022 PF350

[a] Well 1 intersected bedrock at 1970 feet bgs

bgs = Below ground surface
mg/L = Milligrams per liter
NA = Not available or not applicable

Table 12. PFAS in Surface Water from BGNRDF Evaporation Ponds

Analyte	Concentration (ng/L)													
	BGNDRF Pond 1					BGNDRF Pond 2					BGNDRF Pond 3			
Sample Date	12/5/2017	6/24/2019	12/16/2019	11/2/2020	5/12/2021	12/5/2017	6/24/2019	12/16/2019	7/27/2020	11/3/2021	12/5/2017	6/24/2019	12/16/2019	11/3/2021
Sampled by	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR	USBR
PFHxA	16.0	NT	NT	NT	NT	6.8	NT	NT	NT	NT	18.0	NT	NT	NT
PFHpA	31.0	NT	NT	NT	NT	10	NT	NT	NT	NT	25.0	NT	NT	NT
PFOA	490	1,500	1,000	1,100	700	220	1,800	940	1,500	320	350	1,600	610	300
PFNA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFDA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFUnA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFDoA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFTrDA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFTeA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
PFBS	6.50	NT	NT	NT	NT	4.70	NT	NT	NT	NT	9.00	NT	NT	NT
PFHxS	66.0	NT	140	190	45.0	22.0	NT	130	140	37.0	80.0	NT	95.0	30.0
PFOS	27.0	25.0	49.0	59.0	23.0	17.0	41.0	51.0	43.0	68.0	36.0	50.0	57.0	44.0
NMeFOSAA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT
NEtFOSAA	ND	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND	NT	NT	NT

Source: USBR, 2022, Exhibit A
Refer to Table 1 for list of PFAS analytes
ng/L = Nanograms per liter
NT = Sample not tested for this analyte
ND = Analyte reported as not detected

Table 13. PFAS in Groundwater, BGNDRF
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Analyte	Concentration (ng/L)												
	BGNDRF Well 1							BGNDRF Well 2					
Sample Date	2/20/2019	6/25/2019	12/17/2019	6/29/2020	11/3/2020	5/12/2021	11/2/2021	2/20/2019	6/25/2019	12/17/2019	6/29/2020	11/3/2020	12/22/2021
Sampled by	NMDOH	USBR	USBR	USBR	USBR	USBR	USBR	NMDOH	USBR	USBR	USBR	USBR	USBR
PFBA	ND	NT	NT	NT	NT	NT	NT	11	NT	NT	NT	NT	NT
PFPeA	ND	NT	NT	NT	NT	NT	NT	5.4	NT	NT	NT	NT	NT
PFHxA	ND	NT	NT	NT	NT	NT	NT	6.3	NT	NT	NT	NT	NT
PFHpA	ND	NT	NT	NT	NT	NT	NT	5.8	NT	NT	NT	NT	NT
PFOA	ND	ND	ND	ND	ND	ND	ND	220	240	41.0	210	220	460
PFNT	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFDA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFUnt	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFDoA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFTriA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFTeA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFBS	ND	NT	NT	NT	NT	NT	NT	4.9	NT	NT	NT	NT	NT
PFHxS	ND	NT	ND	ND	ND	ND	ND	9.6	NT	ND	9.40	11.0	14.0
PFHpS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFOS	ND	ND	ND	ND	ND	ND	ND	16	16.0	7.60	18.0	24.0	40.0
PFDS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
PFOSA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
6:2 FTS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
8:2 FTS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
NMeFOSAA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT
NEtFOSAA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	NT

Source: NMED, 2019 ; USBR, 2022, Exhibit A
Refer to Table 1 for list of PFAS analytes.
New Mexico Department of Health (NMDOH) collected samples in February and April 2019; other samples were collected by USBR
NMDOH samples analyzed using EPA 537 modified with isotope dilution (M-ID)
ng/L = Nanograms per liter
ND = Not detected
NT = Not tested

Table 13. PFAS in Groundwater, BGNDRF
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Analyte	Concentration (ng/L)												
	BGNDRF Well 1							BGNDRF Well 2					
Sample Date	4/8/2019	6/25/2019	12/17/2019	6/29/2020	11/3/2020	5/12/2021	11/2/2021	4/8/2019	6/25/2019	12/17/2019	6/29/2020	11/3/2020	4/8/2019
Sampled by	NMDOH	USBR	USBR	USBR	USBR	USBR	USBR	NMDOH	USBR	USBR	USBR	USBR	NMDOH
PFBA	ND	NT	NT	NT	NT	NT	NT	3.5	NT	NT	NT	NT	4
PFPeA	ND	NT	NT	NT	NT	NT	NT	1.8	NT	NT	NT	NT	ND
PFHxA	ND	NT	NT	NT	NT	NT	NT	2.3	NT	NT	NT	NT	ND
PFHpA	ND	NT	NT	NT	NT	NT	NT	2.4	NT	NT	NT	NT	ND
PFOA	ND	ND	ND	ND	ND	ND	3.5	120	140	60	220	230	95
PFNT	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFDA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFUnt	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFDoA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFTriA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFTeA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFBS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFHxS	ND	NT	ND	ND	ND	ND	ND	5.3	NT	ND	8.60	6.40	4.6
PFHpS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFOS	ND	ND	ND	ND	ND	ND	ND	24	15.0	7.00	44.0	48	7.7
PFDS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
PFOSA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
6:2 FTS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
8:2 FTS	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
NMeFOSAA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND
NEtFOSAA	ND	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT	ND

Source: NMED, 2019 ; USBR, 2022, Exhibit A
Refer to Table 1 for list of PFAS analytes.
New Mexico Department of Health (NMDOH) collected samples in February and April 2019; other samples were collected by USBR
NMDOH samples analyzed using EPA 537 modified with isotope dilution (M-ID)
ng/L = Nanograms per liter
ND = Not detected
NT = Not tested

Table 14. PFAS in Groundwater Samples from Domestic Wells in the Alamogordo Area

	Concentration (ng/L)																			
Analyte	C-17a	C-17b	C-21a	C-21b	LD-1	LD-2	LD-3	LD-4	MV-1	MV-2	MV-3	MV-4	MV-5a	MV-5b	MV-6a	MV-6b	MV-7	S-36	Z-1	Z-950
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Sample Date	4/8/2019	4/8/2019	4/8/2019	4/8/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019	4/8/2019	2/20/2019	4/8/2019
PFBA	ND	ND	ND	ND	ND	ND	ND	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFPeA	ND	ND	ND	ND	ND	ND	ND	4.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxA	ND	ND	ND	ND	ND	ND	ND	2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHpA	ND	ND	ND	ND	ND	ND	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOA	ND	ND	ND	ND	33	8.0	18	64	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6	ND	3.4
PFNA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFDA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFUnA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFDoA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFTriA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFTeA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxS	ND	ND	ND	ND	3.3	ND	ND	4.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHpS	ND	ND	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOS	ND	ND	ND	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFDS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOSA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NMeFOSAA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NEtFOSAA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PFAS	0	0	0	0	40	8.0	18	83	0	0	0	0	0	0	0	0	0	3.6	0	3.4
PFOA + PFOS	0	0	0	0	33	8.0	18	68	0	0	0	0	0	0	0	0	0	3.6	0	3.4

Source: NMED, 2020b
Refer to Table 1 for list of PFAS analytes.
Analyses performed by Test America using EPA Method 537 modified with isotope dilution (M-ID).
ng/L = Nanograms per liter
NMDOH = New Mexico Department of Health
GW = Groundwater
ND = Analyte reported as not detected

Table 15. PFAS in NMDOH Groundwater Samples from BGNDRF

Analyte	Concentration (ng/L)				
	Well #1	Well #2 [a]	Well #3	Well #4 [b]	Well #5 [c]
Sample Date	2/20/2019	2/20/2019	4/8/2019	4/8/2019	4/8/2019
PFBA	ND	11	ND	3.5	4
PFPeA	ND	5.4	ND	1.8	ND
PFHxA	ND	6.3	ND	2.3	ND
PFHpA	ND	5.8	ND	2.4	ND
PFOA	ND	220	ND	120	95
PFNA	ND	ND	ND	ND	ND
PFDA	ND	ND	ND	ND	ND
PFUnA	ND	ND	ND	ND	ND
PFDoA	ND	ND	ND	ND	ND
PFTriA	ND	ND	ND	ND	ND
PFTeA	ND	ND	ND	ND	ND
PFBS	ND	4.9	ND	ND	ND
PFHxS	ND	9.6	ND	5.3	4.6
PFHpS	ND	ND	ND	ND	ND
PFOS	ND	16	ND	24	7.7
PFDS	ND	ND	ND	ND	ND
PFOSA	ND	ND	ND	ND	ND
6:2 FTS	ND	ND	ND	ND	ND
8:2 FTS	ND	ND	ND	ND	ND
NMeFOSAA	ND	ND	ND	ND	ND
NEtFOSAA	ND	ND	ND	ND	ND
Total PFAS	0	279	0	159.3	111.3
PFOA + PFOS	0	236	0	144	102.7

Source: NMED, 2020b
Refer to Table 1 for list of PFAS analytes.
Analyses performed by Test America using EPA Method 537 modified with isotope dilution (M-ID).
[a] BIA (2022 PF327) reports that this sample was collected at Well 2 storage tank.
[b] BIA (2022 PF327) reports this sample was collected from the pump at Well 2.
[c] BIA (2022 PF327) reports that this samples was collected from the pump at Well 4.
ng/L = Nanograms per liter
BGNDRF = Brackish Groundwater National Desalination Research Facility
NMDOH = New Mexico Department of Health
ND = Analyte reported as not detected

Table 16. PFAS in NMDOH Water Samples from Public Drinking Water Supplies in Alamogordo Area

Analyte	Concentration (ng/L)						
	Alamogordo Prather Treatment Plant	Boles Acres Treatment Unit 1 Entry Point	Boles Acres Treatment Unit 2 Entry Point	Boles Acres Treatment Unit 4 Entry Point	Boles Acres Treatment Unit 5 Entry Point	Holloman AFB Chlorination Station EP	Dollar General Boles Acres Well #1
Sample Date	3/5/2019	3/5/2019	3/5/2019	3/5/2019	3/5/2019	3/5/2019	3/6/2019
PFHxA	ND	ND	ND	ND	ND	ND	ND
PFHpA	ND	ND	ND	ND	ND	ND	ND
PFOA	ND	ND	ND	ND	ND	ND	ND
PFNA	ND	ND	ND	ND	ND	ND	ND
PFDA	ND	ND	ND	ND	ND	ND	ND
PFUnA	ND	ND	ND	ND	ND	ND	ND
PFDoA	ND	ND	ND	ND	ND	ND	ND
PFTriA	ND	ND	ND	ND	ND	ND	ND
PFTeA	ND	ND	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	ND	ND	ND	ND
PFHxS	ND	ND	ND	ND	ND	ND	ND
PFOS	ND	ND	ND	ND	ND	ND	ND
NMeFOSAA	ND	ND	ND	ND	ND	ND	ND
NEtFOSAA	ND	ND	ND	ND	ND	ND	ND
Total PFAS	0	0	0	0	0	0	0
PFOA + PFOS	0	0	0	0	0	0	0

Source: NMED, 2020b
Refer to Table 1 for list of PFAS analytes
Analyses performed by Test America using EPA method 537 modified with isotope dilution (M-ID)
ng/L = Nanograms per liter
ND = Analyte reported as not detected

Table 17. PFAS in NMDOH Groundwater Samples from Monitor Wells at White Sands National Monument

Analyte	Concentration (ng/L)				
	WS1	WS1 Dup	WS2	WS3	WS4
Sample Date	2/20/2019	2/20/2019	2/20/2019	2/20/2019	2/20/2019
PFBA	ND	ND	ND	16	ND
PFPeA	ND	ND	ND	ND	ND
PFHxA	ND	ND	ND	ND	ND
PFHpA	ND	ND	ND	ND	ND
PFOA	ND	ND	ND	ND	ND
PFNA	ND	ND	ND	ND	ND
PFDA	ND	ND	ND	ND	ND
PFUnA	ND	ND	ND	ND	ND
PFDoA	ND	ND	ND	ND	ND
PFTriA	ND	ND	ND	ND	ND
PFTeA	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	5.8	ND
PFHxS	ND	ND	ND	3.6	ND
PFHpS	ND	ND	ND	ND	ND
PFOS	ND	ND	ND	ND	ND
PFDS	ND	ND	ND	ND	ND
PFOSA	ND	ND	ND	ND	ND
6:2 FTS	ND	ND	ND	ND	ND
8:2 FTS	ND	ND	ND	ND	ND
NMeFOSAA	ND	ND	ND	ND	ND
NEtFOSAA	ND	ND	ND	ND	ND
Total PFAS	0	0	0	25.4	0
PFOA + PFOS	0	0	0	0	0

Source: NMED, 2020b
Refer to Table 1 for list of PFAS analytes.
Analyses performed by Test America using EPA Method 537 modified with isotope dilution (M-ID).
ng/L = Nanograms per liter
NMDOH = New Mexico Department of Health
ND = Analyte reported as not detected

Table 18. PFAS in NMDOH Surface Water Samples from Lake Holloman

Analyte	Concentration (ng/L)		
	Lake Holloman southeast side #1	Lake Holloman central east side #2	Lake Holloman northeast side #3
Sample Date	4/8/2019	4/8/2019	4/8/2019
PFBA	9,300	9,500	9,500
PFPeA	24,000	22,000	25,000
PFHxA	28,000	32,000	31,000
PFHpA	3,500	3,900	3,000
PFOA	1,600	1,300	990
PFNA	130	95	35
PFDA	ND	ND	ND
PFUnA	ND	ND	ND
PFDoA	ND	ND	ND
PFTriA	ND	ND	ND
PFTeA	ND	ND	ND
PFBS	5,700	5,600	5,900
PFHxS	16,000	15,000	14,000
PFHpS	280	200	100
PFOS	5,900	4,500	1,700
PFDS	ND	ND	ND
PFOSA	ND	ND	ND
6:2 FTS	8,700	7,900	7,500
8:2 FTS	ND	ND	ND
NMeFOSAA	ND	ND	ND
NEtFOSAA	ND	ND	ND
Total PFAS	103,110	101,995	98,725
PFOA + PFOS	7,500	5,800	2,690

Source: NMED, 2020b
Refer to Table 1 for list of PFAS analytes.
Samples analyzed by Test America using EPA Method 537 modified with isotope dilution (M-ID).
ng/L = Nanograms per liter
NMDOH = New Mexico Department of Health
ND = Analyte reported as not detected

Table 19. PFAS in Selected Groundwater Samples from Alamogordo PFAS Site
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Analyte	Concentration (ng/L)			
	DPMW-1	DPMW-2	DPMW-3	BGNDRF-2
Sample Date	10/27/2020	10/27/2020	10/29/2020	10/27/2020
Sample By	NMED	NMED	NMED	NMED
PFBA	8.4	5.8	<4.4	11
PFPeA	2.4	3.2	<1.8	6.0
PFHxA	3.7	4.7	<1.8	7.6
PFHpA	1.5 J	3.2	<1.8	6.1
PFOA	110	220	8.0	290
PFNA	<1.9	0.45 J	<1.8	1.2 J
PFDA	<1.9	<1.9	<1.8	0.64 J
PFUnA	<1.9	<1.9	<1.8	<1.9
PFDoA	<1.9	<1.9	<1.8	<1.9
PFTriA	<1.9	<1.9	<1.8	<1.9
PFTeA	<1.9	<1.9	<1.8	<1.9
PFBS	1.8	2.2	0.42	3.6
PFPeS	1.6 J	1.6 J	<1.8	2.3
PFHxS	5.5	8.2	0.59 J	12
PFHpS	<1.9	0.48 J	<1.8	0.69 J
PFOS	3.5	8.1	0.91	22
PFNS	<1.9	<1.9	<1.8	<1.9
PFDS	<1.9	<1.9	<1.8	<1.9
FOSA	1.2 J	<1.9	<1.8	5.6
NEtFOSA	<1.9	<1.9	<1.8	<1.9
NMeFOSA	<1.9	<1.9	<1.8	<1.9
NMeFOSAA	<4.9	<4.7	<4.4	<4.7
NEtFOSAA	<4.9	<4.7	<4.4	<4.7
NMeFOSE	<3.9	<3.7	<3.5	<3.8
NEtFOSE	<1.9	<1.9	<1.8	<1.9
4:02 FTS	<1.9	<1.9	<1.8	<1.9
6:02 FTS	<4.9	<4.7	<4.4	<4.7
8:02 FTS	<1.9	<1.9	<1.8	<1.9
10:02 FTS	<1.9	<1.9	<1.8	<1.9

Notes are provided at the end of the table

Table 19. PFAS in Selected Groundwater Samples from Alamogordo PFAS Site
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Analyte	Concentration (ng/L)			
	DPMW-1	DPMW-2	DPMW-3	BGNDRF-2
Sample Date	10/27/2020	10/27/2020	10/29/2020	10/27/2020
Sample By	NMED	NMED	NMED	NMED
ADONA	<1.9	<1.9	<1.8	<1.9
HFPO-DA Gen X	<3.9	<3.7	<3.5	<3.8
F-53B Major	<1.9	<1.9	<1.8	<1.9
F-53B Minor	<1.9	<1.9	<1.8	<1.9
Total PFAS	139.6	257.93	9.92	368.73

Source: Eurofins, 2020
Refer to Table 1 for list of PFAS analytes.
ng/L = Nanograms per liter
NMED = New Mexico Environment Department
J = Concentration is considered an estimate

Table 20. PFAS in USGS Surface Water Samples
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Analyte	Concentration (ng/L)					
	Alamo Canyon Springs	Caballero Canyon Springs	Crockett Springs	Gordon Canyon Springs	Lower Maruche Infiltration Gallery	Lower Maruche Infiltration Gallery
USGS Site ID	325114105500401	325234105501101	330057105505601	324948105492601	325954105501201	325954105501201
Sample Date	5/26/2021	5/25/2021	4/30/2021	5/25/2021	4/29/2021 [a]	4/29/2021 [b]
PFBA	<4.0	<4.0	<4.0	<4.0	<4.0	<3.7
PFPeA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFHxA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFHpA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFOA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFNA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFDA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFUnDA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFDoDA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFTrDA	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFTeDA	<2.0	<2.0	<2.0	<2.0	<2.0	<9.3
PFBS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFPeS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFHxS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFHpS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFOS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFNS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9
PFDS	<2.0	<2.0	<2.0	<2.0	<2.0	<1.9

Notes are provided at the end of the table.

Table 20. PFAS in USGS Surface Water Samples
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Analyte	Concentration (ng/L)					
	Alamo Canyon Springs	Caballero Canyon Springs	Crockett Springs	Gordon Canyon Springs	Lower Maruche Infiltration Gallery	Lower Maruche Infiltration Gallery
USGS Site ID	325114105500401	325234105501101	330057105505601	324948105492601	325954105501201	325954105501201
Sample Date	5/26/2021	5/25/2021	4/30/2021	5/25/2021	4/29/2021 [a]	4/29/2021 [b]
PFOSA	<4.0	<4.0	<4.0	<4.0	<4.0	<3.7
4:2 FTS	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4
6:2 FTS	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4
8:2 FTS	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4
N-MeFOSAA	<4.0	<4.0	<4.0	<4.0	<4.0	<3.7
N-EtFOSAA	<4.0	<4.0	<4.0	<4.0	<4.0	<3.7
HFPO-DA	<4.0	<4.0	<4.0	<4.0	<4.0	<3.7
11CL-PF3OUdS	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4
9Cl-PF3ONS	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4
ADONA	<8.0	<8.0	<8.0	<8.0	<8.0	<7.4

Notes are provided at the end of the table.

Table 20. PFAS in USGS Surface Water Samples
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Analyte	Concentration (ng/L)					
	Lower Maruche Infiltration Gallery	Lower Springer Springs	Reservoirs 1-3	Upper Maruche Springs	Upper Springer Infiltration Gallery	Fresnal Canyon Intake
USGS Site ID	325954105501201	325901105492301	325813105560301	325942105501901	325825105541201	325848105554701
Sample Date	4/29/2021 [c]	4/30/2021	2/10/2021	4/29/2021	4/30/2021	12/30/2020
PFBA	<4.0	<3.6	<4.0	<3.7	<3.6	<5.0
PFPeA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFHxA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFHpA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFOA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFNA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFDA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFUnDA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFDoDA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFTrDA	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFTeDA	<2.0	<1.8	<10	<1.9	<1.8	<2.5
PFBS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFPeS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFHxS	<2.0	2.5	1.3	<1.9	2.7	1.5
PFHpS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFOS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFNS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5
PFDS	<2.0	<1.8	<2.0	<1.9	<1.8	<2.5

Notes are provided at the end of the table.

Table 20. PFAS in USGS Surface Water Samples
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Analyte	Concentration (ng/L)					
	Lower Maruche Infiltration Gallery	Lower Springer Springs	Reservoirs 1-3	Upper Maruche Springs	Upper Springer Infiltration Gallery	Fresnal Canyon Intake
USGS Site ID	325954105501201	325901105492301	325813105560301	325942105501901	325825105541201	325848105554701
Sample Date	4/29/2021 [c]	4/30/2021	2/10/2021	4/29/2021	4/30/2021	12/30/2020
PFOSA	<4.0	<3.6	<4.0	<3.7	<3.6	<5.0
4:2 FTS	<8.0	<7.1	<8.0	<7.4	<7.1	<10
6:2 FTS	<8.0	<7.1	<8.0	<7.4	<7.1	<10
8:2 FTS	<8.0	<7.1	<8.0	<7.4	<7.1	<10
N-MeFOSAA	<4.0	<3.6	<4.0	<3.7	<3.6	<5.0
N-EtFOSAA	<4.0	<3.6	<4.0	<3.7	<3.6	<5.0
HFPO-DA	<4.0	<3.6	<4.0	<3.7	<3.6	<5.0
11CL-PF3OUdS	<8.0	<7.1	<8.0	<7.4	<7.1	<10
9Cl-PF3ONS	<8.0	<7.1	<8.0	<7.4	<7.1	<10
ADONA	<8.0	<7.1	<8.0	<7.4	<7.1	<10

Sample location identifiers, coordinates, and preliminary results for Statewide PFAS Study downloaded from NMED PFAS Data webpage, accessed March 27, 2022
All chemistry data downloaded from USGS National Water Information System (NWIS), accessed April 5, 2022
Refer to Table 1 for list of PFAS analyes.
[a] Sample collected at 10:30 a.m.
[b] Sample collected at 11:30 a.m.
[c] Sample collected at 12:30 p.m.
ng/L = Nanograms per liter

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Alamo Canyon Springs	Caballero Canyon Springs	Crockett Springs	Fresnal Canyon Diversion	Fresnal Canyon Springs	Fresnal Canyon Springs	Lower Maruche Infiltration Gallery
USGS Site ID		325114105500401	325234105501101	330057105505601	324948105492601	325954105501201	325954105501201	325954105501201
Sample Date		5/26/2021	5/25/2021	4/30/2021	5/25/2021	4/29/2021	4/29/2021	4/29/2021
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Temperature	°C	11.5	12.2	14.5	10.4	12.8	10.6	13.1
Specific conductance (field) @ 25°C	µS/cm	858	909	1,570	613	1,420	1,530	1,290
Specific conductance (lab) @ 25°C	µS/cm	816	914	1,560	587	1,390	1,560	1,410
Dissolved oxygen	mg/L	4.1	8.1	8.3	8.4	7.2	2.4	6.3
pH (field)	s.u.	7.1	8.0	7.5	8.2	7.1	7.3	7.1
pH (lab)	s.u.	8.1	8.1	8.1	8.2	8.1	8.1	8.0
Hydrogen ion (calculated)	mg/L	0.00008	0.00001	0.00003	0.00001	0.00008	0.00005	0.00009
Carbon dioxide	mg/L	50	4.6	17	3.0	44	28	48
Alkalinity as $CaCO_3$ (field)	mg/L	302	258	259	251	278	291	283
Carbonate (field)	mg/L	0.1	0.3	0.7	0.5	0.2	0.5	0.2
Bicarbonate (field)	mg/L	368	314	314	305	338	354	345
ANC as $CaCO_3$, fixed end point (lab)	mg/L	309	263	218	265	257	293	270
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite-N	mg/L	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Nitrate-N	mg/L	0.305	0.352	0.244	0.525	0.219	<0.040	0.188
Nitrate+nitrite-N	mg/L	0.305	0.352	0.244	0.528	0.219	<0.040	0.188
Ammonia	mg/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Nitrate	mg/L	1.35	1.56	1.08	2.32	0.969	<0.177	0.833
Nitrite as NO_2	mg/L	<0.003	<0.003	<0.003	0.01	<0.003	<0.003	<0.003
Organic carbon	mg/L	0.65	0.56	0.55	0.67	0.69	5.06	0.64
Hardness as $CaCO_3$	mg/L	479	492	843	346	682	744	694
Noncarbonate hardness	mg/L	177	234	584	96	404	453	410
Calcium	mg/L	144	141	243	102	199	212	203
Magnesium	mg/L	29.2	34.2	57.2	22.3	44.9	52.2	45.6
Orthophosphate	mg/L	<0.012	<0.012	<0.012	<0.012	0.014	<0.012	0.013
Orthophosphate as P	mg/L	<0.004	<0.004	<0.004	<0.004	0.005	<0.004	0.004
Sodium	mg/L	12.8	25.4	54.1	10.1	66.1	77	67
Sodium absorption ratio	mg/L	0.26	0.5	0.81	0.24	1.1	1.23	1.11
Sodium fraction of cations (calculated)	%	6.0	10	12	6.0	17	18	17

Notes are provided at the end of the table.

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Alamo Canyon Springs	Caballero Canyon Springs	Crockett Springs	Fresnal Canyon Diversion	Fresnal Canyon Springs	Fresnal Canyon Springs	Lower Maruche Infiltration Gallery
USGS Site ID		325114105500401	325234105501101	330057105505601	324948105492601	325954105501201	325954105501201	325954105501201
Sample Date		5/26/2021	5/25/2021	4/30/2021	5/25/2021	4/29/2021	4/29/2021	4/29/2021
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Potassium	mg/L	0.61	0.78	1.22	0.60	0.99	2.16	1.12
Chloride	mg/L	15.0	30.3	77.1	11.5	104	124	103
Sulfate	mg/L	162	239	586	89.2	386	437	382
Fluoride	mg/L	0.15	0.19	0.38	0.16	0.21	0.26	0.25
Aluminum	µg/L	<9	<9	<15	<9	<15	<6	<6
Antimony	µg/L	<0.060	<0.060	<0.120	<0.060	<0.120	<0.120	<0.120
Arsenic	µg/L	<0.30	<0.30	<0.20	0.32	<0.50	0.29	<0.20
Barium	µg/L	33.0	25.3	12.7	30.6	22.4	24.5	22.4
Beryllium	µg/L	<0.010	<0.010	<0.050	<0.010	<0.020	<0.020	<0.020
Boron	µg/L	24	28	66	15	52	59	54
Cadmium	µg/L	<0.030	<0.030	<0.060	<0.030	<0.060	<0.060	<0.060
Chromium	µg/L	<1.5	<1.5	<1.0	<0.50	<2.5	<1.0	<1.0
Copper	µg/L	<1.2	<1.2	<0.80	<0.40	<2.0	<0.80	<0.80
Iron	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	35.1	<5.0
Lead	µg/L	<0.020	<0.020	<0.040	<0.020	<0.100	<0.040	<0.060
Manganese	µg/L	4.43	<0.20	0.40	<0.20	0.52	14.7	0.40
Molybdenum	µg/L	0.505	0.514	0.933	0.586	0.630	0.480	0.638
Nickel	µg/L	<0.60	<0.60	<0.40	<0.60	<1.0	0.56	<0.40
Selenium	µg/L	0.69	0.92	0.88	0.57	0.52	0.17	0.57
Silver	µg/L	<1.00	<1.00	<2.00	<1.00	<2.00	<2.00	<2.00
Uranium	µg/L	2.30	1.56	1.73	1.39	1.83	1.25	1.83
Vanadium	µg/L	<0.6	1.2	0.9	1.2	1.2	<0.6	1.2
Zinc	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	<2.0
Tritium	pCi/L	4.12	2.88	nt	4.02	2.76	NT	NT
TDS dried at 180°C	mg/L	592	667	1260	414	1020	1140	1,040
TDS sum of constituents (calculated)	mg/L	546	627	1180	388	969	1080	973
TDS (calculated)	tons/acre	0.81	0.91	1.72	0.56	1.39	1.55	72.2
Carbon-14	% Modern	NT	NT	52.62	NT	72.31	81.38	0.16
Carbon-14 counting error	% Modern	NT	NT	0.16	NT	0.15	0.19	-10.49

Notes are provided at the end of the table.

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Alamo Canyon Springs	Caballero Canyon Springs	Crockett Springs	Fresnal Canyon Diversion	Fresnal Canyon Springs	Fresnal Canyon Springs	Lower Maruche Infiltration Gallery
USGS Site ID		325114105500401	325234105501101	330057105505601	324948105492601	325954105501201	325954105501201	325954105501201
Sample Date		5/26/2021	5/25/2021	4/30/2021	5/25/2021	4/29/2021	4/29/2021	4/29/2021
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
delta C-13/C-12	per mil	NT	NT	-7.97	NT	-10.37	-10.19	-66.5
delta H-2/H-1	per mil	-69.0	-69.1	-66.9	-69.0	-67.7	-62.2	-9.76
delta O-18/O-16	per mil	-10.16	-10.00	-9.71	-10.09	-9.67	-8.25	

Notes are provided at the end of the table.

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Lower Springer Springs	Reservoirs 1-3	Upper Maruche Springs	Upper Springer Infiltration Gallery	Fresnal Canyon Intake
USGS Site ID		325901105492301	325813105560301	325942105501901	325825105541201	325848105554701
Sample Date		4/30/2021	2/10/2021	4/29/2021	4/30/2021	12/30/2020
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Temperature	°C	12.9	7.5	13.1	12.6	9.1
Specific conductance (field) @ 25°C	µS/cm	2,530	1,540	1,250	2,150	1,430
Specific conductance (lab) @ 25°C	µS/cm	2,470	1,530	1,280	2,120	1,510
Dissolved oxygen	mg/L	6.5	9.2	8.3	8.1	9.8
pH (field)	s.u.	7.1	7.5	7.2	7.2	7.5
pH (lab)	s.u.	8.0	8.3	8.2	8.2	8.2
Hydrogen ion (calculated)	mg/L	0.00009	0.00003	0.00007	0.00006	0.00003
Carbon dioxide	mg/L	52	15	39	38	15
Alkalinity as $CaCO_3$ (field)	mg/L	303	270	285	303	270
Carbonate (field)	mg/L	0.3	0.9	0.3	0.4	0.5
Bicarbonate (field)	mg/L	369	328	347	369	329
ANC as $CaCO_3$, fixed end point (lab)	mg/L	278	234	285	262	196
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite-N	mg/L	< 0.001	<0.001	<0.001	<0.001	<0.001
Nitrate-N	mg/L	0.575	0.376	0.389	0.502	0.340
Nitrate+nitrite-N	mg/L	0.575	0.376	0.389	0.502	0.340
Ammonia	mg/L	<0.026	<0.026	<0.026	<0.026	<0.026
Nitrate	mg/L	2.55	1.66	1.72	2.22	1.50
Nitrite as NO_2	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Organic carbon	mg/L	0.61	1.06	0.81	0.61	1.36
Hardness as $CaCO_3$	mg/L	695	615	655	592	593
Noncarbonate hardness	mg/L	392	344	370	289	322
Calcium	mg/L	203	178	192	173	170
Magnesium	mg/L	45.8	41.6	42.3	38.9	40.5
Orthophosphate	mg/L	0.021	<0.012	0.012	0.014	<0.012
Orthophosphate as P	mg/L	0.007	<0.004	0.004	0.005	<0.004
Sodium	mg/L	264	102	56	223	96.7
Sodium absorption ratio	mg/L	4.37	1.80	0.95	3.98	1.73
Sodium fraction of cations (calculated)	%	45	27	16	45	26

Notes are provided at the end of the table.

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Lower Springer Springs	Reservoirs 1-3	Upper Maruche Springs	Upper Springer Infiltration Gallery	Fresnal Canyon Intake
USGS Site ID		325901105492301	325813105560301	325942105501901	325825105541201	325848105554701
Sample Date		4/30/2021	2/10/2021	4/29/2021	4/30/2021	12/30/2020
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Potassium	mg/L	0.99	1.00	1.07	0.8	0.94
Chloride	mg/L	450	166	88.9	375	154
Sulfate	mg/L	401	327	320	298	310
Fluoride	mg/L	0.23	0.25	0.25	0.21	0.18
Aluminum	µg/L	<9	<6	<6	<9	<6
Antimony	µg/L	<0.180	<0.120	<0.120	<0.180	<0.120
Arsenic	µg/L	<0.30	0.23	<0.20	<0.30	0.21
Barium	µg/L	25.8	23.8	21.3	25.6	24.8
Beryllium	µg/L	<0.030	<0.020	<0.020	<0.030	<0.020
Boron	µg/L	58	47	48	47	47
Cadmium	µg/L	<0.090	<0.060	<0.060	<0.090	<0.060
Chromium	µg/L	<1.5	<1.0	<1.0	<1.5	<1.0
Copper	µg/L	<1.2	4.4	58.3	<1.2	1.4
Iron	µg/L	<10.0	<5.0	<5.0	<10.0	<5.0
Lead	µg/L	<0.060	0.968	3.83	<0.060	0.116
Manganese	µg/L	<0.40	1.96	0.88	3.67	4.66
Molybdenum	µg/L	0.736	0.792	0.618	0.693	0.835
Nickel	µg/L	<0.60	<0.40	<0.40	<0.60	0.40
Selenium	µg/L	0.75	0.58	0.66	0.72	0.54
Silver	µg/L	<3.00	<2.00	<2.00	<3.00	<2.00
Uranium	µg/L	2.13	2.90	1.69	1.47	2.98
Vanadium	µg/L	<1.2	<0.6	1.3	<1.2	0.6
Zinc	µg/L	<4.0	12.9	<2.0	<4.0	50.8
Tritium	pCi/L	3.11	3.40	2.86	3.20	3.45
TDS dried at 180°C	mg/L	1,610	1,030	928	1,360	886
TDS sum of constituents (calculated)	mg/L	1,550	981	874	1,290	936
TDS (calculated)	tons/acre	62.11	NT	66.26	63.22	73.05
Carbon-14	% Modern	0.13	NT	0.18	0.21	0.16
Carbon-14 counting error	% Modern	-9.34	NT	-9.26	-9.15	-8.64

Notes are provided at the end of the table.

Table 21. General Chemistry of USGS Surface Water Samples
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Analyte	Units	Lower Springer Springs	Reservoirs 1-3	Upper Maruche Springs	Upper Springer Infiltration Gallery	Fresnal Canyon Intake
USGS Site ID		325901105492301	325813105560301	325942105501901	325825105541201	325848105554701
Sample Date		4/30/2021	2/10/2021	4/29/2021	4/30/2021	12/30/2020
Sampled by		USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
delta C-13/C-12	per mil	-66.6	-66.6	-65.4	-66.4	-66.6
delta H-2/H-1	per mil	-9.74	-9.86	-9.77	-9.79	-9.73
delta O-18/O-16	per mil					

Source: NMED, 2021b
NA = Analysis did not include this parameter
µS/cm = MicroSiemens per centimeter
s.u. = Standard units
mg/L = Milligrams per liter
µg/L = Micrograms per liter
pCi/L = Picograms per liter
T.U. = Tritium units (1 T.U. = 3.22 pCi/L)
ANC = Acid neutralizing capacity

Table 22. PFAS in USGS Groundwater Samples
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Analyte	Concentration (ng/L)											
Location Name	*Golf Course Well*	*Prather 1 North*	*Prather 1 North*	*Prather 2 South*	*Prather 2 South*	*Snake Tank Well 5*	*ADWS Well 2*	*ADWS Well 3*	*ADWS Well 4*	*ADWS Well 4*	*ADWS Well 5*	*ADWS Well 6*
Sample Date	*8/16/2021*	*9/17/2020*	*4/15/2021*	*9/18/2020*	*4/15/2021*	*1/27/2021*	*2/9/2021*	*1/27/2021*	*9/17/2020*	*2/10/2021*	*1/27/2021*	*5/25/2021*
PFBA	<4.0	<4.3	<3.7	<4.0	<3.7	<4.5	<3.7	<4.3	<3.8	<3.7	<4.2	<3.6
PFPeA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFHxA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFHpA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFOA	8	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFNA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFDA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFUnDA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFDoDA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<9.3	<2.2	<1.9	<1.9	<2.1	<1.8
PFTrDA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<9.3	<2.2	<1.9	<1.9	<2.1	<1.8
PFTeDA	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<9.3	<2.2	<1.9	<1.9	<2.1	<1.8
PFBS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFPeS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFHxS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFHpS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFOS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFNS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFDS	<2.0	<2.2	<1.9	<2.0	<1.9	<2.3	<1.9	<2.2	<1.9	<1.9	<2.1	<1.8
PFOSA	<4.0	<4.3	<3.7	<4.0	<3.7	<4.5	<3.7	<4.3	<3.8	<3.7	<4.2	<3.6
4:2 FTS	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<7.4	<8.7	<7.7	<7.4	<8.3	<7.1
6:2 FTS	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<7.4	<8.7	11	<7.4	<8.3	<7.1
8:2 FTS	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<7.4	<8.7	<7.7	<7.4	<8.3	<7.1
N-MeFOSAA	<4.0	<4.3	<3.7	<4.0	<3.7	<4.5	<3.7	<4.3	<3.8	<3.7	<4.2	<3.6
N-EtFOSAA	<4.0	<4.3	<3.7	<4.0	<3.7	<4.5	<3.7	<4.3	<3.8	<3.7	<4.2	<3.6
HFPO-DA	<4	<11	<3.7	<10	<3.7	<4.5	<3.7	<4.3	<9.6	<3.7	<4.2	<3.6
11CL-PF3OUdS	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<37	<8.7	<7.7	<7.4	<8.3	<7.1
9Cl-PF3ONS	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<7.4	<8.7	<7.7	<7.4	<8.3	<7.1
ADONA	<8.0	<8.7	<7.4	<8.0	<7.4	<9.1	<7.4	<8.7	<7.7	<7.4	<8.3	<7.1

Sample location identifiers, coordinates, and preliminary results for Statewide PFAS Study downloaded from NMED PFAS Data webpage, accessed March 27, 2022
All chemistry data downloaded from USGS National Water Information System (NWIS), accessed April 5, 2022; Refer to Table 1 for list of PFAS analytes.
ADWS = Alamogordo Drinking Water System

ng/L = Nanograms per liter
< = Compound not detected at the concentration posted

Table 22. PFAS in USGS Groundwater Samples
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Analyte	Concentration (ng/L)											
Location Name	*ADWS Well 7*	*ADWS Well 8*	*Boles Well 1*	*Boles Well 2*	*Boles Well 4*	*Boles Well 5*	*Dungan Well 1*	*Enchanted Well 1*	*La Luz Well 1*	*La Luz Well 2*	*La Luz Well 3*	*La Luz Well 4*
Sample Date	*1/27/2021*	*12/22/2020*	*8/17/2021*	*11/5/2020*	*11/5/2020*	*2/11/2021*	*1/27/2021*	*12/30/2020*	*12/30/2020*	*12/29/2020*	*12/30/2020*	*2/9/2021*
PFBA	<3.7	<4.0	<3.7	<3.7	<3.6	<3.7	<3.7	<4.2	<3.8	<3.8	<4.0	<4.0
PFPeA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFHxA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFHpA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFOA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFNA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFDA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFUnDA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFDoDA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFTrDA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFTeDA	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFBS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFPeS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFHxS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFHpS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFOS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFNS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFDS	<1.9	<2.0	<1.9	<1.9	<1.8	<1.9	<1.9	<2.1	<1.9	<1.9	<2.0	<2.0
PFOSA	<3.7	<4.0	<3.7	<3.7	<3.6	<3.7	<3.7	<4.2	<3.8	<3.8	<4.0	<4.0
4:2 FTS	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0
6:2 FTS	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0
8:2 FTS	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0
N-MeFOSAA	<3.7	<4.0	<3.7	<3.7	<3.6	<3.7	<3.7	<4.2	<3.8	<3.8	<4.0	<4.0
N-EtFOSAA	<3.7	<4.0	<3.7	<3.7	<3.6	<3.7	<3.7	<4.2	<3.8	<3.8	<4.0	<4.0
HFPO-DA	<3.7	<4.0	<3.7	<3.7	<3.6	<3.7	<3.7	<4.2	<3.8	<3.8	<4.0	<4.0
11CL-PF3OUdS	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0
9Cl-PF3ONS	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0
ADONA	<7.4	<8.0	<7.4	<7.4	<7.1	<7.4	<7.4	<8.3	<7.7	<7.7	<8.0	<8.0

Sample location identifiers, coordinates, and preliminary results for Statewide PFAS Study downloaded from NMED PFAS Data webpage, accessed March 27, 2022
All chemistry data downloaded from USGS National Water Information System (NWIS), accessed April 5, 2022; Refer to Table 1 for list of PFAS analytes.
ADWS = Alamogordo Drinking Water System

ng/L = Nanograms per liter
< = Compound not detected at the concentration posted

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	Golf Course Well	Prather 1 North	Prather 1 North	Prather 2 South	Prather 2 South	Snake Tank Well 5	ADWS Well 2	ADWS Well 3	ADWS Well 4	ADWS Well 5	ADWS Well 5	ADWS Well 6
USGS Site ID		325132105573201	324752105585301	324752105585301	324711105585201	324711105585201	331238106022501	325704105560701	325704105561801	325717105560601	325827105562201	325827105562201	325648105561201
Sample Date		8/16/2021	9/17/2020	4/15/2021	9/18/2020	4/15/2021	2/9/2021	1/27/2021	2/9/2021	1/27/2021	9/17/2020	2/10/2021	1/27/2021
Sample By		USGS-WRD	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD
Temperature	°C	23.2	19.5	19.7	19.5	20.0	28.2	18.2	20.4	18.8	14.1	14.3	28.0
Specific conductance at 25°C (field)	µS/cm	2,610	1,500	1,480	1,010	1,010	2,840	2,530	1,960	1,920	2,180	2,240	2,310
Specific conductance at 25°C (laboratory)	µS/cm	2,610	1,590	1,560	1,020	1,010	2,810	2,570	1,960	1,960	2,260	2,240	2,310
Dissolved oxygen	mg/L	3.6	4.7	4.6	3.9	3.8	3.3	5.8	3.6	5.6	6.7	6.2	0.8
pH (field)	s.u.	7.1	7.2	7.1	7.3	7.3	6.7	7.0	7.0	7.1	7.1	7.0	7.1
pH (laboratory)	s.u.	7.8	7.9	8.1	7.9	8.1	7.9	8.0	8.1	7.9	7.8	8.0	8.1
Hydrogen ion (calculated)	mg/L	0.00008	0.00006	0.00007	0.00005	0.00005	0.0002	0.0001	0.0001	0.00008	0.00009	0.00011	0.00009
Carbon dioxide	mg/L	26	20	24	17	16	47	35	32	30	34	44	28
Alkalinity as $CaCO_3$ (field)	mg/L	162	176	166	172	166	123	185	169	184	206	204	166
Carbonate (field)	mg/L	0.2	0.7	0.2	0.3	0.2	0.1	0.2	0.3	0.1	0.3	0.2	0.1
Bicarbonate (field)	mg/L	197	213	202	209	202	150	225	205	224	250	248	203
ANC as $CaCO_3$, fixed end point (laboratory)	mg/L	162	110	147	125	156	124	170	170	187	171	189	164
Ammonia (as N)	mg/L	<0.02	<0.01	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02
Nitrite (as N)	mg/L	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002
Nitrate (as N)	mg/L	4.09	1.72	1.71	0.558	0.596	0.347	0.58	0.37	0.850	0.742	0.751	0.275
Nitrate+nitrite (as N)	mg/L	4.09	1.72	1.71	0.558	0.597	0.347	0.58	0.37	0.852	0.742	0.751	0.277
Ammonia	mg/L	<0.026	<0.013	<0.026	<0.013	<0.026	<0.026	<0.026	<0.026	<0.026	<0.013	<0.026	<0.026
Nitrate	mg/L	18.1	7.59	7.57	2.47	2.64	1.53	2.57	1.64	3.76	3.29	3.32	1.22
Nitrite as NO_2	mg/L	<0.003	<0.003	0.003	<0.003	0.004	<0.003	<0.003	<0.003	0.006	<0.003	<0.003	0.006
Organic carbon	mg/L	0.27	<0.46	0.23	0.24	<0.23	<0.23	0.39	<0.23	0.33	0.44	0.43	<0.23
Hardness as CaCO3	mg/L	1,180	760	733	470	440	1,680	1,050	717	763	941	904	839
Noncarbonate hardness	mg/L	1,020	584	567	298	274	1,560	863	548	580	735	700	673
Calcium	mg/L	264	176	170	102	97.1	482	258	167	185	233	225	190
Magnesium	mg/L	126	77.6	75.2	52.2	48	115	97.7	72.7	73.1	87.1	82.8	88.7
Orthophosphate	mg/L	0.028	0.034	0.034	0.036	0.037	0.016	0.028	0.013	<0.012	0.016	<0.012	<0.012
Orthophosphate as P	mg/L	0.009	0.011	0.011	0.012	0.012	0.005	0.009	0.004	<0.004	0.005	<0.004	<0.004
Sodium	mg/L	167	62.6	61	49	48.3	85.2	188	161	146	167	159	202
Sodium absorption ratio	mg/L	2.12	0.99	0.98	0.98	1.00	0.90	2.52	2.62	2.30	2.36	2.30	3.03

Notes are provided at the end of the table.

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	Golf Course Well	Prather 1 North	Prather 1 North	Prather 2 South	Prather 2 South	Snake Tank Well 5	ADWS Well 2	ADWS Well 3	ADWS Well 4	ADWS Well 5	ADWS Well 5	ADWS Well 6
USGS Site ID		325132105573201	324752105585301	324752105585301	324711105585201	324711105585201	331238106022501	325704105560701	325704105561801	325717105560601	325827105562201	325827105562201	325648105561201
Sample Date		8/16/2021	9/17/2020	4/15/2021	9/18/2020	4/15/2021	2/9/2021	1/27/2021	2/9/2021	1/27/2021	9/17/2020	2/10/2021	1/27/2021
Sample By		USGS-WRD	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD
Sodium fraction of cations (calculated)	%	24	15	15	18	19	10	28	33	29	28	28	34
Potassium	mg/L	4.45	2.10	1.87	2.86	2.37	4.19	2.06	1.97	1.55	2.10	1.77	2.91
Chloride	mg/L	306	186	187	69.1	72.3	174	325	218	224	285	273	283
Sulfate	mg/L	891	428	431	282	282	1420	756	557	575	658	630	687
Fluoride	mg/L	0.39	0.24	0.26	0.49	0.51	0.59	0.35	0.47	0.32	0.31	0.33	0.64
Aluminum	µg/L	<15	<6.0	<9.0	<6.0	<6.0	<15	<6.0	<6.0	<6.0	<6.0	<9.0	<6.0
Antimony	µg/L	<0.120	<0.120	<0.120	<0.120	<0.120	<0.180	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120
Arsenic	µg/L	0.29	0.86	0.68	1.3	1.4	<0.50	0.40	0.28	0.23	0.36	<0.30	0.22
Barium	µg/L	18.7	21.2	19.4	20.9	19.2	13.3	12.5	12.3	14.6	11.0	10.1	22.4
Beryllium	µg/L	<0.020	<0.020	<0.030	<0.020	<0.020	<0.050	<0.020	<0.020	<0.020	<0.020	<0.030	<0.020
Boron	µg/L	98	45	42	47	45	66	73	58	84	74	68	93
Cadmium	µg/L	<0.060	<0.060	<0.060	<0.060	<0.060	<0.090	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060
Chromium	µg/L	<1.0	1.2	<1.0	1.4	1.0	<2.5	1.4	1.4	< 1.0	< 1.0	<1.5	< 1.0
Copper	µg/L	0.83	5.0	3.6	2.1	2.0	<1.2	10.6	1.6	2.2	1.6	1.3	<0.80
Iron	µg/L	93.1	35.7	38.8	152	188	23.9	19.9	11.5	198	<20.0	16.4	441
Lead	µg/L	<0.040	0.123	0.110	0.139	0.109	<0.060	<0.040	0.175	<0.040	<0.040	<0.040	0.065
Manganese	µg/L	1.71	1.79	1.38	1.97	2.62	1.75	2.78	1.12	12.3	0.54	0.69	17.5
Molybdenum	µg/L	1.50	0.594	0.723	1.15	1.31	4.78	0.467	0.857	0.42	0.287	0.286	1.69
Nickel	µg/L	2.7	0.75	0.78	1.7	1.7	5.6	11.1	5.6	0.84	0.91	1.6	1.7
Selenium	µg/L	2.9	3.6	3.4	1.1	1.2	1.9	1.1	0.46	1.4	0.92	0.80	1.1
Silver	µg/L	<2.00	<2.00	<3.00	<2.00	<2.00	<3.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
Uranium	µg/L	3.97	2.66	2.80	2.89	2.91	3.02	4.05	3.35	3.53	3.04	3.08	4.39
Vanadium	µg/L	1.4	4.3	4.0	5.6	5.7	2.5	1.9	2.2	1.2	1.3	<1.2	1.5
Zinc	µg/L	45.2	39.7	31.6	21.7	22.9	<4.0	86.7	21.1	14.1	10.6	12.0	21.9
Tritium	pCi/L	NT	R 0.33	R 0.07	R 0.26	R 0.04	R 0.05	0.68	0.25	2.71	1.58	1.10	0.40
TDS dried at 180°C	mg/L	1970	1010	1080	684	735	2510	1820	1400	1390	1540	1590	1660
TDS sum of constituents (calculated)	mg/L	1870	1050	1030	664	654	2350	1740	1280	1320	1560	1500	1560
TDS (calculated)	tons/acre	2.67	1.37	1.47	0.93	1.00	3.41	2.47	1.90	1.89	2.09	2.16	2.26
Carbon-14	% Modern	NT	26.44	26.82	14.90	15.11	NT	48.11	NT	43.95	64.95	NT	3.53
Carbon-14 counting error	% Modern	NT	0.10	0.18	0.09	0.15	NT	0.18	NT	0.23	0.15	NT	0.23

Notes are provided at the end of the table.

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	Golf Course Well	Prather 1 North	Prather 1 North	Prather 2 South	Prather 2 South	Snake Tank Well 5	ADWS Well 2	ADWS Well 3	ADWS Well 4	ADWS Well 5	ADWS Well 5	ADWS Well 6
USGS Site ID		325132105573201	324752105585301	324752105585301	324711105585201	324711105585201	331238106022501	325704105560701	325704105561801	325717105560601	325827105562201	325827105562201	325648105561201
Sample Date		8/16/2021	9/17/2020	4/15/2021	9/18/2020	4/15/2021	2/9/2021	1/27/2021	2/9/2021	1/27/2021	9/17/2020	2/10/2021	1/27/2021
Sample By		USGS-WRD	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD
delta C-13/C-12	per mil	NT	-6.15	-6.20	-4.91	-4.97	NT	-7.29	NT	-7.13	-8.37	NT	-3.96
delta H-2/H-1	per mil	-64.7	-65.6	-64.9	-65.7	-67.3	-63.1	-61.9	-62.8	-63.5	-62.2	-62.2	-63.3
delta O-18/O-16	per mil	-9.06	-9.5	-9.54	-9.52	-9.57	-9.14	-8.82	-9.21	-9.12	-9.02	-9.02	-9.11

Notes are provided at the end of the table.

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	ADWS Well 7	ADWS Well 8	Boles Acres Well 1	Boles Acres Well 2	Boles Acres Well 4	Boles Acres Well 5	Dungan Well 1	Enchanted Valley Well 1	La Luz Well 1	La Luz Well 2	La Luz Well 3	La Luz Well 4
USGS Site ID		325610105561801	325745105561001	324827105585001	324817105584801	324904105585401	324827105593201	325510105584101	325839105590101	325846105561501	325852105560301	325847105554801	325854105554801
Sample Date		5/25/2021	1/27/2021	12/22/2020	8/17/2021	11/5/2020	11/5/2020	2/11/2021	1/27/2021	12/30/2020	12/30/2020	12/29/2020	12/30/2020
Sample By		USGS-WRD	USGS-WRD	USGS-WRD	USGS	USGSNMWC	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Temperature	°C	21.5	20.2	20.2	25.8	20.0	18.5	19.1	19.1	15.0	13.9	15.5	16.1
Specific conductance at 25°C (field)	µS/cm	1280	2070	1340	1510	2730	2870	1910	2460	2810	2600	3170	2950
Specific conductance at 25°C (laboratory)	µS/cm	1990	2090	1370	1540	2740	2730	1930	2420	2900	2710	3110	3080
Dissolved oxygen	mg/L	4.9	4.4	2.1	3.5	4.5	2.1	7.0	7.6	7.8	6.2	7.7	2.6
pH (field)	s.u.	7.5	7.2	7.3	7.1	7.0	7.2	7.0	7.4	7.1	7.2	7.1	7.1
pH (laboratory)	s.u.	8.0	8.0	7.9	7.9	7.8	7.7	7.9	8.1	7.9	8.0	7.8	8.0
Hydrogen ion (calculated)	mg/L	0.00003	0.00007	0.00005	0.00008	0.0001	0.00007	0.00009	0.00005	0.00009	0.00007	0.00008	0.00008
Carbon dioxide	mg/L	13	24	15	29	31	21	35	16	33	22	29	27
Alkalinity as $CaCO_3$ (field)	mg/L	188	183	159	184	164	160	197	176	198	170	177	177
Carbonate (field)	mg/L	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.1
Bicarbonate (field)	mg/L	229	222	194	223	199	194	239	215	241	207	216	216
ANC as $CaCO_3$, fixed end point (laboratory)	mg/L	191	167	120	162	154	162	193	168	137	147	159	104
Ammonia (as N)	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite (as N)	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	0.374	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Nitrate (as N)	mg/L	0.935	0.552	1.74	1.38	4.03	2.80	1.56	2.31	0.966	0.57	0.622	0.087
Nitrate+nitrite (as N)	mg/L	0.935	0.554	1.74	1.38	4.03	3.18	1.56	2.31	0.966	0.57	0.622	0.087
Ammonia	mg/L	<0.026	<0.026	<0.026	<0.026	<0.026	0.057	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Nitrate	mg/L	4.14	2.45	7.72	6.12	17.8	12.4	6.92	10.2	4.27	2.52	2.76	0.386
Nitrite as NO_2	mg/L	<0.003	0.005	<0.003	<0.003	<0.003	1.23	<0.003	0.005	<0.003	<0.003	<0.003	<0.003
Organic carbon	mg/L	0.45	0.30	0.26	0.26	0.40	0.36	0.32	0.45	0.74	0.68	0.69	0.56
Hardness as CaCO3	mg/L	785	803	603	639	1280	1290	748	999	1070	1050	1250	952
Noncarbonate hardness	mg/L	597	620	444	455	1120	1130	552	822	874	876	1070	775
Calcium	mg/L	191	190	136	148	293	287	189	248	281	268	316	240
Magnesium	mg/L	75.2	79.8	64.3	65.3	133	138	67	92	89.8	91.6	112	85.8
Orthophosphate	mg/L	0.018	0.021	0.028	0.023	0.028	0.017	0.016	0.016	<0.012	<0.012	<0.012	<0.012
Orthophosphate as P	mg/L	0.006	0.007	0.009	0.008	0.009	0.006	0.005	0.005	<0.004	<0.004	<0.004	<0.004
Sodium	mg/L	152	158	65.7	64	119	123	139	171	238	198	231	326
Sodium absorption ratio	mg/L	2.35	2.42	1.16	1.10	1.45	1.49	2.21	2.35	3.17	2.67	2.85	4.60

Notes are provided at the end of the table.

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	ADWS Well 7	ADWS Well 8	Boles Acres Well 1	Boles Acres Well 2	Boles Acres Well 4	Boles Acres Well 5	Dungan Well 1	Enchanted Valley Well 1	La Luz Well 1	La Luz Well 2	La Luz Well 3	La Luz Well 4
USGS Site ID		325610105561801	325745105561001	324827105585001	324817105584801	324904105585401	324827105593201	325510105584101	325839105590101	325846105561501	325852105560301	325847105554801	325854105554801
Sample Date		5/25/2021	1/27/2021	12/22/2020	8/17/2021	11/5/2020	11/5/2020	2/11/2021	1/27/2021	12/30/2020	12/30/2020	12/29/2020	12/30/2020
Sample By		USGS-WRD	USGS-WRD	USGS-WRD	USGS	USGSNMWC	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Sodium fraction of cations (calculated)	%	30	30	19	18	17	17	29	27	33	29	29	43
Potassium	mg/L	1.71	2.24	2.54	1.93	2.52	2.67	1.57	2.12	2.47	2.10	2.37	2.53
Chloride	mg/L	221	252	128	166	448	407	217	288	432	408	451	514
Sulfate	mg/L	515	627	393	423	782	854	538	752	786	716	921	765
Fluoride	mg/L	0.27	0.48	0.34	0.32	0.20	0.25	0.30	0.33	0.29	0.35	0.35	0.6
Aluminum	µg/L	<6.0	<6.0	<6.0	<6.0	<9.0	<9.0	<9.0	<6.0	<9.0	<9.0	<9.0	<9.0
Antimony	µg/L	<0.120	<0.120	<0.120	<0.120	<0.180	<0.180	<0.120	<0.120	<0.180	<0.180	<0.180	0.139
Arsenic	µg/L	<0.20	0.32	0.95	<0.20	0.57	0.46	0.42	0.43	<0.30	<0.30	<0.30	<0.30
Barium	µg/L	13.5	13.5	18.0	17.1	23.2	18.8	13.0	14.5	15.0	11.5	10.3	13.6
Beryllium	µg/L	<0.020	<0.020	<0.020	<0.020	<0.030	<0.030	<0.050	<0.020	<0.030	<0.030	<0.030	<0.030
Boron	µg/L	86	77	50	49	51	51	79	70	90	75	86	199
Cadmium	µg/L	<0.060	<0.060	<0.060	<0.060	<0.090	<0.090	<0.060	<0.060	<0.090	<0.090	<0.090	<0.030
Chromium	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	<1.5	<1.5	< 1.0	< 1.0	<1.5	<1.5	<1.5	<1.5
Copper	µg/L	2.0	1.2	<0.80	0.91	2.3	3.1	2.5	3.4	7.3	1.5	6.8	3.1
Iron	µg/L	156	252	12.5	<10.0	14.9	<10.0	<5.0	<10.0	34.5	233	33.7	105
Lead	µg/L	<0.040	<0.040	<0.040	0.041	<0.060	0.232	1.44	1.01	0.645	0.354	0.456	0.384
Manganese	µg/L	3.56	18.6	1.38	1.44	0.84	2.91	0.30	0.62	1.67	14.4	2.83	7.29
Molybdenum	µg/L	0.478	1.13	1.44	0.761	0.492	0.590	0.256	0.248	0.600	0.538	0.654	2.16
Nickel	µg/L	1.7	<0.40	<0.40	<0.40	<0.60	<0.60	<0.60	<0.40	<0.60	<0.60	<0.60	2.6
Selenium	µg/L	1.5	1.0	1.8	1.6	5.3	4.6	1.1	1.3	0.83	0.88	1.3	0.48
Silver	µg/L	<2.00	<2.00	<2.00	<2.00	<3.00	<3.00	<2.00	<2.00	<3.00	<3.00	<3.00	<1.00
Uranium	µg/L	3.20	4.45	2.71	2.29	3.78	4.01	2.77	2.97	2.53	2.27	2.87	1.75
Vanadium	µg/L	1.2	1.4	5.2	2.8	3.7	2.6	2.7	1.7	<1.2	<1.2	<1.2	<0.6
Zinc	µg/L	6.5	59.1	30.9	73.1	13.1	1880	16.0	34.2	36.3	8.0	42.7	270
Tritium	pCi/L	0.22	0.93	R 0.18	na	0.21	R 0.10	0.89	0.70	3.56	3.23	2.71	2.49
TDS dried at 180°C	mg/L	1440	1490	960	1070	1930	2010	1370	1770	2060	1840	2220	2110
TDS sum of constituents (calculated)	mg/L	1270	1420	893	986	1890	1920	1280	1670	1950	1790	2140	2040
TDS (calculated)	tons/acre	1.96	2.03	1.30	1.45	2.63	2.73	1.86	2.41	2.80	2.51	3.02	2.87
Carbon-14	% Modern	NT	26.00	10.58	NT	18.88	15.63	NT	72.11	87.71	85.47	81.23	56.15

Notes are provided at the end of the table.

Table 23. General Chemistry of USGS Groundwater Samples
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Analyte	Units	ADWS Well 7	ADWS Well 8	Boles Acres Well 1	Boles Acres Well 2	Boles Acres Well 4	Boles Acres Well 5	Dungan Well 1	Enchanted Valley Well 1	La Luz Well 1	La Luz Well 2	La Luz Well 3	La Luz Well 4
USGS Site ID		325610105561801	325745105561001	324827105585001	324817105584801	324904105585401	324827105593201	325510105584101	325839105590101	325846105561501	325852105560301	325847105554801	325854105554801
Sample Date		5/25/2021	1/27/2021	12/22/2020	8/17/2021	11/5/2020	11/5/2020	2/11/2021	1/27/2021	12/30/2020	12/30/2020	12/29/2020	12/30/2020
Sample By		USGS-WRD	USGS-WRD	USGS-WRD	USGS	USGSNMWC	USGSNMWC	USGS-WRD	USGSNMWC	USGS-WRD	USGS-WRD	USGS-WRD	USGS-WRD
Carbon-14 counting error	% Modern	NT	0.21	0.11	NT	0.22	0.22	NT	0.19	0.25	0.24	0.20	0.14
delta C-13/C-12	per mil	NT	-5.86	-5.28	NT	-6.95	-6.86	NT	-8.44	-9.27	-9.79	-9.61	-7.81
delta H-2/H-1	per mil	-63.7	-62.5	-66.0	-65.5	-64.4	-62.5	-62.5	-62.9	-62.4	-63.0	-62.1	-62.8
delta O-18/O-16	per mil	-9.1	-9.06	-9.48	-9.42	-9.2	-9.2	-9.12	-9.00	-8.87	-8.87	-8.74	-8.82

Source: USGS, 2022
NA = Analysis did not include this parameter
µS/cm = MicroSiemens per centimeter
s.u. = Standard units
mg/L = Milligrams per liter
µg/L = Micrograms per liter
pCi/L = Picograms per liter
T.U. = Tritium units (1 T.U. = 3.22 pCi/L)
ANC = Acid neutralizing capacity

Table 24. PFAS in Sediment Samples Collected by DBS&A at Holloman AFB
Page 1 of 2

Analyte	Concentration (µg/kg)											
	SED-1	SED-2	SED-3	SED-4	SED-5	SED-5 DUP	SED-6	SED-8	SED-9	SED-9 DUP	SED-10	SED-11
Date	1/14/2022	1/14/2022	1/14/2022	1/13/2022	1/13/2022	1/13/2022	1/14/2022	1/11/2022	1/14/2022	1/14/2022	1/14/2022	1/13/2022
PFBA	4.29	2.74	3.17	38.5	4.58	4.35	0.526	187	3.69	7.5	3.42	17.7
PFPeA	13.2	8.03	8.93	122	17.3	15.1	0.985	312	30.5	62.8	24	101
PFHxA	23.2	16.2	18.1	44.9	23.9	21.7	2.25	1,530	18.6	47.5	20.1	118
PFHpA	3.42	2.32	2.53	4.25	3.96	3.72	0.571	160	7.59	24.8	12.3	51.3
PFOA	14.2	12.6	12.8	8.63	33.8	17.6	2.57	1,050	1.54	5.26	1.53	38.2
PFNA	<1.94	0.502	0.543	11.4	17.5	16.2	0.731	242	<1.97	1.61	0.656	34.7
PFDA	<1.94	0.843	0.879	1.3	3.04	5.39	0.752	1,490	<1.97	0.838	<2.00	9.38
PFUnA	<1.94	0.67	0.698	<2.00	1.27	2.7	<1.94	1,270	<1.97	<1.99	<2.00	2.18
PFDoA	<1.94	0.835	0.757	<2.00	0.558	0.951	<1.94	1,310	<1.97	<1.99	<2.00	<2.00
PFTrDA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	164	<1.97	<1.99	<2.00	<2.00
PFTeDA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	421	<1.97	<1.99	<2.00	<2.00
PFBS	4.65	2.94	3.4	14.9	2.52	2.85	1.6	12.6	1.24	3.51	1.09	13.8
PFPeS	5.4	3.34	3.99	4.63	2.59	2.58	<1.94	17.2	1.1	3.94	1.03	28.3
PFHxS	42.2	35.1	40.3	74.8	253	129	5.16	1,010	13	40.1	12.8	461
PFHpS	2.2	6.26	5.08	6.09	10.5	8.19	<1.94	212	<1.97	2.15	0.529	35.6
PFOS	136	587	555	365	799	1,080	32.2	109,000	48.2	254	49	3,370
4:2 FTS	0.687	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	7.59	<1.97	<1.99	<2.00	<2.00
6:2 FTS	90.1	129	125	15.1	66.5	37.7	<1.94	<1.99	6.01	13.2	1.52	14.3
8:2 FTS	2.72	17.1	15.2	2.19	6.56	11.6	<1.94	<1.99	<1.97	0.534	<2.00	1.64
MeFOSAA	<1.94	<2.00	<1.98	<2.00	1.48	1.95	<1.94	88.4	<1.97	<1.99	<2.00	1.11
EtFOSAA	<1.94	<2.00	<1.98	<2.00	0.583	1.00	<1.94	156	<1.97	<1.99	<2.00	1.85
HFPO-DA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00

Notes are provided at the end of the table.

Table 24. PFAS in Sediment Samples Collected by DBS&A at Holloman AFB
Page 2 of 2

Analyte	Concentration (µg/kg)											
	SED-1	SED-2	SED-3	SED-4	SED-5	SED-5 DUP	SED-6	SED-8	SED-9	SED-9 DUP	SED-10	SED-11
Date	1/14/2022	1/14/2022	1/14/2022	1/13/2022	1/13/2022	1/13/2022	1/14/2022	1/11/2022	1/14/2022	1/14/2022	1/14/2022	1/13/2022
PFMPA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
PFMBA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
NFDHA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
11Cl-PF3OUdS	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
9Cl-PF3ONS	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
PFEESA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00
ADONA	<1.94	<2.00	<1.98	<2.00	<2.00	<1.96	<1.94	<1.99	<1.97	<1.99	<2.00	<2.00

Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
Refer to Table 1 for list of PFAS analytes
µg/kg = Micrograms per kilogram
< = Analyte was not detected at the concentration posted

Table 25. PFAS in Surface Water Samples Collected by DBS&A at Holloman AFB

Analyte	Concentration (ng/L)			
	SW-1	SW-2	SW-2 DUP	SW-3
Sample Date	1/13/2022	1/13/2022	1/13/2022	1/13/2022
PFBA	82.6	5,230	5,070	5,050
PFPeA	296	16,800	18,200	17,600
PFHxA	324	10,700	10,600	10,600
PFHpA	96.8	1,840	1,800	1,740
PFOA	137	728	640	530
PFNA	12.4	51.6	40.3	26.6
PFDA	2.09 J	4.14	3.57 J	1.06
PFUnA	<4.16	<3.88	<3.86	<3.72
PFDoA	<4.16	<3.88	<3.86	<3.72
PFTrDA	<4.16	<3.88	<3.86	<3.72
PFTeDA	<4.16	<3.88	<3.86	<3.72
PFBS	46.3	3,500	3,020	3,360
PFPeS	51.6	2,610	2,160	2,550
PFHxS	449	8,220	7,900	7,390
PFHpS	12.5	139	116	77.7
PFOS	643	4,360	3,840	1,950
4:2 FTS	3.20 J	98.9	93.5	98.9
6:2 FTS	395	3,040	2,880	3,250
8:2 FTS	4.82	17.7	8.64	2.28 J
MeFOSAA	<4.16	<3.88	<3.86	<3.72
EtFOSAA	<4.16	<3.88	<3.86	<3.72
HFPO-DA	<4.16	<3.88	<3.86	<3.72
PFMPA	<4.16	<3.88	<3.86	<3.72
PFMBA	<4.16	<3.88	<3.86	<3.72
NFDHA	<4.16	<3.88	<3.86	<3.72
11Cl-PF3OUdS	<4.16	<3.88	<3.86	<3.72
9Cl-PF3ONS	<4.16	<3.88	<3.86	<3.72
PFEESA	<4.16	<3.88	<3.86	<3.72
ADONA	<4.16	<3.88	<3.86	<3.72

Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
Refer to Table 1 for list of PFAS analytes.
ng/L = Nanograms per liter
< = Analyte not detected at the concentration posted.

Table 26. General Chemistry for Surface Water Samples Collected by DBS&A at Holloman AFB, Page 1 of 2

Analyte	Method	Concentration (mg/L [a])			
		SW-1	SW-2	SW-2 DUP	SW-3
Sample Date		1/13/2022	1/13/2022	1/13/2022	1/13/2022
Aluminum (dissolved)	EPA 200.7	<0.020	<0.20	<0.20	<0.20
Antimony (dissolved)	EPA 200.8	<0.050	<0.050	<0.050	<0.020
Arsenic (dissolved)	EPA 200.8	<0.050	<0.050	<0.050	<0.020
Barium (dissolved)	EPA 200.7	0.030	0.072	0.077	0.075
Beryllium (dissolved)	EPA 200.7	<0.0020	<0.020	<0.020	<0.020
Cadmium (dissolved)	EPA 200.7	<0.0020	<0.020	<0.020	<0.020
Calcium (dissolved)	EPA 200.7	500	980	910	930
Chromium (dissolved)	EPA 200.7	<0.0060	<0.060	<0.060	<0.060
Cobalt (dissolved)	EPA 200.7	<0.0060	<0.060	<0.060	NA
Copper (dissolved)	EPA 200.8	<0.050	<0.050	<0.050	<0.020
Iron (dissolved)	EPA 200.7	<0.020	<0.10	<0.10	<0.10
Lead (dissolved)	EPA 200.8	<0.025	<0.025	<0.025	<0.010
Magnesium (dissolved)	EPA 200.7	120	3,300	3,100	3,300
Manganese (dissolved)	EPA 200.7	0.0035	<0.020	<0.020	<0.020
Nickel (dissolved)	EPA 200.7	<0.010	<0.10	<0.10	<0.10
Selenium (dissolved)	EPA 200.8	<0.050	<0.050	<0.050	<0.020
Sodium (dissolved)	EPA 200.7	280	11,000	10,000	11,000
Vanadium (dissolved)	EPA 200.7	<0.050	<0.50	<0.50	<0.50
Zinc (dissolved)	EPA 200.7	0.016	<0.10	<0.10	<0.10
Total organic carbon	SM5310B	5	76	78	76
Fluoride	EPA 300.0	0.86	<2.0	<2.0	<2.0
Chloride	EPA 300.0	390	20,000	21,000	20,000
Bromide	EPA 300.0	<0.50	3.6	3.6	3.6
Phosphorus,	EPA 300.0	<2.5	<10	<10	<10
Sulfate	EPA 300.0	1,400	8,900	8,900	8,800
Nitrate+nitrite as N	EPA 300.0	<1.0	<20	<20	<20
Total Kjeldahl nitrogen		<1.0	12	11	11
Conductivity (µs/cm)	SM2510B	3,900	87,000	91,000	84,000
Bicarbonate (as CaCO3)	SM2320B	116.5	36	<20.0	<20
Carbonate (as $CaCO_3$)	SM2320B	<2.0	178.6	199.7	215.3

Notes are provided at the end of the table.

Table 26. General Chemistry for Surface Water Samples Collected by DBS&A at Holloman AFB, Page 2 of 2

Analyte	Method	Concentration (mg/L [a])			
		SW-1	SW-2	SW-2 DUP	SW-3
Sample Date		1/13/2022	1/13/2022	1/13/2022	1/13/2022
Total Alkalinity (as $CaCO_3$)	SM2320B	116.5	214.6	214	215.4
Total dissolved solids	SM2540C	2,980	46,700	45,700	47,700

Source: Hall Environmental Analysis Laboratory, 2022, Sample Delivery Group 2201641

[a] Unless otherwise noted

mg/L = Milligrams per liter
EPA = U.S. Environmental Protection Agency
µS/cm = Microsiemens per centimeter

Table 27. Final Field Parameters for Surface Water and Groundwater Samples

Location ID	Sample Date	Sample Type	Well Depth (feet btoc)	Depth to Water (feet btoc)	pH (s.u.)	Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Comments
FT31-LM1	1/11/2022	Groundwater	29.96	23.49	7.14	19.4	27,095	2.32	148.3	Clear
FT31-LM2	1/11/2022	Groundwater	30.4	23.24	7.29	19.5	25,692	3.97	141.5	Clear
FT31-LM4	1/11/2022	Groundwater	31.31	24.15	7.11	20.1	25,000	0.30	140.0	Clear
FT31-LM5	1/11/2022	Groundwater	37.24	23.81	6.97	19.8	29,502	0.32	150.3	Clear
MW01004	1/11/2022	Groundwater	28.32	21.29	7.10	19.7	25,120	1.38	163.0	Clear
MW05001	1/11/2022	Groundwater	27.98	7.14	7.37	20.6	3,823	1.13	133.6	Clear
MW29-01	1/12/2022	Groundwater	29.01	21.85	7.16	18.4	24,601	2.23	139.4	Clear
MW-30&31-1	1/12/2022	Groundwater	30.93	23.76	7.10	19.2	30,310	0.16	72.6	Clear
S1-MW3	1/12/2022	Groundwater	29.02	19.13	7.07	19.4	41,720	0.12	–57.4	Clear
MW-02&05-02	1/12/2022	Groundwater	23.67	19.20	6.98	21.2	7,563	0.20	–78.1	Clear
MW-02&05-10	1/12/2022	Groundwater	22.64	17.73	6.87	19.1	7,996	0.20	42.0	Clear
GC-MW01	1/13/2022	Groundwater	19.49	8.46	6.66	20.3	59,544	1.00	148.0	Clear
GC-MW02	1/13/2022	Groundwater	18.97	7.81	6.92	20.2	41,387	1.42	149.2	Clear
GC-MW03	1/13/2022	Groundwater	19.37	9.65	6.95	18.7	10,906	0.23	117.2	Clear
GC-MW04	1/13/2022	Groundwater	18.44	4.77	6.78	21.2	57,636	0.63	123.7	Clear
SW-01	1/13/2022	Surface Water	NA	NA	NC	NC	NC	NC	NC	Turbid
SW-02	1/13/2022	Surface Water	NA	NA	10.26	15.3	54,563	23.56	124.7	Turbid
SW-03	1/13/2022	Surface Water	NA	NA	10.52	9.4	55,235	38.76	84.9	Turbid

btoc = Below top of casing
s.u. = Standard units
°C = Degrees Celsius
µS/cm = MicroSiemens per centimeter
mg/L = Milligrams per liter
mV = Millivolts
NA = Not applicable
NC = Not collected

Table 28a. PFAS in Groundwater Samples Collected by DBS&A at Holloman AFB

Analyte	Concentration (ng/L)															
Sample ID	FT31-LM1	FT31-LM2	FT31-LM4	FT31-LM5	MW01004	MW05001	MW-29-01	MW-30&33-1	S1-MW3	MW-02&05-02	MW-02&05-02 DUP	MW-02&05-10	GC-MW01	GC-MW02	GC-MW03	GC-MW04
Sample Date	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/13/2022*	*1/13/2022*	*1/13/2022*	*1/13/2022*
PFBA	914	410	7,000 D	16,100 D	29.9	9,390 D	<3.78	<3.75	42.4	1,660	1,670	2,530 D	4.4	1.25 J	195	15.8
PFPeA	1,700	782	12,100 D	95,300 D	32.6	33,700 D	<3.78	<3.75	77.7	3,700 D	3,710 D	5,020 D	2.80 J	4.77	978	21.7
PFHxA	2,740 D	2,300 D	46,600 D	172,000 D	49.5	83,800 D	<3.78	1.09 J	249	8,630 D	9,980 D	13,700 D	3.89	6	873	26.3
PFHpA	21.6	11	7,640 D	30,900 D	4.02	7,510 D	<3.78	<3.75	19.8	871	921	1,600	<3.79	<3.83	194	7.05
PFOA	15.2	<3.81	12,800 D	143,000 D	2.6 J	9,780 D	<3.78	<3.75	181	5,010 D	5,520 D	6,500 D	2.52 J	<3.83	76.4	11.5
PFNA	<3.77	<3.81	12.2	869	<3.79	881	<3.78	<3.75	<3.82	46	50.2	54.6	<3.79	<3.83	1.47 J	<3.82
PFDA	<3.77	<3.81	<3.78	6.39	<3.79	641	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFUnA	<3.77	<3.81	<3.78	<3.94	<3.79	48.2	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFDoA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFTrDA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFTeDA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFBS	906	454	41,800 D	96,600 D	19.5	3,790 D	<3.78	<3.75	67.5	1,910	2,350 D	3,230 D	9.44	4.31	384	7.83
PFPeS	105	82	40,300 D	95,000 D	7.31	3,530 D	<3.78	<3.75	37.5	1,580	1,860	1,720 D	5.26	2.68 J	293	5.72
PFHxS	215	24.6	144,000 D	246,000 D	18.5	46,700 D	<3.78	<3.75	118	12,700 D	12,600 D	15,300 D	20.1	14.8	1,590	39.7
PFHpS	<3.77	<3.81	1,570	5,990 D	<3.79	4,310 D	<3.78	<3.75	<3.82	144	160	239	<3.79	<3.83	29.6	<3.82
PFOS	11.9	2.15 J	7,450 DQ	43,200 D	22.8	280,000 D	3.28 J	1.23 J	3.94	2,620 D	2,630 D	4,210 D	6.09	2.53 JQ	589 Q	9.84 Q
4:2 FTS	6.28	<3.81	3,700 D	14,200 D	2.34 J	888	<3.78	<3.75	<3.82	9.11	<3.82	8.1	<3.79	<3.83	<4.04	<3.82
6:2 FTS	41.4	1.13 JQ	22,100 D	97,600 D	4.08	164,000 D	1.28 J	<3.75	1.99 J	3,620 D	2,720 D	2,670 D	<3.79	0.967 J	158	<3.82
8:2 FTS	<3.77	<3.81	1.53 J	561	1.7 J	15,200 D	<3.78	<3.75	<3.82	34	35.2	33.9	<3.79	<3.83	<4.04	<3.82
MeFOSAA	<3.77	<3.81	<3.78	<3.94	<3.79	10.8	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
EtFOSAA	<3.77	<3.81	<3.78	<3.94	<3.79	26.4	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
HFPO-DA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFMPA	<3.77	<3.81	26.5 Q	64.4	<3.79	8.04	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFMBA	<3.77	<3.81	24.3	<3.94	<3.79	16.7	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
NFDHA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
11Cl-PF3OUdS	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82

Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
Refer to table 1 for list of PFAS analytes.
ng/L = Nanograms per liter
J = Concentration above the level of detection (LOD), but below the LOQ; value is considered an estimate
D = Result from diluted sample
Q = Ion transition ratio outside acceptance criteria

Table 28a. PFAS in Groundwater Samples Collected by DBS&A at Holloman AFB
Page 2 of 2

Analyte	Concentration (ng/L)															
Sample ID	FT31-LM1	FT31-LM2	FT31-LM4	FT31-LM5	MW01004	MW05001	MW-29-01	MW-30&33-1	S1-MW3	MW-02&05-02	MW-02&05-02 DUP	MW-02&05-10	GC-MW01	GC-MW02	GC-MW03	GC-MW04
Sample Date	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/11/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/12/2022*	*1/13/2022*	*1/13/2022*	*1/13/2022*	*1/13/2022*
9Cl-PF3ONS	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
PFEESA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82
ADONA	<3.77	<3.81	<3.78	<3.94	<3.79	<1.98	<3.78	<3.75	<3.82	<3.85	<3.82	<3.88	<3.79	<3.83	<4.04	<3.82

Source: Vista Analytical Laboratory, Sample Delivery Group 2201641
Refer to table 1 for list of PFAS analytes.
ng/L = Nanograms per liter
J = Concentration above the level of detection (LOD), but below the LOQ; value is considered an estimate
D = Result from diluted sample
Q = Ion transition ratio outside acceptance criteria

Table 28b. Construction of Monitor Wells Sampled by DBS&A

Well ID	Location	Date Installed	Ground Elevation [a]	Top of Casing Elevation [a]	Well Depth (feet bgs)	Well Diameter (inches)	Depth Top of Screen (feet bgs)	Depth Bottom of Screen (feet bgs)	Source
FT31-LM1	Fmr Fire Training Area	NA	NA	4,103.69 [b]	35.86	NA	24	34	Environmental Flight, 2011
FT31-LM2	Fmr Fire Training Area	NA	NA	4,103.50 [b]	37.5	NA	23.50	33.50	Environmental Flight, 2011
FT31-LM4	Fmr Fire Training Area	11/6/2017	4,102.84	4,105.70	31.05	2.0	NA	NA	AFW, 2018
FT31-LM5	Fmr Fire Training Area	11/6/2017	4,101.83	4,105.09	36.85	2.0	NA	NA	AFW, 2018
MW01004	Fmr Fire Training Area	11/5/2017	4,102.59	4,102.74	29.30	2.0	18.0	28.0	AFW, 2018
MW05001	Evaporation Pond 2	11/6/2017	4,048.40	4,048.16	29.00	2.0	19.0	29.0	AFW, 2018
MW-29-01	Fmr Army Landfill 29	NA	NA	NA	NA	NA	NA	NA	NA
MW-30&33-1	Grease Trap Disposal	NA	NA	NA	NA	NA	NA	NA	NA
S1-MW3	POL Spill Site 1	NA	NA	4,098.70	26.5	2.0	11.0	26.0	AECOM, 2019
MW-02&05-02	POL Spill Site 1	NA	NA	4,097.04	21.0	2.0	11.0	21.0	AECOM, 2019
MW-02&05-10	POL Spill Site 1	NA	NA	4,096.31	18.0	2.0	8.0	18.0	AECOM, 2019
GC-MW01	Golf Course	NA	NA	4,046.60	19.2	NA	NA	NA	Swift River/Versar, 2022
GC-MW02	Golf Course	NA	NA	4,047.64	18.81	NA	NA	NA	Swift River/Versar, 2022
GC-MW03	Golf Course	NA	NA	4,037.38	19.1	NA	NA	NA	Swift River/Versar, 2022
GC-MW04	Golf Course	NA	NA	4,049.54	18.15	NA	NA	NA	Swift River/Versar, 2022

Note: Well construction diagrams were not identified for the existing wells that were sampled on Holloman AFB. Historical reports were reviewed in an effort to identify any construction information, but these efforts were largely unsuccessful.

[a] Elevation datum not provided

[b] Elevation relative to National Geodetic Vertical Datum of 1929.

bgs = Below ground surface

NA = Not available

Table 29. General Chemistry for Groundwater Samples Collected by DBS&A at Holloman AFB
Page 1 of 2

	Concentration (mg/L [a])															
	Fire Training Area FT-31					Evaporation Pond 2	North Area ERP Sites						Golf Course			
Analyte	FT31-LM1	FT31-LM2	FT31-LM4	FT31-LM5	MW01004	MW05001	MW-29-01	MW-30&33-1	S1-MW3	MW-02&05-02	MW-02&05-02 D	MW-02&05-10	GC-MW01	GC-MW02	GC-MW03	GC-MW04
Sample Date	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/13/2022	1/13/2022	1/13/2022	1/13/2022
Aluminum (dissolved) [b]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.020	<0.10	<0.10	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.10	<0.20
Antimony (dissolved) [c]	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.001	<0.010	<0.010	<0.020	<0.0050	<0.0050	<0.0050	<0.020	<0.020	<0.010	<0.020
Arsenic (dissolved) [c]	0.010	<0.010	<0.010	<0.010	<0.0050	0.022	0.01	0.012	<0.020	0.027	0.024	0.009	<0.020	<0.020	0.015	<0.020
Barium (dissolved) [b]	<0.010	0.012	<0.010	<0.010	0.015	0.011	0.016	<0.010	<0.020	0.016	0.016	0.012	0.045	0.037	0.014	0.028
Beryllium (dissolved) [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0020	<0.010	<0.010	<0.020	<0.020	<0.020	<0.010	<0.020	<0.020	<0.010	<0.020
Cadmium (dissolved) [b]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0020	<0.010	<0.010	<0.020	<0.020	<0.020	<0.010	<0.020	<0.020	<0.010	<0.020
Calcium (dissolved) [b]	750	780	760	770	780	510	940	740	640	550	540	590	2,500	2,100	770	2,500
Chromium (dissolved) [b]	<0.030	<0.030	<0.030	<0.030	<0.030	<0.0060	<0.030	<0.030	<0.060	<0.060	<0.060	<0.030	<0.060	<0.060	<0.030	<0.060
Cobalt (dissolved) [b]	<0.030	<0.030	<0.030	<0.030	<0.030	0.010	<0.030	<0.030	<0.060	<0.060	<0.060	<0.030	<0.060	<0.060	<0.030	<0.060
Copper [c]	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.001	<0.010	<0.010	<0.020	<0.0050	<0.0050	<0.0010	<0.020	<0.020	<0.010	<0.020
Iron (dissolved) [b]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.020	<0.10	<0.10	0.73	12	11	<0.10	<0.10	<0.10	<0.10	<0.10
Lead (dissolved) [c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0025	<0.0005	<0.0050	<0.0050	<0.010	<0.0025	<0.0025	<0.0025	<0.010	<0.010	<0.0050	<0.010
Magnesium (dissolved) [b]	1,200	1,100	1,000	1,300	960	290	860	1,200	1,900	580	560	390	3,700	1,500	600	3,100
Manganese (dissolved) [b]	0.012	<0.010	0.02	0.14	<0.010	0.65	<0.010	<0.010	2.1	1.4	1.4	2.7	<0.020	<0.020	0.04	0.085
Nickel (dissolved) [b]	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.050	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.050	<0.10
Selenium (dissolved) [c]	0.012	<0.010	<0.010	<0.010	0.0074	<0.001	<0.010	0.018	<0.020	<0.0010	<0.0010	0.0011	<0.020	<0.020	<0.010	<0.020
Sodium (dissolved) [b]	5,600	5,000	4,700	5,700	4,700	230	4,100	6,000	8,600	900	860	1,200	9,000	6,700	1,400	9,100
Vanadium (dissolved) [b]	<0.25	<0.25	<0.25	<0.25	<0.25	<0.050	<0.25	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.25	<0.50
Zinc (dissolved) [b]	<0.050	<0.050	<0.050	<0.050	<0.050	0.018	<0.050	<0.050	<0.10	0.017	0.014	<0.050	<0.10	<0.10	<0.050	<0.10
Total Organic Carbon [d]	3.5	3.2	6.9	12	1.5	6.8	1.9	2.1	5.5	20	20	13	4.8	1.8	7.6	3.2
Fluoride [e]	<2.0	<2.0	<2.0	<2.0	<2.0	1.7	<2.0	<2.0	<2.0	1.9	1.9	1.6	<2.0	<2.0	3.8	<2.0
Chloride [e]	8,000	7,700	7,100	9,000	7,300	120	7,200	8,500	13,000	500	510	900	28,000	16,000	2,800	25,000
Bromide [e]	2.1	1.5	3.4	3.8	<2.0	<0.5	2.7	2.3	3.4	0.64	0.64	0.98	3.8	2.5	<0.50	3.4
Phosphorus [e]	<10	<10	<10	<10	<10	<10	<10	<10	<25	<10	<10	<10	<2.5	<2.5	<2.5	<2.5
Sulfate [e]	5,300	5,300	4,700	5,800	4,600	2,600	3,500	5,800	10,000	4,000	4,000	3,400	3,600	2,500	2,800	2,800
Nitrate+Nitrite as N [e]	20	15	12	14	12	<1.0	16	17	<10	<1.0	<1.0	<1.0	<20	<20	12	<20
Total Kjeldahl Nitrogen	<5.0	<2.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.0	<1.0	<2.0	<2.0	<1.0
Conductivity [f] (µS/cm)	42,000	38,000	37,000	45,000	36,000	4,600	34,000	44,000	71,000	8,300	8,300	8,800	99,000	67,000	16,000	93,000
Bicarbonate (as CaCO3) [g]	187.5	162.4	209.3	298.3	210.3	116.2	141.0	217.4	426.9	590.7	592.6	462.6	154.1	107.9	412.3	175.6
Carbonate (as CaCO3) [g]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

Notes are provided at the end of the table.

Table 29. General Chemistry for Groundwater Samples Collected by DBS&A at Holloman AFB
Page 2 of 2

	Concentration (mg/L [a])															
	Fire Training Area FT-31					Evaporation Pond 2	North Area ERP Sites						Golf Course			
Analyte	FT31-LM1	FT31-LM2	FT31-LM4	FT31-LM5	MW01004	MW05001	MW-29-01	MW-30&33-1	S1-MW3	MW-02&05-02	MW-02&05-02 D	MW-02&05-10	GC-MW01	GC-MW02	GC-MW03	GC-MW04
Sample Date	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/11/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/12/2022	1/13/2022	1/13/2022	1/13/2022	1/13/2022
Total Alkalinity (as CaCO3) [g]	187.5	162.4	209.3	298.3	210.3	116.2	141.0	217.4	426.9	590.7	592.6	462.6	154.1	107.9	412.3	175.6
Total dissolved solids [h]	22,200	20,900	20,400	24,100	20,300	4,240	18,200	23,000	36,100	7,340	7,340	6,820	53,700	35,700	8,790	48,800

Source: Hall Environmental Analysis Laboratory, 2022, Sample Delivery Group 2201641

[a] Unless otherwise noted.

[b] Analyzed using U.S. Environmental Protection Agency (EPA) method 200.7.

[c] Analyzed using EPA method 200.8.

[d] Analyzed using standard method SM 5310B.

[e] Analyzed using EPA method 300.0.

[f] Analyzed using SM 2510B.

[g] Analyzed using SM 2320B.

[h] Analyzed using SM 2540C.

mg/L = Milligrams per liter

µS/cm = Microsiemens per centimeter

Appendix A

Notice to Proceed

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

1190 St. Francis Drive / PO Box 5469
Santa Fe, NM 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lieutenant Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

February 9, 2021

Mr. John R. Bunch, PG
Daniel B. Stephens & Associates, Inc.
6020 Academy Road NE, Suite 100
Albuquerque, NM 87109
Sent via email: jbunch@geo-logic.com

Re: Notice to Proceed – Phase I Remedial Investigation in the Vicinity of Cannon Air Force Base, Curry County, and Holloman Air Force Base, Otero County, New Mexico Contract #21-667-1210-00002

Dear Mr. Bunch:

The New Mexico Environment Department (NMED) has reviewed the Technical and Cost Proposal submitted by Daniel B. Stephens & Associates, Inc., dated January 28, 2021 for the completion of a Phase I Remedial Investigation (RI) in the vicinity of Cannon Air Force Base, Curry County, and Holloman Air Force Base, Otero County, New Mexico. NMED approves the Technical and Cost Proposal for this project as follows:

Task and Cost Summary for Cannon Air Force Base

Task No.	Description	Cost
1	Site Data Review and Site Visit	$12,528.00
2	Planning Documents	$18,310.00
3	Sampling Existing Water Supply Wells	$14,231.00
4	Drilling and Well Installation	$266,944.62
5	One Year of Quarterly GW Monitoring	$62,260.00
6	Phase 1 Progress Report	$19,950.00
7	Modeling	$9,051.25
	Subtotal:	$403,274.87
	New Mexico Gross Receipts Tax @ 7.8750%	$31,757.90
	Total:	**$435,032.77**

Task and Cost Summary for Holloman Air Force Base

Task No.	Description	Cost
1	Site Data Review and Site Visit	$12,470.00
2	Planning Documents	$18,310.00
3	Sampling Existing Water Supply Wells and Surface Water	$9,840.00
4	Drilling and Well Installation	$156,212.00
5	One Year of Quarterly GW Monitoring	$38,852.00
6	Phase 1 Progress Report	$19,950.00
7	Modeling	$9,051.25
8	Waterfowl and Small Mammal Survey	$185,800.00
	Subtotal:	$450,485.25
	New Mexico Gross Receipts Tax @ 7.8750%	$35,475.72
	Total:	**$485,960.97**

NMED has assigned work order # DBSA-PFAS to this work. This work order is approved based on a time and materials cost not to exceed the amount shown in the above Cost Summary. Enclosed is a copy of the approved work order for your files. The total budget approved for this work order shall not exceed $921,000.00 including New Mexico Gross Receipts Tax. This work will be completed by June 30, 2021, however, uncompleted work tasks may continue during State of New Mexico fiscal years (FY) 2022, 2023, 2024, and 2025, if approved by the New Mexico Legislature.

Prior approval from the NMED project manager is required before budget may be moved from between tasks or different labor categories. The use of any staff or subcontractors not specified in the approved Contractor Fee Schedule must be pre-approved in writing by NMED. Additional costs due to changes in the written technical proposal or task assignment must be approved by NMED in writing before the additional work commences.

Prior to submitting an invoice, Daniel B. Stephens & Associates, Inc. must first submit a summary of tasks performed or deliverables produced during the billing period. NMED will issue an acceptance of this summary and request for an invoice for the costs incurred for the reported tasks or deliverables. Each summary and invoice must identify the work order number, NMED subaccount code, activity code, and contract number.

Any activities performed or completed pursuant to this Notice to Proceed must comply with any and all applicable federal, state, or local laws, including but not limited to any orders issued in relation to any Public Health Orders in relation to the COVID-19 virus.

Please contact Dr. Patrick Longmire at (505) 699-9015 or patrick.longmire@state.nm.us if you have any questions about this request.

Sincerely,

Michelle Hunter

Digitally signed by Michelle Hunter
Date: 2021.02.09 15:43:46 -07'00'

Michelle Hunter, Bureau Chief
Ground Water Quality Bureau

cc: Patrick Longmire, GWQB
Stephanie Stringer, Director, RPD
Chris Catechis, Deputy Director, RPD
Miquella Lopez, Financial Manager, RPD
GWQB Reading File

Appendix B

Groundwater Flow Maps

DBS&A
Daniel B. Stephens & Associates, Inc.

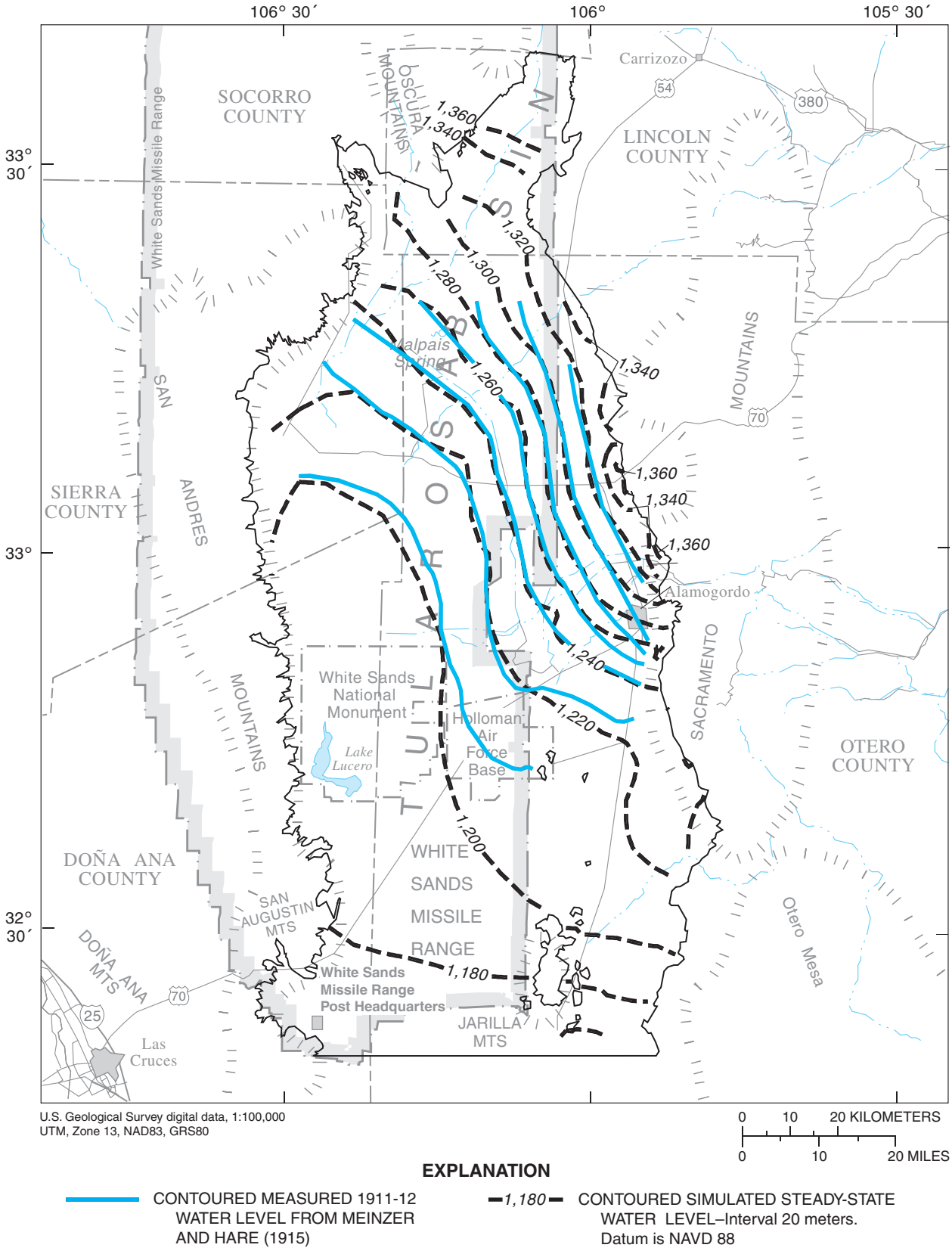


Figure 10. Water-level contours representing measured 1911-12 water levels and simulated steady-state water levels in the uppermost active model cells.

1656000.000000 1672000.000000 1688000.000000 1704000.000000

740000.000000 720000.000000 700000.000000 680000.000000

N

NBG-MW01 4093.995
NBG-MW02 4092.696
NBG-MW03 4115.227
NBG-MW04 4107.066
NBG-MW05 4108.926
NBG-MW06 4100.758
NBG-MW07 4113.519
NBG-MW08 4131.87
NBG-MW09 4082.995
NBG-MW10 4112.325
NBG-MW11 4145.359
NBG-MW12 4079.344
NBG-MW13 4096.839
MW-BG-02 4149.875
NBG-MW14 4065.603
NBG-MW15 4077.233
NBG-MW16 4140.268
NBG-MW17 4130.381
NBG-MW18 4063.962
NBG-MW19 4046.794
NBG-MW20 4050.565
NBG-MW21 4113.256
NBG-MW22 4095.536
NBG-MW23 4090.887

4100 4110 4120 4130 4140
4090 4080 4070 4060 4050

Groundwater Flow

0 3,000 6,000 12,000
Feet

Projection: New Mexico State Plane Central Zone, North American Datum 1983 (Feet)

Legend

- Nitrate Study Groundwater Monitoring Well
- Potentiometric Contour Lines (10' Interval)
- Groundwater Flow Direction
- (4090.887) Groundwater Elevation in feet above mean sea level (amsl)
- Holloman AFB Boundary

NATIONVIEW

Nitrate Background Study Potentiometric Surface Map (July 2013)

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0017	1"=6000'	9/6/2013	cm

DRAWING NO: Figure 2-7

Nitrate Characterization Study Report
Holloman AFB, New Mexico

Figure 2-7

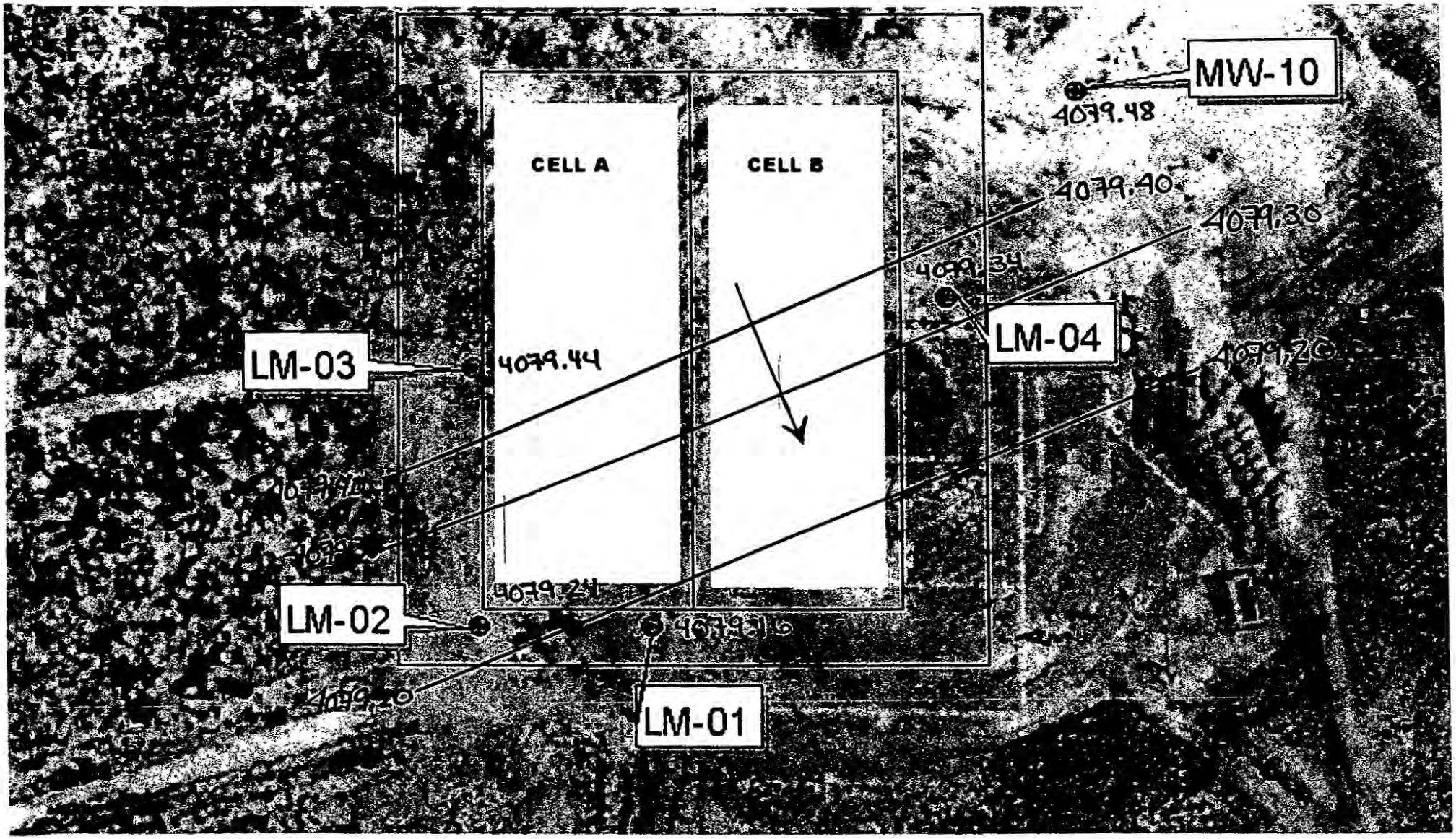
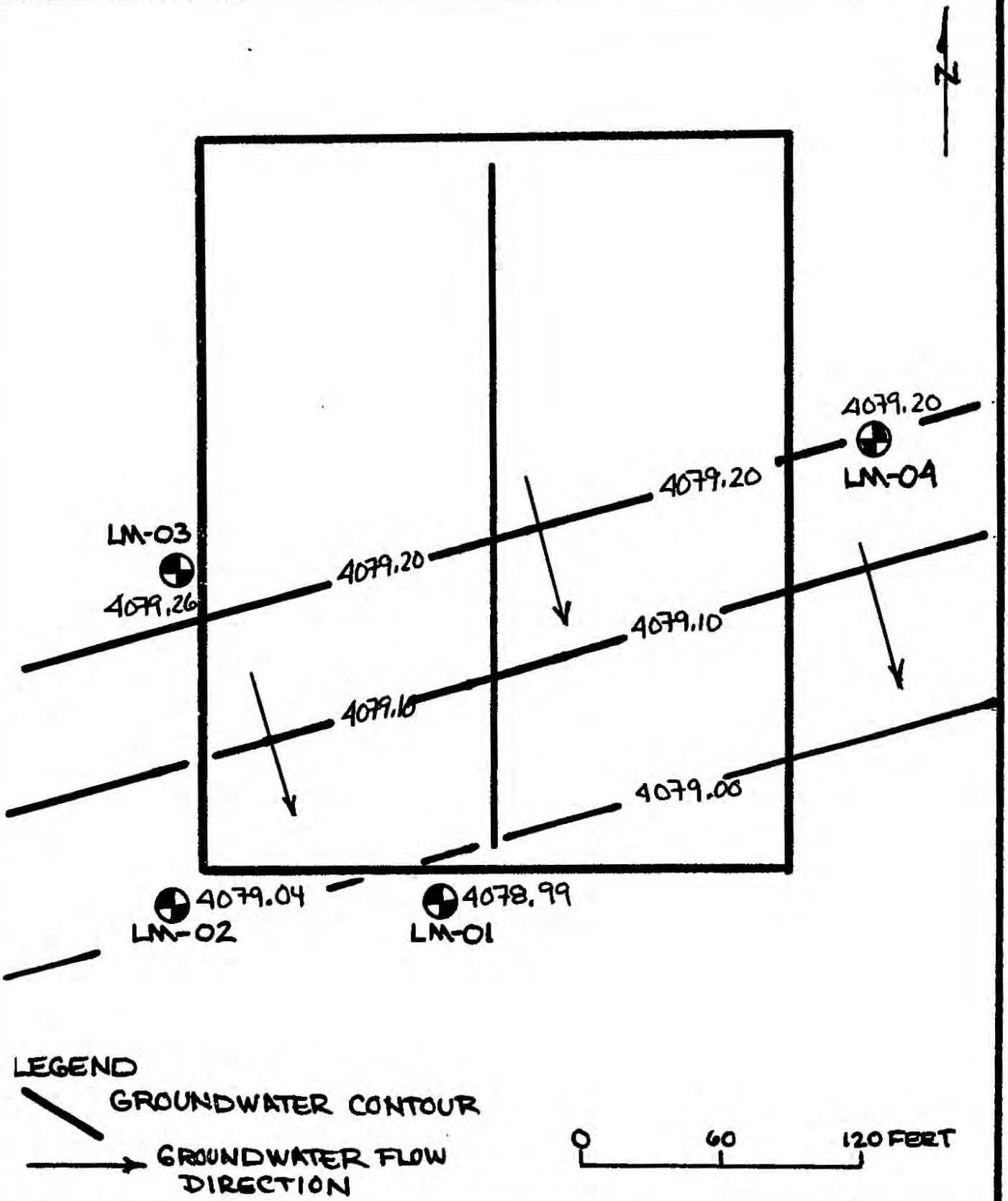
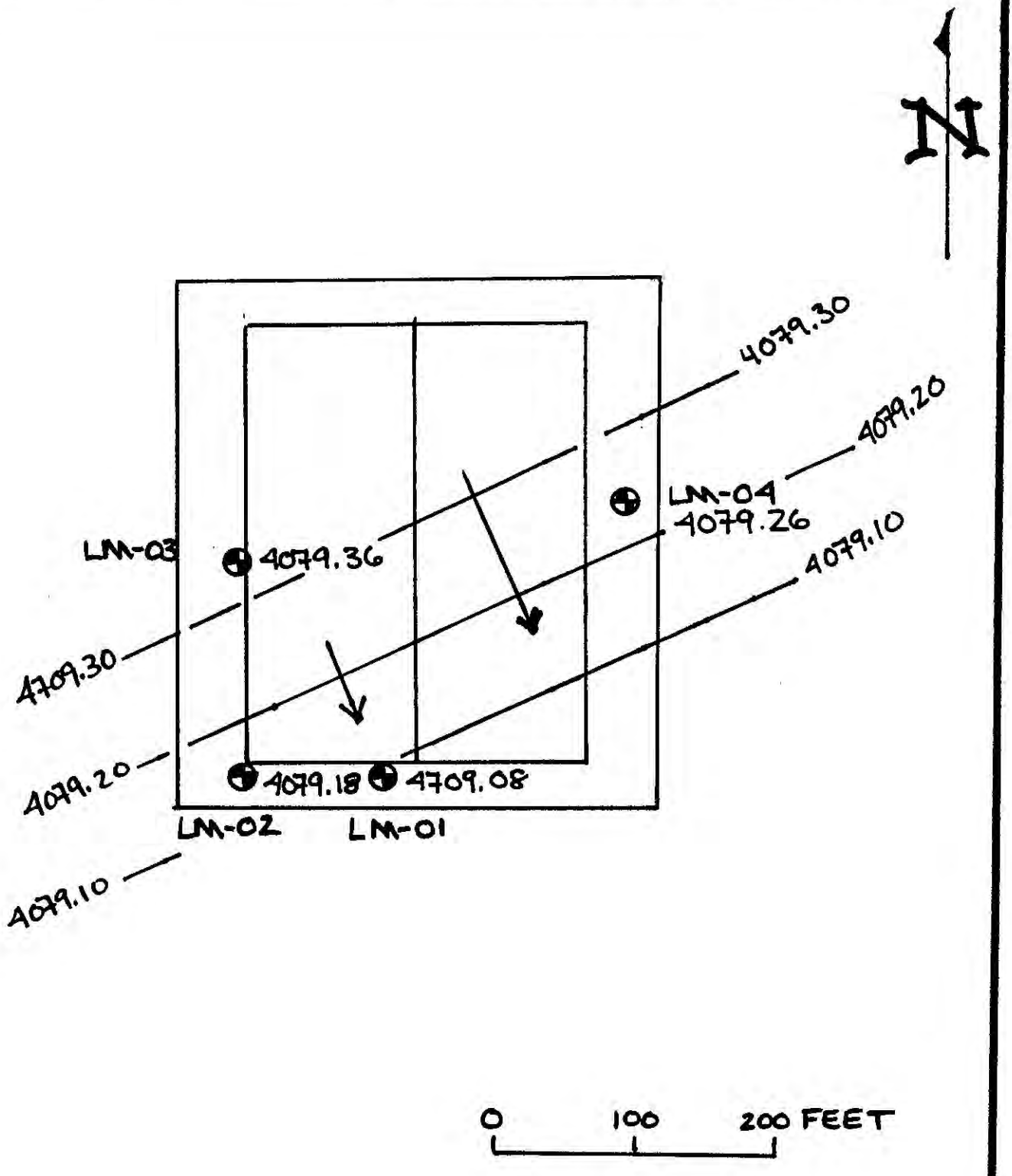


FIGURE 1 LANDFARM AND GROUNDWATER COUNTOUR MAP
FEBRUARY 2004

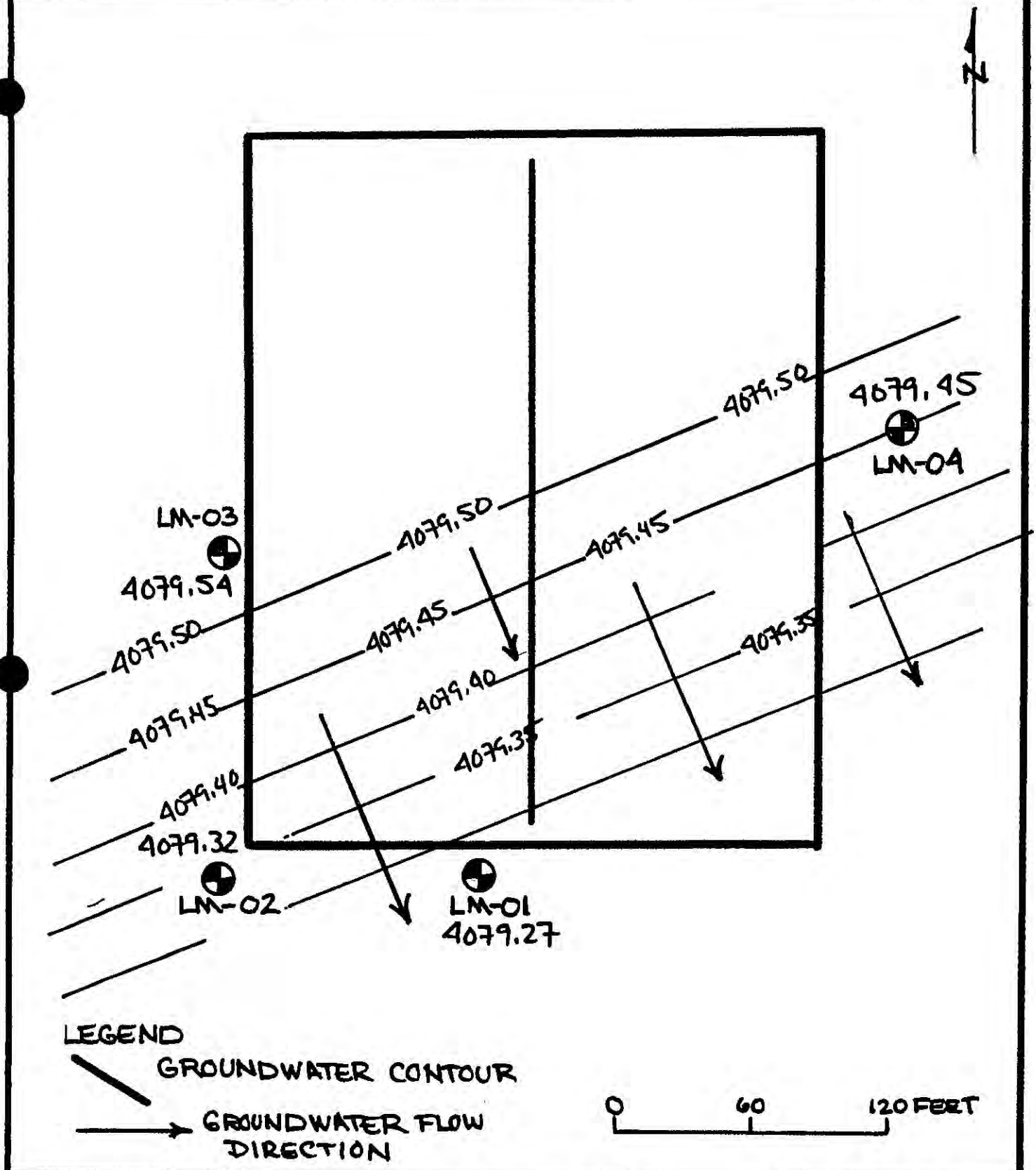
1236 9



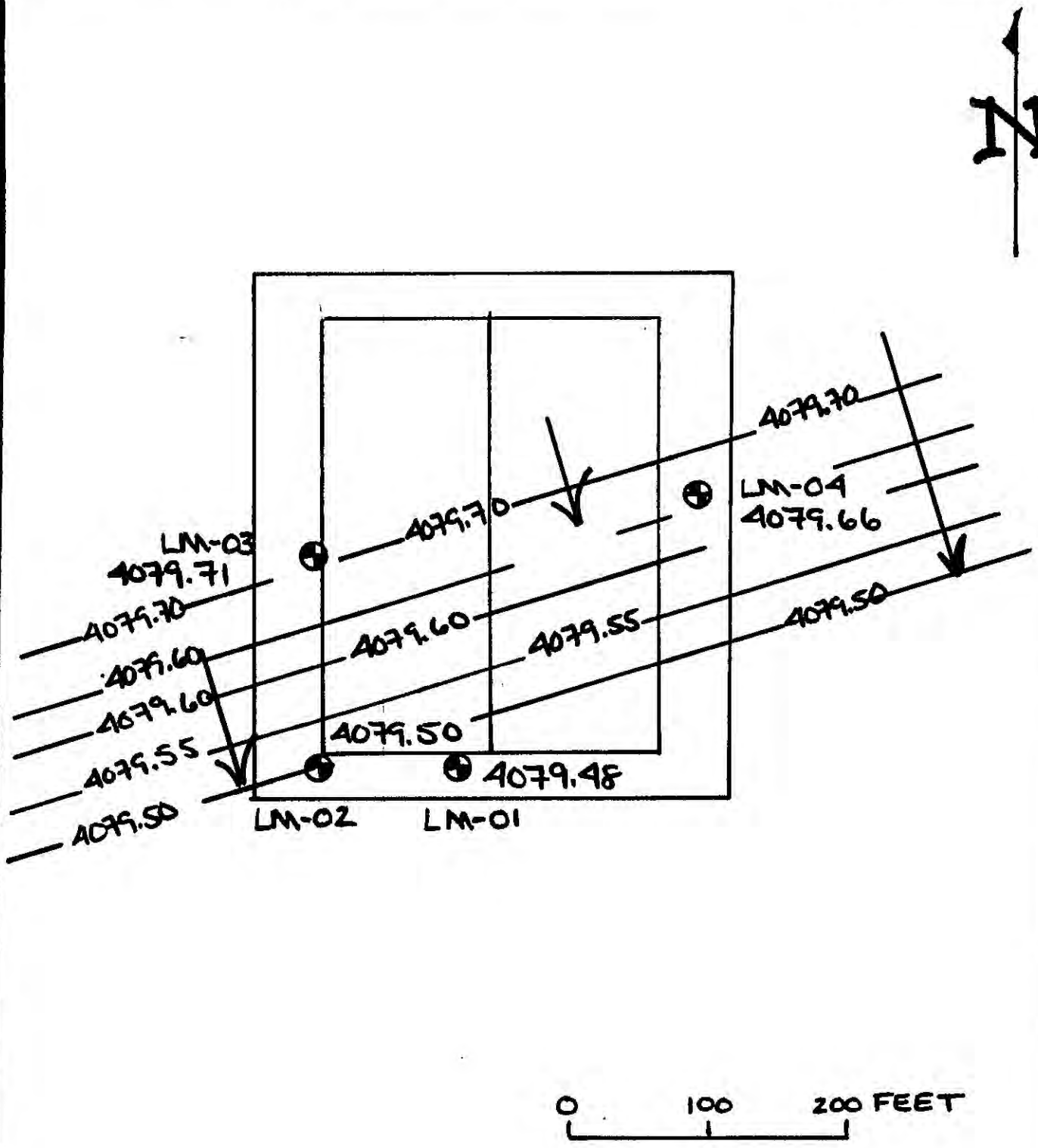
HOLLOMAN AFB NEW MEXICO	FT-31 LANDFARM GROUNDWATER MONITORING WELL LOCATIONS	FIGURE 1



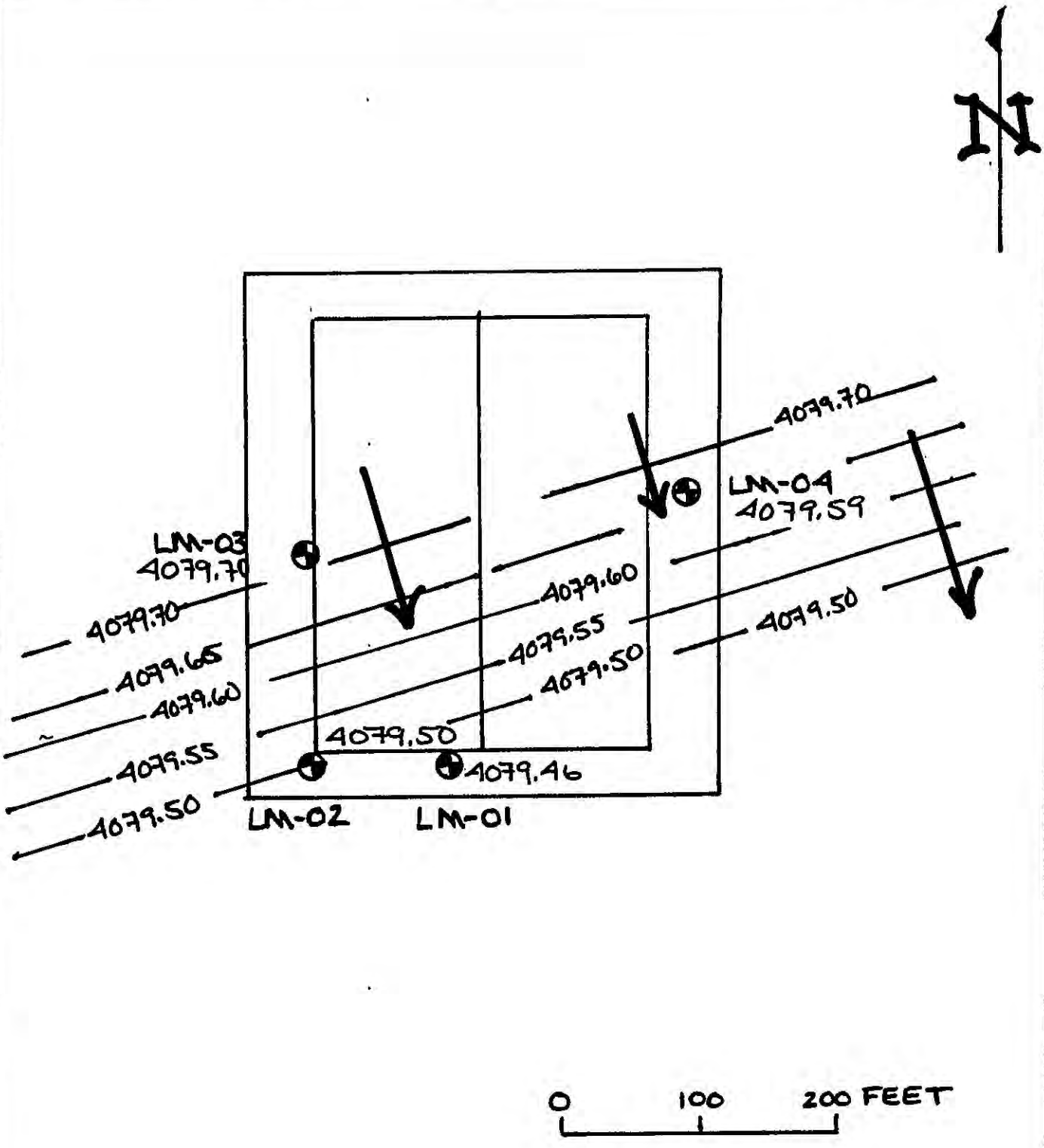
HOLLOMAN AFB, NM FT-31 LANDFARM	GROUNDWATER CONTOUR MAP (NOVEMBER, 2004)	FIGURE 1



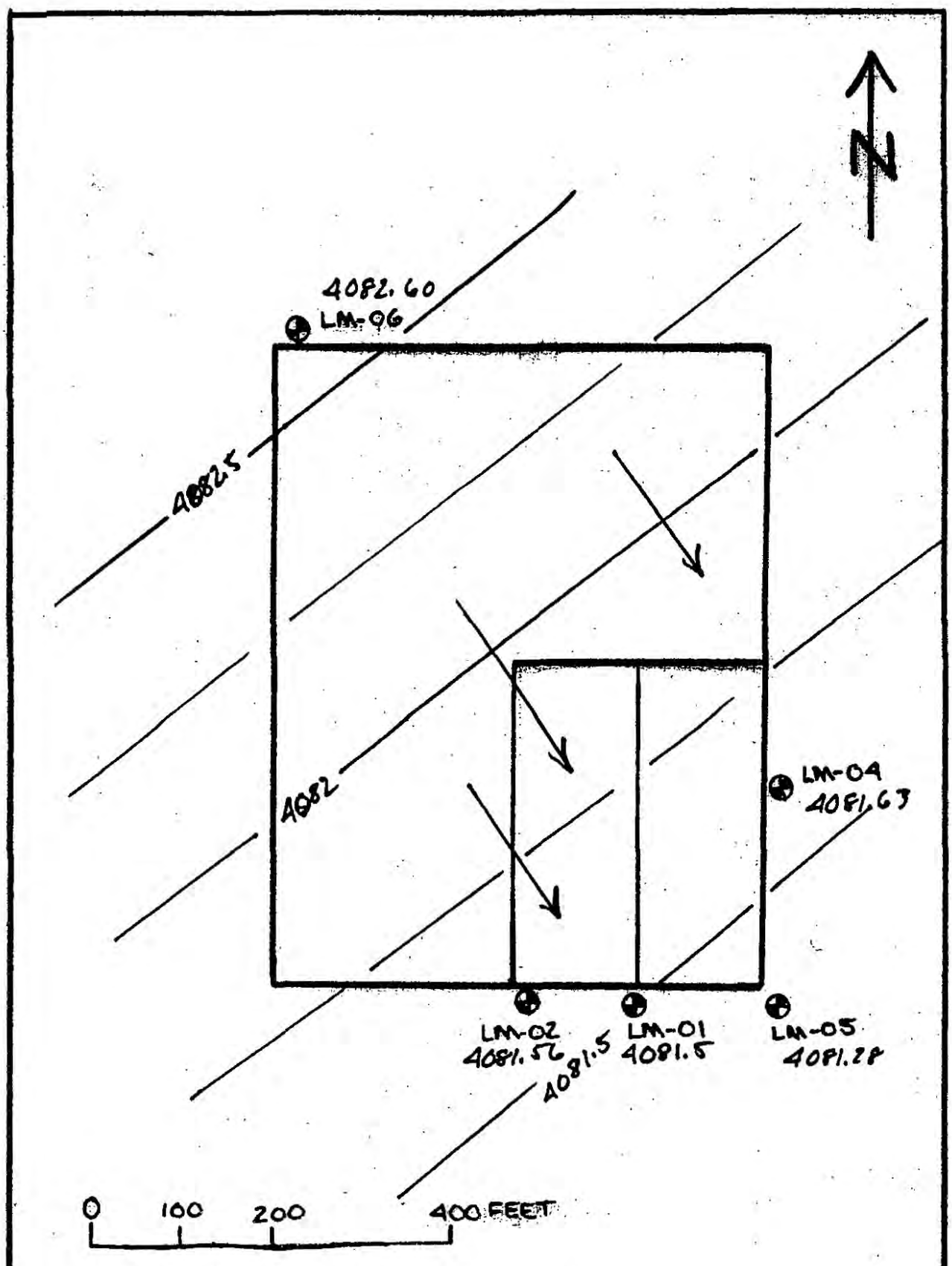
HOLLOMAN AFB NEW MEXICO	FT-31 LANDFARM GROUNDWATER MONITORING WELL LOCATIONS	FEB 2005 FIGURE 1



HOLLOMAN AFB, NM FT-31 LANDFARM	GROUNDWATER CONTOUR MAP (MAY, 2005)	FIGURE 1

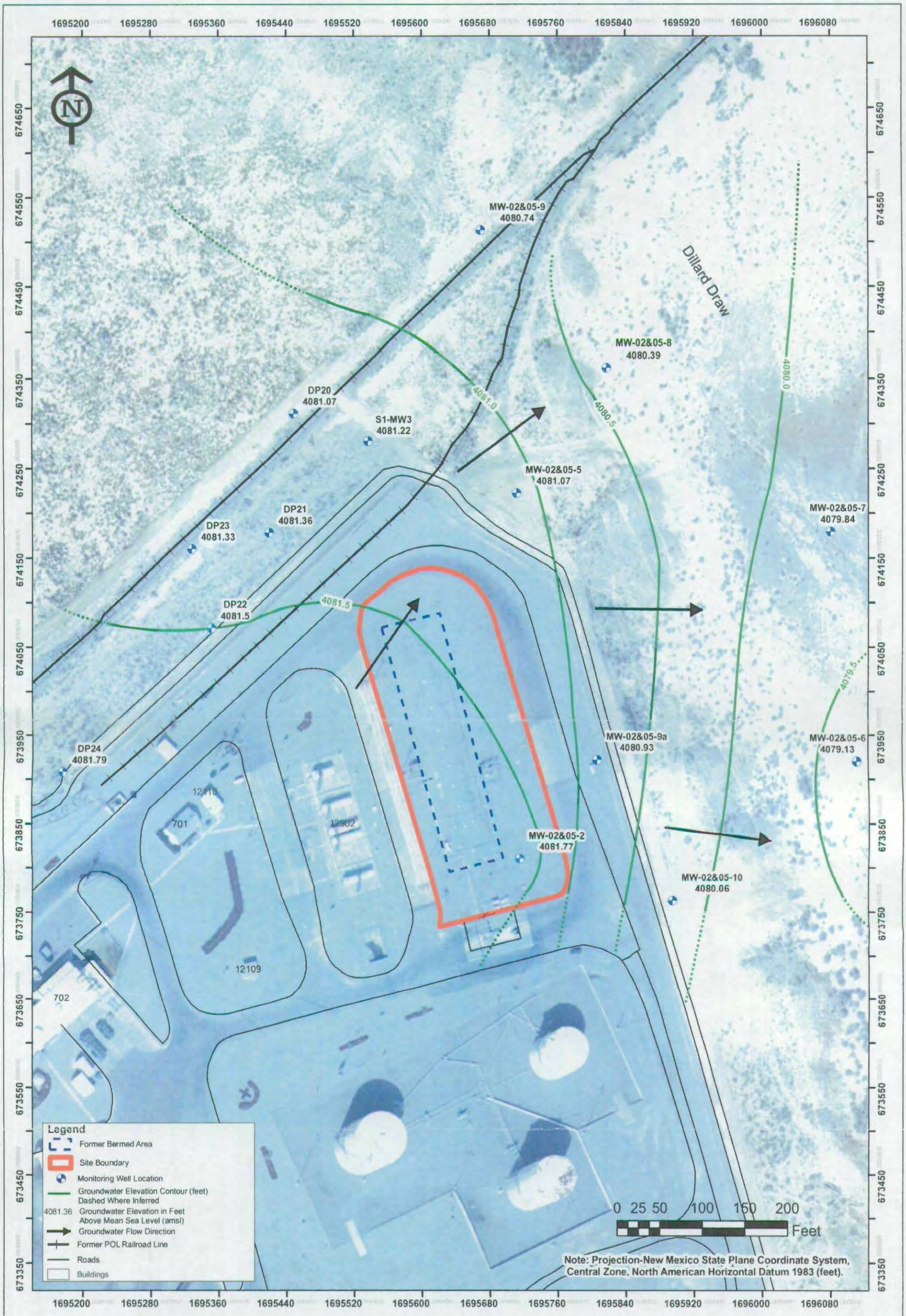


HOLLOMAN AFB, NM FT-31 LANDFARM	GROUNDWATER CONTOUR MAP (AUGUST, 2005)	FIGURE 1



GROUND WATER CONTOUR MAP
February 2011

DP-1466
FT-31 LAND FARM
HOLLOMAN AFB, NM
FIGURE 1



NATIONVIEW

Site SS-02/05
Potentiometric Surface Map
(July 2006)

PROJECT NO.	SCALE	DATE	DRAWN BY
8090013	1"=100'	1/7/11	cm

DRAWING NO. fig3-8

SS 02-05
ACM Completion Report
Holloman AFB, New Mexico

Figure 3-8

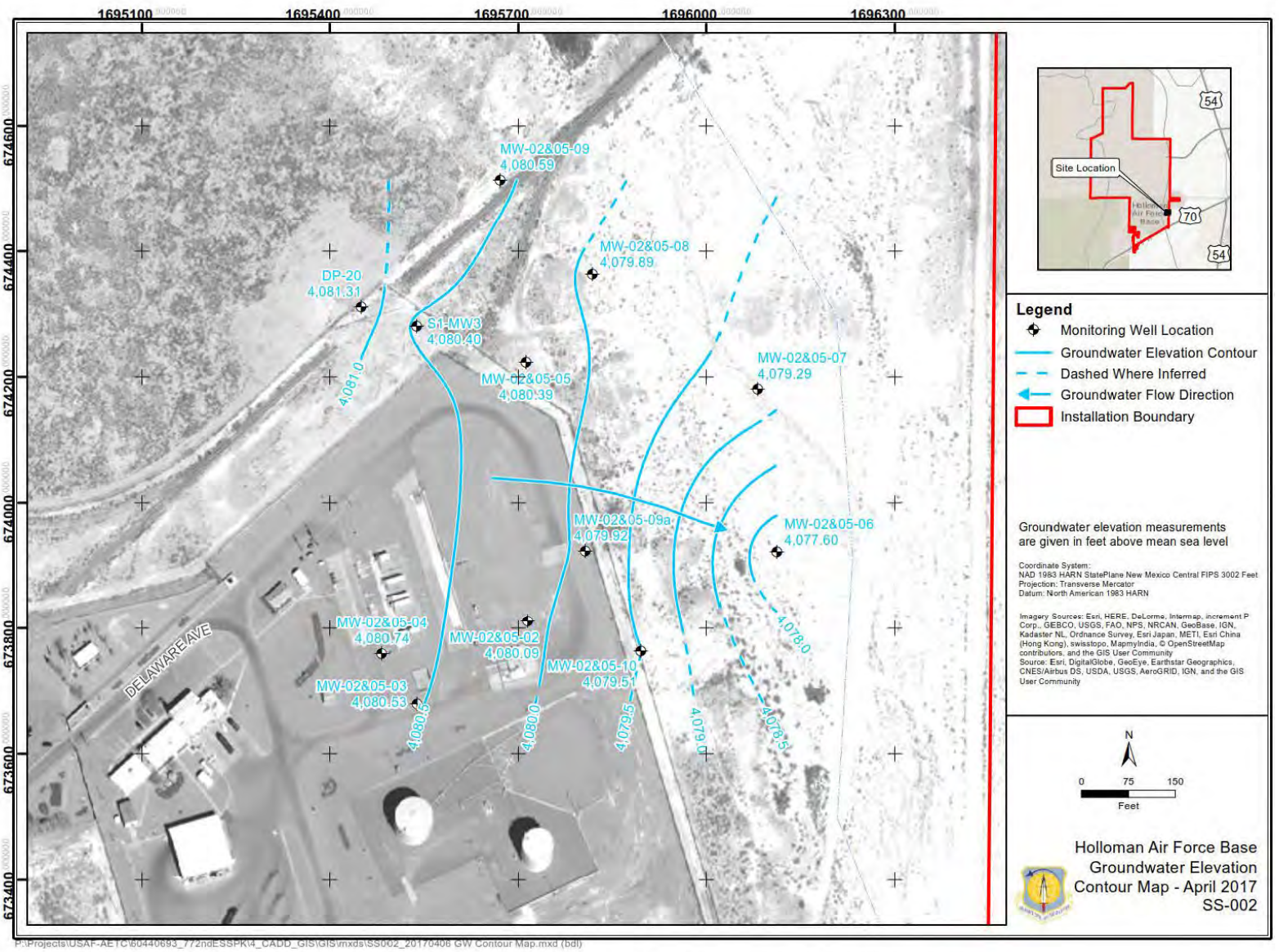


Figure 4-1. April 2017 Groundwater Elevation Contour Map

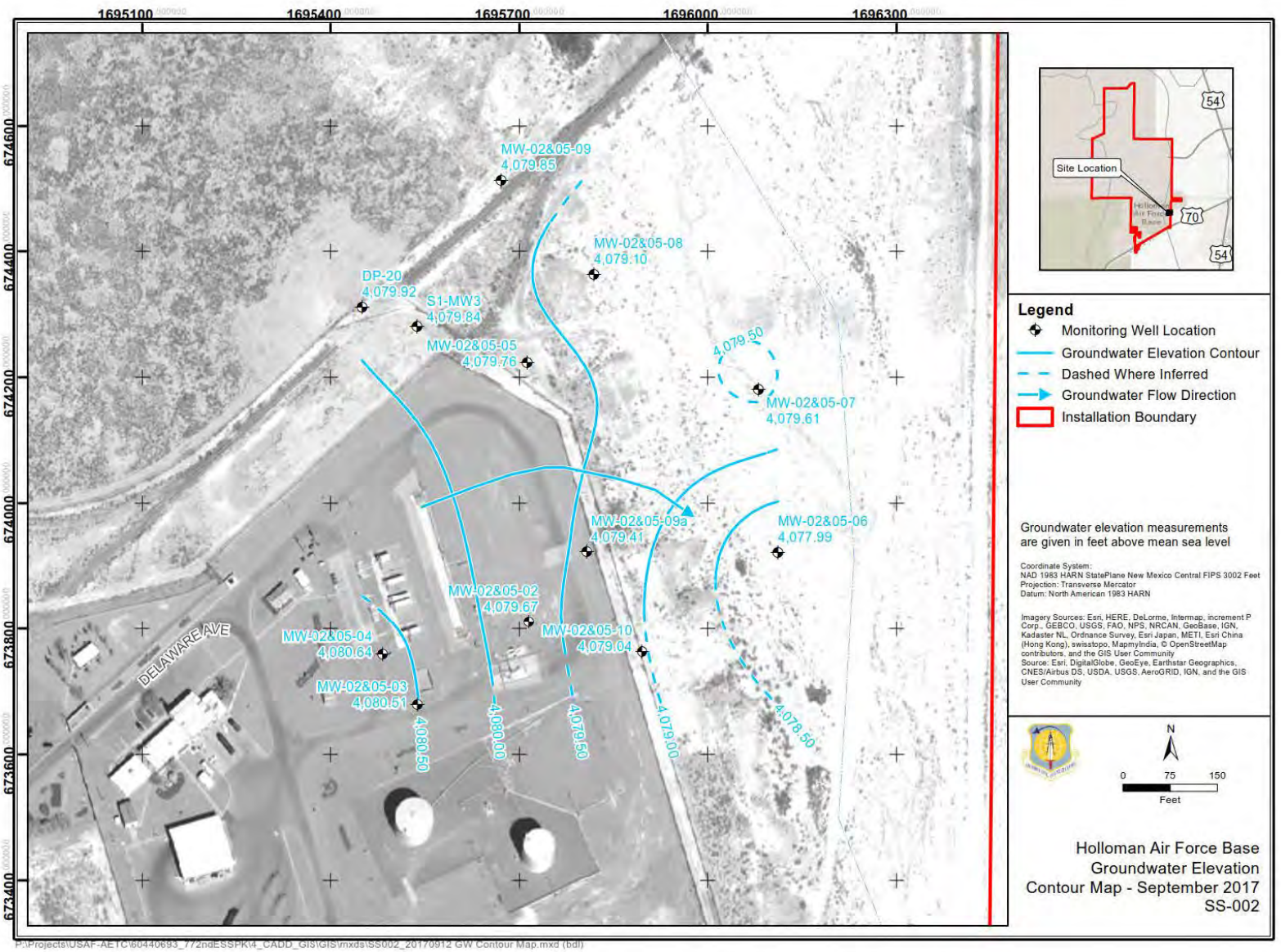


Figure 4-2. September 2017 Groundwater Elevation Contour Map

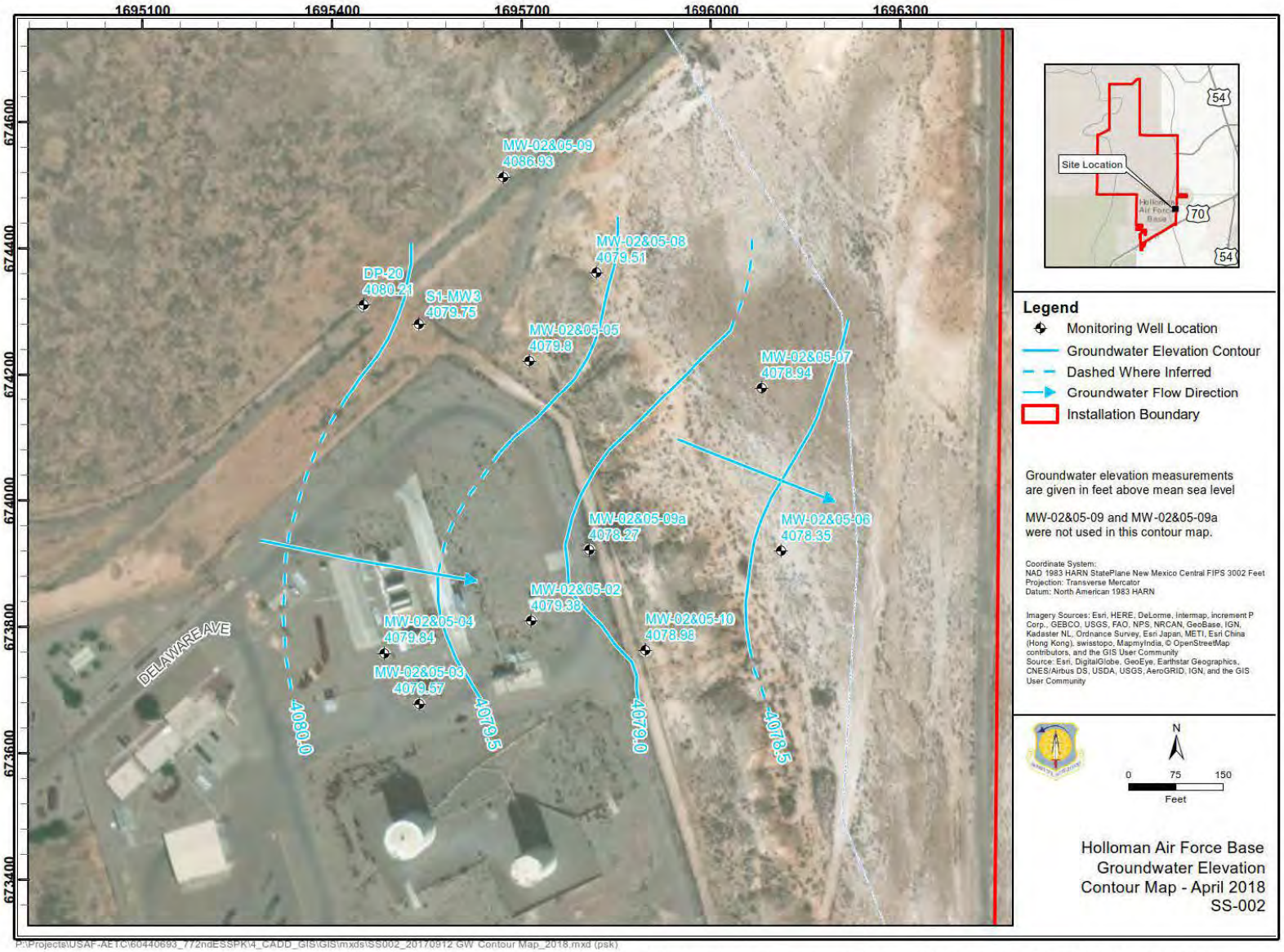


Figure 4-1 Holloman Air Force Base Groundwater Elevation Contour Map – Version 1 April 2018, SS-002

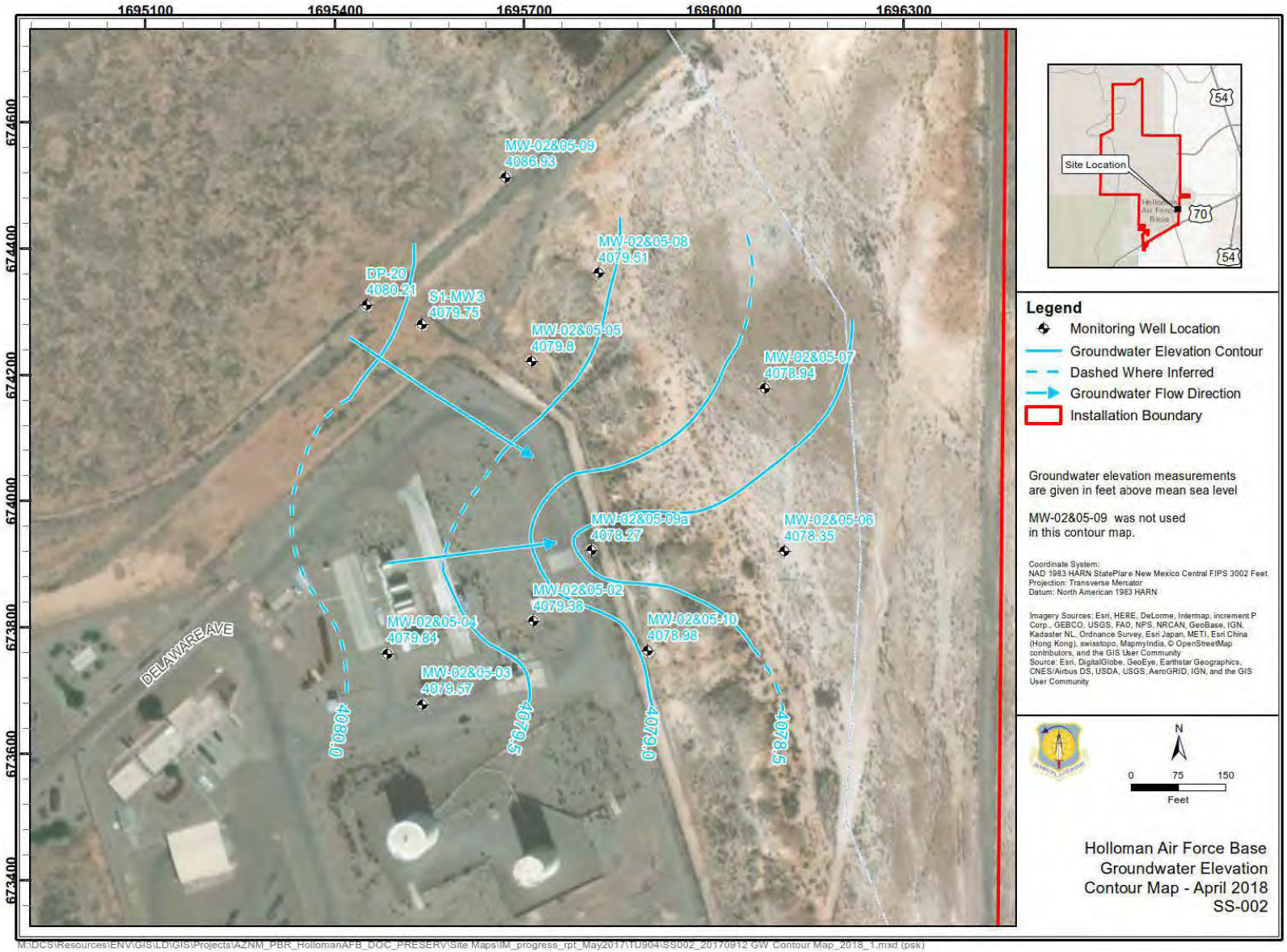


Figure 4-2 Holloman Air Force Base Groundwater Elevation Contour Map – Version 2 April 2018, SS-002

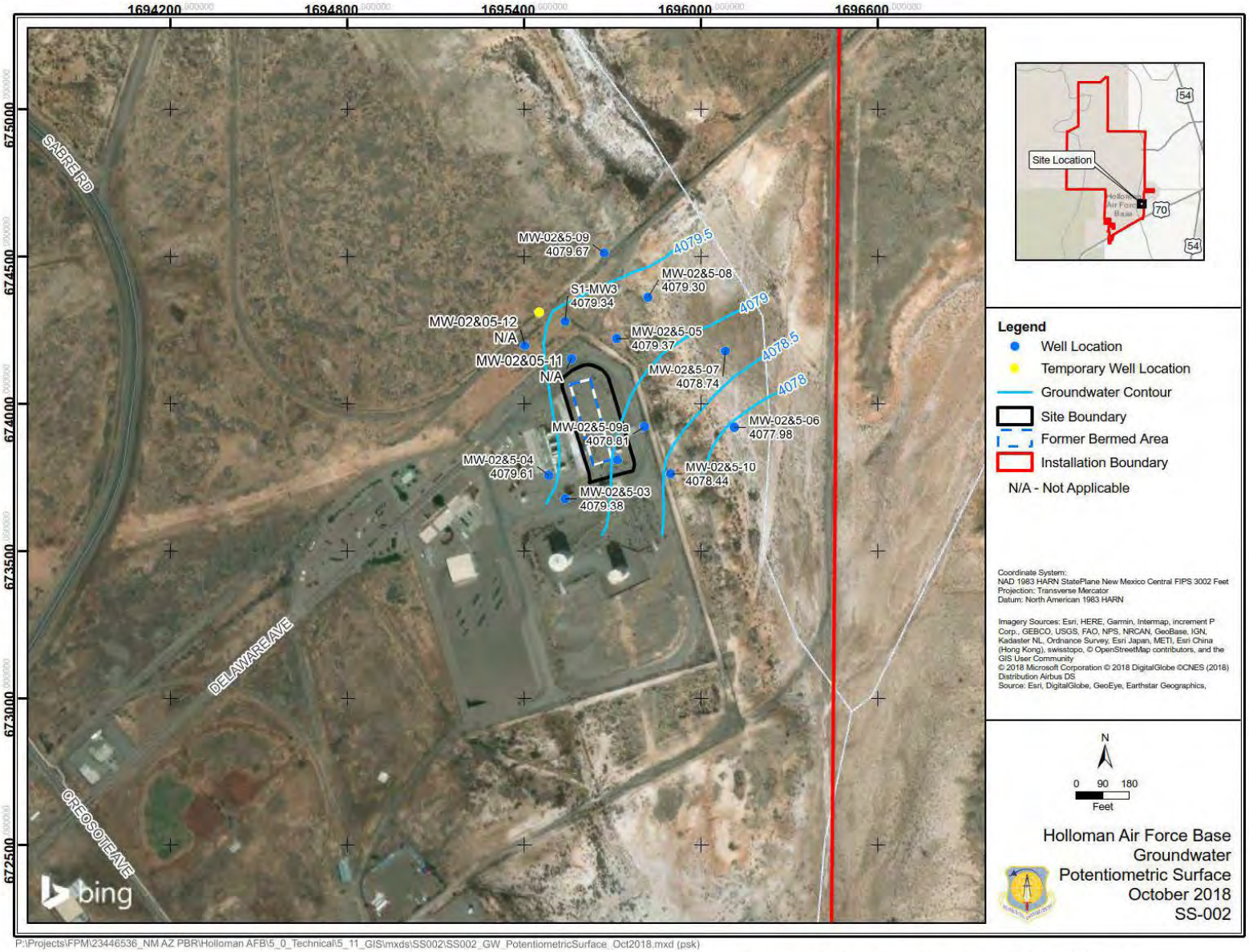
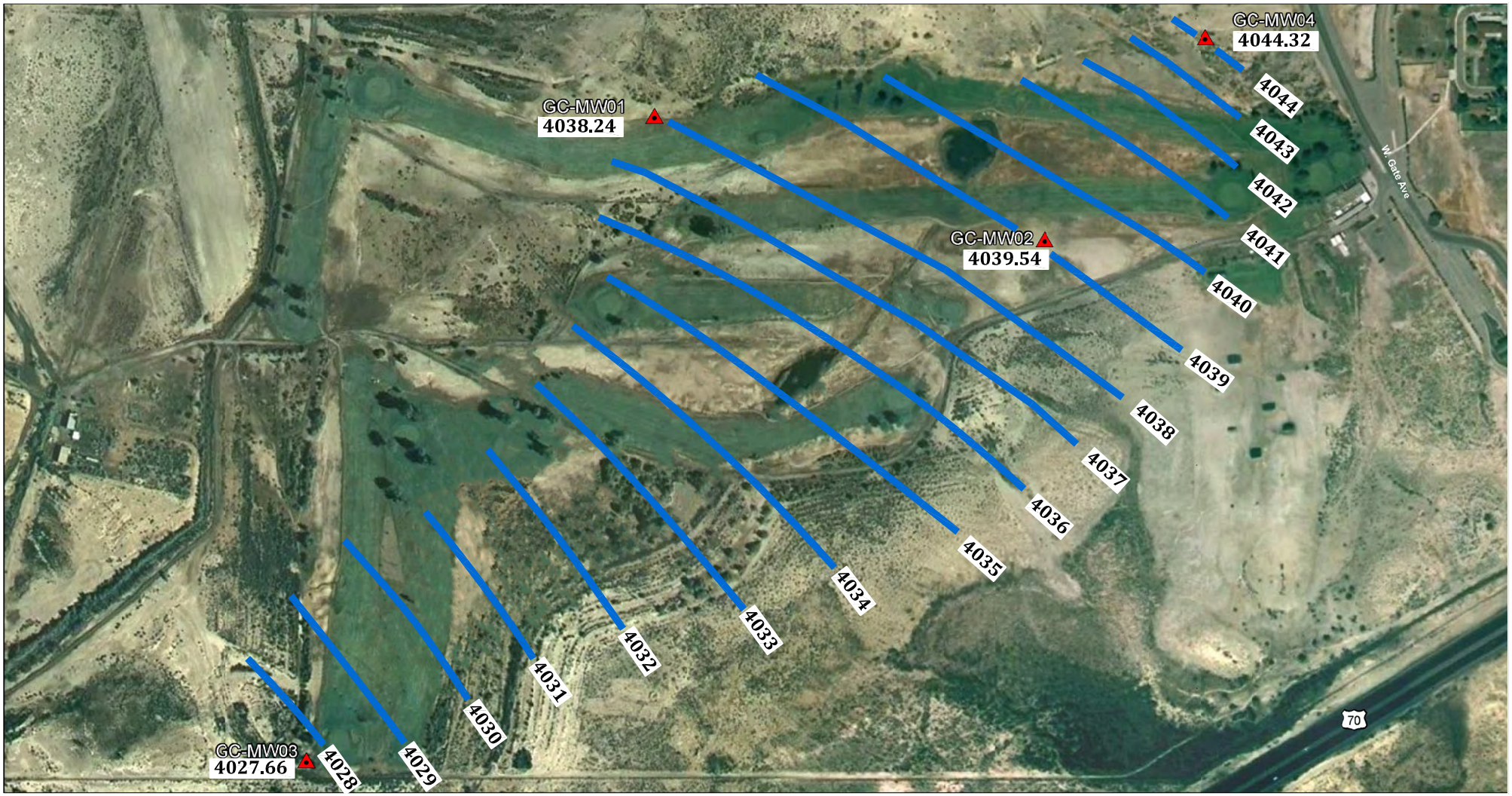


Figure 4-3 Holloman Air Force Base Groundwater Potentiometric Surface October 2018, SS-002



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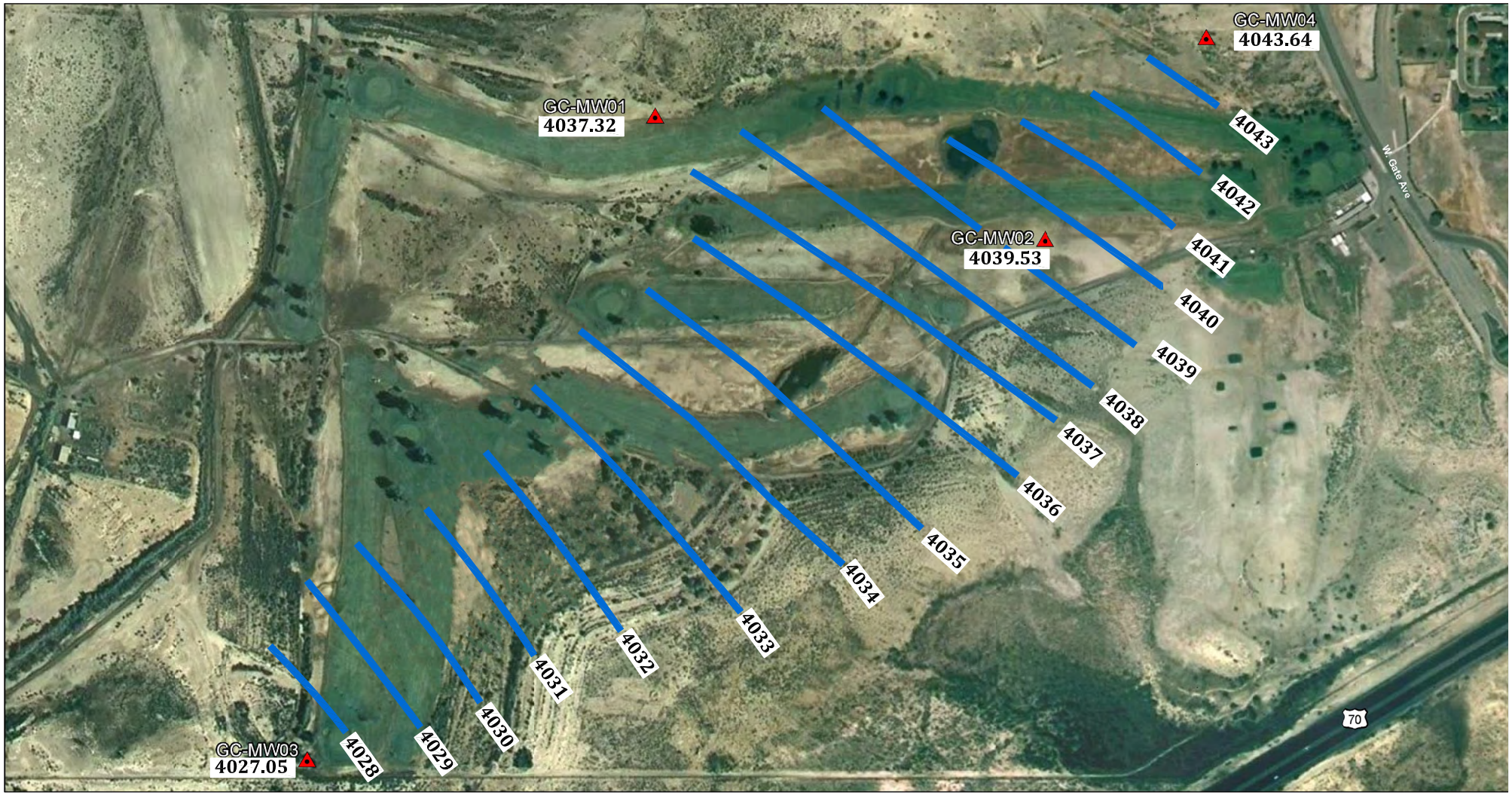
Figure 1
Golf Course Monitoring Well Location Map With Potentiometric Surface December 2020
Quarterly Groundwater Monitoring Report
Quarter 4, 2020
Holloman AFB, New Mexico
Base Map: World Aerial Imagery

Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet
0 150 300 600



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Figure 1
Golf Course Monitoring Well Location Map With Potentiometric Surface March 2021
Quarterly Groundwater Monitoring Report
Quarter 1, 2021
Holloman AFB, New Mexico

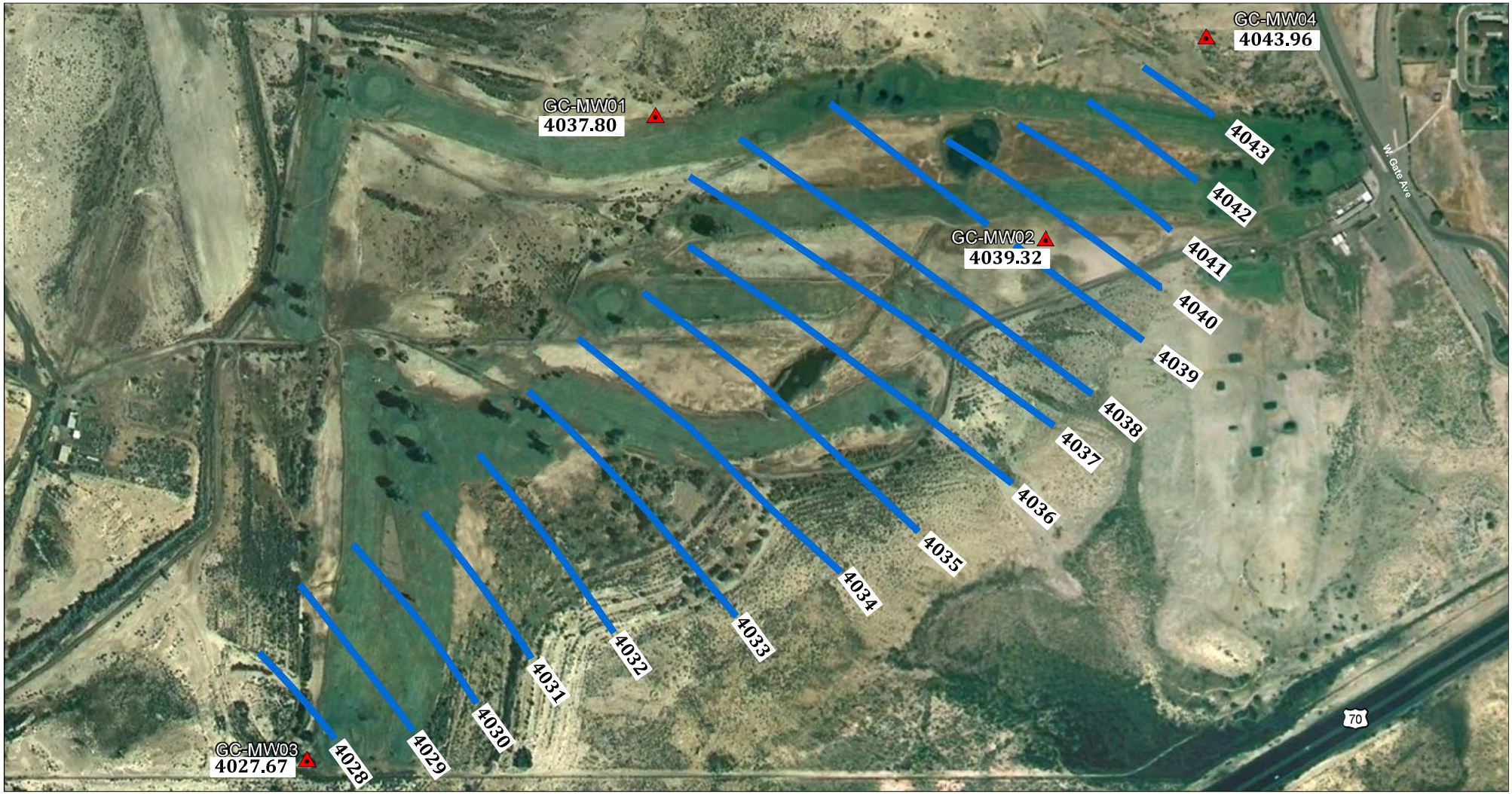
Base Map: World Aerial Imagery

Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet
0 150 300 600



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Figure 1

Golf Course Monitoring Well Location Map With Potentiometric Surface June 2021

Quarterly Groundwater Monitoring Report
Quarter 2, 2021
Holloman AFB, New Mexico

Base Map: World Aerial Imagery

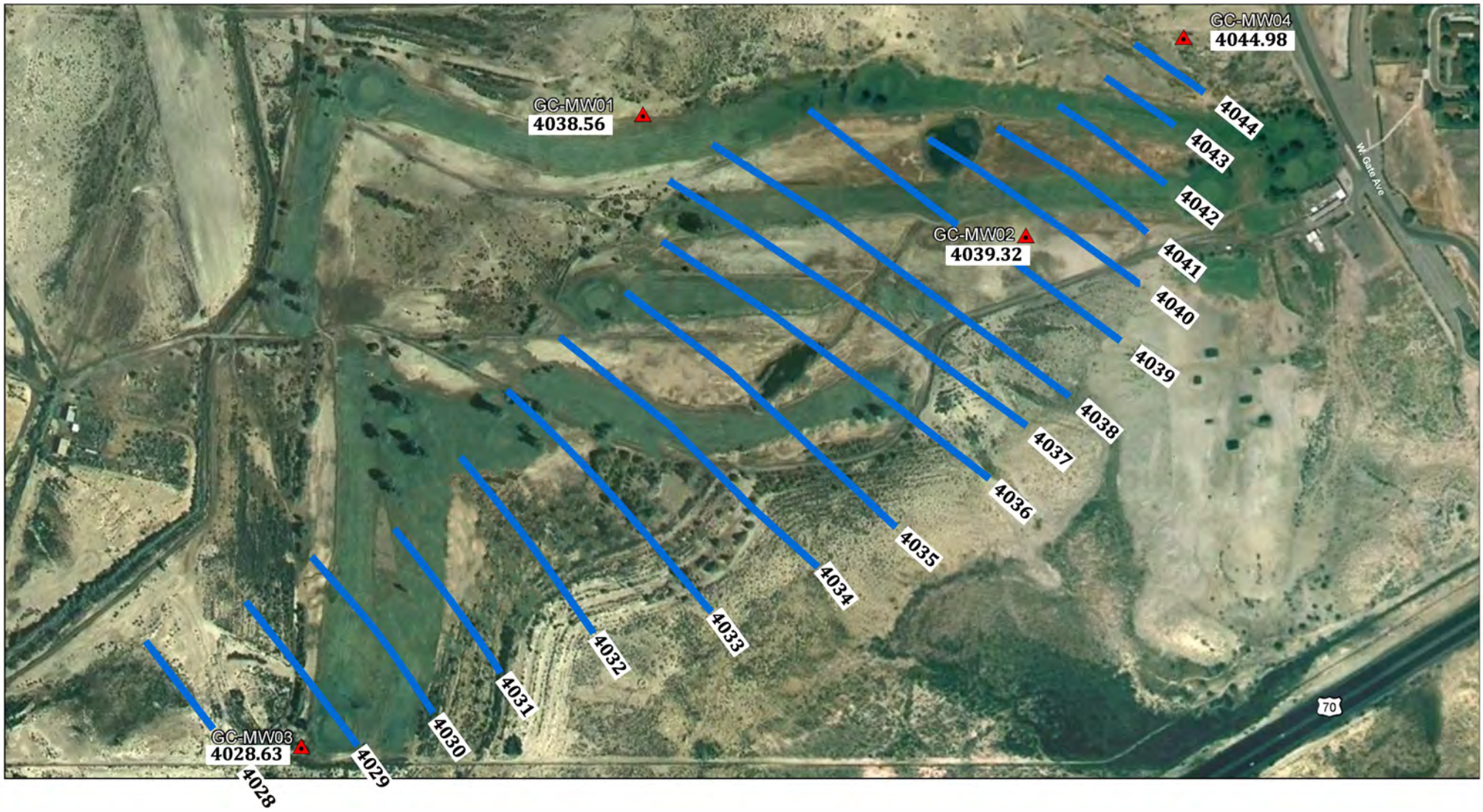
Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet

0 150 300 600



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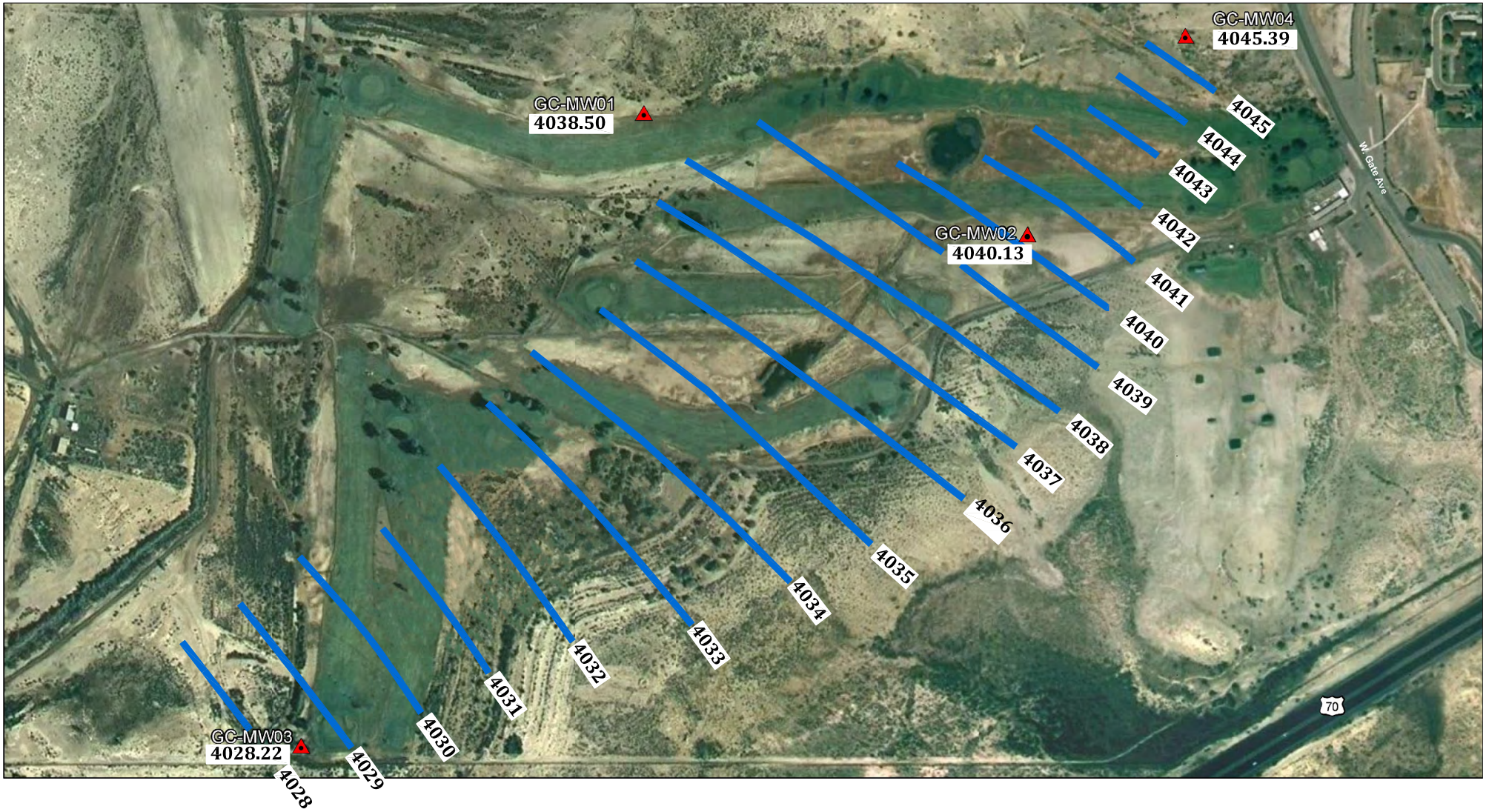
Figure 1
Golf Course Monitoring Well Location Map With Potentiometric Surface August 2021
Quarterly Groundwater Monitoring Report
Quarter 3, 2021
Holloman AFB, New Mexico
Base Map: World Aerial Imagery

▲ Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet
0 150 300 600



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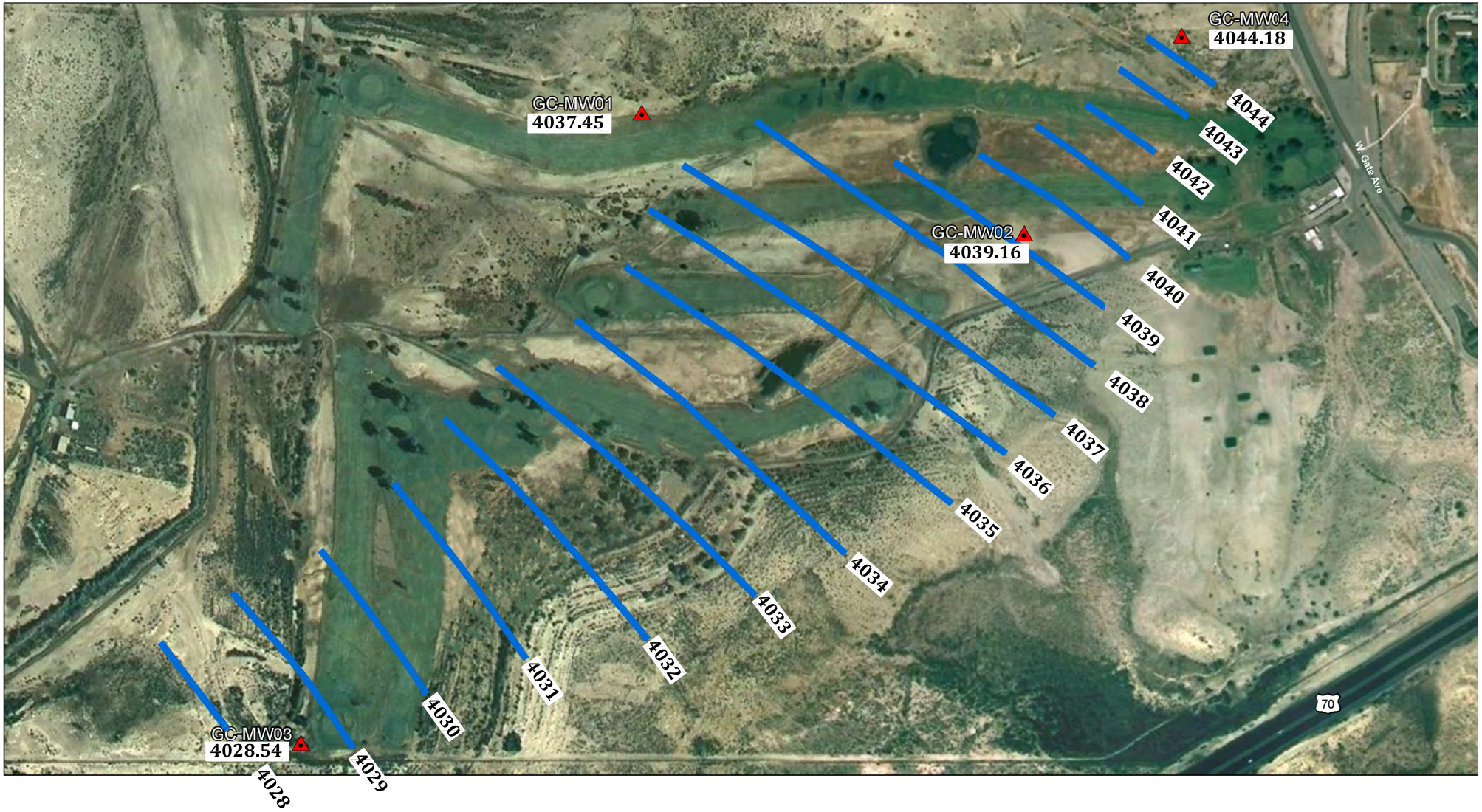
Figure 1
Golf Course Monitoring Well Location Map With Potentiometric Surface October 2021
Quarterly Groundwater Monitoring Report
Quarter 4, 2021
Holloman AFB, New Mexico
Base Map: World Aerial Imagery

Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet
0 150 300 600



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Figure 1

Golf Course Monitoring Well Location Map With Potentiometric Surface January 2022

Quarterly Groundwater Monitoring Report
Quarter 1, 2022
Holloman AFB, New Mexico

Base Map: World Aerial Imagery

Golf Course Monitoring Well (#)

Groundwater Contour (ft)

Contour Interval = 1 Foot

Feet
0 150 300 600

Appendix C

Results of Slug Tests at Holloman AFB

DBS&A
Daniel B. Stephens & Associates, Inc.

Slug Test Data for Holloman AFB Sites

ERP Site No.[1]	ERP Site Name[1]	Well ID	Test Type	Calculated Hydraulic Conductivity	Units	Source doc	Doc loc
LF-01	Main Base Landfill	MW-1	RH	3.00E-05	cm/sec	WHA, 1989	15
LF-01	Main Base Landfill	MW-2	RH	1.00E-05	cm/sec	WHA, 1989	15
LF-01	Main Base Landfill	MW-3	RH	2.00E-05	cm/sec	WHA, 1989	15
LF-01	Main Base Landfill	MW-4	RH	1.00E-04	cm/sec	WHA, 1989	15
LF-01	Main Base Landfill	MW-5	RH	5.00E-05	cm/sec	WHA, 1989	15
LF-10	Old Base Landfill	MW-1	RH	2.00E-04	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-2	RH	2.00E-04	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-3	RH	4.00E-04	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-4	RH	2.00E-04	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-5	RH	9.00E-04	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-6	RH	9.00E-05	cm/sec	WHA, 1989	75
LF-10	Old Base Landfill	MW-7	RH	2.00E-04	cm/sec	WHA, 1989	75
SS-17	BX Service Station	MW-1	RH	6.00E-04	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-2	RH	4.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-3	RH	2.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-4	RH	3.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-5	RH	2.00E-04	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-6	RH	8.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-7	RH	4.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-8	RH	2.00E-05	cm/sec	WHA, 1989	157
SS-17	BX Service Station	MW-9	RH	5.00E-04	cm/sec	WHA, 1989	157
FT-31	Fire Training Area (FT-31)	MW-3	RH	1.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-4	RH	1.00E-04	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-5	RH	4.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-6	RH	3.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-7	RH	6.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-8	RH	2.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	MW-9	RH	3.00E-05	cm/sec	WHA, 1989	228
FT-31	Fire Training Area (FT-31)	31-MW01	RH	1.09E-03	ft/min	Radian 1995a	341
FT-31	Fire Training Area (FT-31)	31-MW03	RH	1.17E-03	ft/min	Radian 1995a	342
FT-31	Fire Training Area (FT-31)	31-MW04	RH	1.25E-04	ft/min	Radian 1995a	343
FT-31	Fire Training Area (FT-31)	31-MW05	RH	8.47E-04	ft/min	Radian 1995a	344
FT-31	Fire Training Area (FT-31)	31-MW06	RH	5.54E-04	ft/min	Radian 1995a	345
FT-31	Fire Training Area (FT-31)	31-MW07	RH	1.03E-03	ft/min	Radian 1995a	346
FT-31	Fire Training Area (FT-31)	31-MW08	RH	1.63E-04	ft/min	Radian 1995a	347
FT-31	Fire Training Area (FT-31)	31-MW09	RH	3.56E-04	ft/min	Radian 1995a	348
FT-31	Fire Training Area (FT-31)	31-MW10	RH	5.27E-04	ft/min	Radian 1995a	349
FT-31	Fire Training Area (FT-31)	31-MW11	RH	1.08E-03	ft/min	Radian 1995a	350
FT-31	Fire Training Area (FT-31)	31-MW12	RH	4.45E-04	ft/min	Radian 1995a	351
FT-31	Fire Training Area (FT-31)	31-MW13	RH	7.69E-04	ft/min	Radian 1995a	352
50	Aircraft Maintenance Hangar	MW-1	RH	2.00E-04	cm/sec	WHA, 1989	301
50	Aircraft Maintenance Hangar	MW-2	RH	1.00E-03	cm/sec	WHA, 1989	301
50	Aircraft Maintenance Hangar	MW-3	RH	2.00E-04	cm/sec	WHA, 1989	301
50	Aircraft Maintenance Hangar	MW-4	RH	1.00E-04	cm/sec	WHA, 1989	301
50	Aircraft Maintenance Hangar	MW-6	RH	3.00E-04	cm/sec	WHA, 1989	301
51	Old Age Refueling Station	MW-1	RH	6.00E-05	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-2	RH	4.00E-05	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-3	RH	2.00E-04	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-4	RH	7.00E-04	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-5	RH	7.00E-04	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-7	RH	3.00E-04	cm/sec	WHA, 1989	32
51	Old Age Refueling Station	MW-8	RH	2.00E-04	cm/sec	WHA, 1989	32
53	JP-4 Underground Waste Tank	MW-1	RH	1.00E-04	cm/sec	WHA, 1989	87

Slug Test Data for Holloman AFB Sites

ERP Site No.[1]	ERP Site Name[1]	Well ID	Test Type	Calculated Hydraulic Conductivity	Units	Source doc	Doc loc
53	JP-4 Underground Waste Tank	MW-2	RH	2.00E-04	cm/sec	WHA, 1989	87
53	JP-4 Underground Waste Tank	MW-3	RH	9.00E-05	cm/sec	WHA, 1989	87
53	JP-4 Underground Waste Tank	MW-4	RH	9.00E-05	cm/sec	WHA, 1989	87
54	POL Washrack Discharge Area	MW-1	RH	1.00E-04	cm/sec	WHA, 1989	126
54	POL Washrack Discharge Area	MW-2	RH	9.00E-05	cm/sec	WHA, 1989	126
54	POL Washrack Discharge Area	MW-3	RH	4.00E-05	cm/sec	WHA, 1989	126
54	POL Washrack Discharge Area	MW-4	RH	3.00E-04	cm/sec	WHA, 1989	126
54	POL Washrack Discharge Area	MW-7	RH	9.00E-05	cm/sec	WHA, 1989	126
54	POL Washrack Discharge Area	MW-8	RH	2.00E-04	cm/sec	WHA, 1989	126
55	Military Gas Station	MW-1	RH	2.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-2	RH	3.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-3	RH	2.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-4	RH	3.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-5	RH	3.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-6	RH	3.00E-04	cm/sec	WHA, 1989	187
55	Military Gas Station	MW-7	RH	1.00E-03	cm/sec	WHA, 1989	187
	Sewage Lagoons/Lake Holloman	S-2	FH	3.30E-05	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-4	FH	4.00E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-5	FH	2.90E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-8	FH	2.60E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-11	FH	3.80E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-15	FH	3.30E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	S-16	FH	2.20E-03	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	D-2	FH	1.30E-04	cm/sec	Radian, 1989	88
	Sewage Lagoons/Lake Holloman	D-5	FH	1.50E-04	cm/sec	Radian, 1989	88
	Sites 2&5--POL Spill Sites Nos. 1 and 2	MW-02&05-0	RH	7.21E-04	cm/sec	Radian, 1992	4-40
	Sites 2&5--POL Spill Sites Nos. 1 and 2	MW-02&05-0	RH	9.42E-04	cm/sec	Radian, 1992	4-40
	Sites 2&5--POL Spill Sites Nos. 1 and 2	MW-02&05-0	RH	1.13E-03	cm/sec	Radian, 1992	4-40
	Sites 2&5--POL Spill Sites Nos. 1 and 2	MW-02&05-0	RH	1.52E-03	cm/sec	Radian, 1992	4-40
	Sites 2&5--POL Spill Sites Nos. 1 and 2	MW-02&05-0	RH	4.23E-04	cm/sec	Radian, 1992	4-40
	Site 3	MW-03-01	RH	1.19E-03	cm/sec	Radian, 1992	4-40
	Acid Trailer Burial Site	MW-04-01	RH	1.46E-04	cm/sec	Radian, 1992	4-87
	Acid Trailer Burial Site	MW-04-02	RH	5.66E-04	cm/sec	Radian, 1992	4-87
	Acid Trailer Burial Site	MW-04-03	RH	1.12E-03	cm/sec	Radian, 1992	4-87
	Acid Trailer Burial Site	MW-04-04	RH	5.37E-04	cm/sec	Radian, 1992	4-87
	Refuse Collection Truck Washrack	MW-08-01	RH	1.52E-03	cm/sec	Radian, 1992	4-99
	Refuse Collection Truck Washrack	MW-08-02	RH	2.29E-03	cm/sec	Radian, 1992	4-99
	Refuse Collection Truck Washrack	MW-08-03	RH	6.62E-03	cm/sec	Radian, 1992	4-99
	Waste POL Drum Storage/Spill Area	MW-09-01	RH	5.09E-04	cm/sec	Radian, 1992	4-126
	Waste POL Drum Storage/Spill Area	MW-09-02	RH	9.87E-04	cm/sec	Radian, 1992	4-126
	Waste POL Drum Storage/Spill Area	MW-09-03	RH	1.05E-03	cm/sec	Radian, 1992	4-126
	Waste POL Drum Storage/Spill Area	MW-09-04	RH	1.54E-03	cm/sec	Radian, 1992	4-126
	Former Entomology Shop Area	MW-14-01	RH	8.09E-03	cm/sec	Radian, 1992	4-154
	Former Entomology Shop Area	MW-14-02	RH	3.56E-03	cm/sec	Radian, 1992	4-154
	Former Entomology Shop Area	MW-14-03	RH	3.19E-03	cm/sec	Radian, 1992	4-154
	Former Entomology Shop Area	MW-14-04	RH	3.70E-03	cm/sec	Radian, 1992	4-154
	Existing Entomology Shop Area	MW-16-01	RH	2.25E-03	cm/sec	Radian, 1992	4-172
	Existing Entomology Shop Area	MW-16-02	RH	4.22E-03	cm/sec	Radian, 1992	4-172
	Existing Entomology Shop Area	MW-16-03	RH	5.16E-03	cm/sec	Radian, 1992	4-172
	Existing Entomology Shop Area	MW-16-04	RH	8.39E-04	cm/sec	Radian, 1992	4-172
	Golf Course Landfill	MW-19-01	RH	7.21E-04	cm/sec	Radian, 1992	4-189
	Golf Course Landfill	MW-19-02	RH	9.42E-04	cm/sec	Radian, 1992	4-189
	Golf Course Landfill	MW-19-03	RH	1.13E-03	cm/sec	Radian, 1992	4-189

Slug Test Data for Holloman AFB Sites

ERP Site No.[1]	ERP Site Name[1]	Well ID	Test Type	Calculated Hydraulic Conductivity	Units	Source doc	Doc loc
	West Area Landfill No. 2	MW-21-01	RH	3.98E-04	cm/sec	Radian, 1992	4-211
	West Area Landfill No. 2	MW-21-02	RH	1.53E-03	cm/sec	Radian, 1992	4-211
	West Area Landfill No. 2	MW-21-03	RH	2.20E-03	cm/sec	Radian, 1992	4-211
	West Area Landfill No. 2	MW-21-04	RH	3.61E-03	cm/sec	Radian, 1992	4-211
	West Area Landfill No. 1	MW-22-01	RH	4.51E-04	cm/sec	Radian, 1992	4-224
	West Area Landfill No. 1	MW-22-02	RH	4.79E-04	cm/sec	Radian, 1992	4-224
	West Area Landfill No. 1	MW-22-03	RH	1.62E-03	cm/sec	Radian, 1992	4-224
	West Area Landfill No. 1	MW-22-04	RH	1.63E-03	cm/sec	Radian, 1992	4-224
	MOBSS Landfill	MW-23-01	RH	1.65E-03	cm/sec	Radian, 1992	4-237
	MOBSS Landfill	MW-23-02	RH	8.56E-04	cm/sec	Radian, 1992	4-237
	MOBSS Landfill	MW-23-03	RH	1.06E-03	cm/sec	Radian, 1992	4-237
	MOBSS Landfill	MW-23-04	RH	7.86E-04	cm/sec	Radian, 1992	4-237
	Former Equipment Maintenance Area	MW-24-01	RH	1.04E-03	cm/sec	Radian, 1992	4-248
	Former Equipment Maintenance Area	MW-24-02	RH	1.17E-03	cm/sec	Radian, 1992	4-248
	Former Equipment Maintenance Area	MW-24-03	RH	2.21E-03	cm/sec	Radian, 1992	4-248
	Former Equipment Maintenance Area	MW-24-04	RH	1.12E-03	cm/sec	Radian, 1992	4-248
	Former Equipment Maintenance Area	MW-24-05	RH	1.23E-03	cm/sec	Radian, 1992	4-248
	Former Equipment Maintenance Area	MW-24-06	RH	9.38E-04	cm/sec	Radian, 1992	4-248
	Possible Missile Fuel Spill Site	MW-26-01	RH	1.05E-03	cm/sec	Radian, 1992	4-265
	Possible Missile Fuel Spill Site	MW-26-02	RH	1.66E-03	cm/sec	Radian, 1992	4-265
	Possible Missile Fuel Spill Site	MW-26-03	RH	2.04E-03	cm/sec	Radian, 1992	4-265
	Possible Missile Fuel Spill Site	MW-26-04	RH	2.02E-03	cm/sec	Radian, 1992	4-265
	Former North Area Washrack	MW-28-01	RH	2.41E-03	cm/sec	Radian, 1992	4-280
	Former North Area Washrack	MW-28-02	RH	1.04E-03	cm/sec	Radian, 1992	4-280
	Former North Area Washrack	MW-28-03	RH	5.63E-03	cm/sec	Radian, 1992	4-280
	Former Army Landfill	MW-29-01	RH	4.23E-04	cm/sec	Radian, 1992	4-294
	Former Army Landfill	MW-29-02	RH	2.04E-03	cm/sec	Radian, 1992	4-294
	Former Army Landfill	MW-29-03	RH	5.93E-04	cm/sec	Radian, 1992	4-294
	Grease Trap & Cooking Grease Disposal Pits	MW-30&33-0	RH	2.94E-03	cm/sec	Radian, 1992	4-309
	Grease Trap & Cooking Grease Disposal Pits	MW-30&33-0	RH	4.25E-04	cm/sec	Radian, 1992	4-309
	Grease Trap & Cooking Grease Disposal Pits	MW-30&33-0	RH	1.52E-04	cm/sec	Radian, 1992	4-309
	Grease Trap & Cooking Grease Disposal Pits	MW-30&33-0	RH	6.36E-04	cm/sec	Radian, 1992	4-309
	Unconventional Fuels Area Spill Site	MW-36-01	RH	4.19E-04	cm/sec	Radian, 1992	4-347
	Unconventional Fuels Area Spill Site	MW-36-02	RH	7.19E-04	cm/sec	Radian, 1992	4-347
	Unconventional Fuels Area Spill Site	MW-36-03	RH	1.54E-03	cm/sec	Radian, 1992	4-347
	Unconventional Fuels Area Spill Site	MW-36-04	RH	7.10E-04	cm/sec	Radian, 1992	4-347
	Unconventional Fuels Area Spill Site	MW-36-05	RH	1.18E-03	cm/sec	Radian, 1992	4-347
	Early Missile Testing Site	MW-37-01	RH	1.59E-03	cm/sec	Radian, 1992	4-362
	Early Missile Testing Site	MW-37-02	RH	8.78E-04	cm/sec	Radian, 1992	4-362
	Early Missile Testing Site	MW-37-03	RH	4.97E-03	cm/sec	Radian, 1992	4-362
	Early Missile Testing Site	MW-37-04	RH	7.08E-04	cm/sec	Radian, 1992	4-362
	Early Missile Testing Site	MW-37-05	RH	1.58E-03	cm/sec	Radian, 1992	4-362
	Early Missile Testing Site	MW-37-06	RH	4.07E-04	cm/sec	Radian, 1992	4-362
	Sled Test Maintenance Area	MW-38-01	RH	6.17E-03	cm/sec	Radian, 1992	4-386
	Sled Test Maintenance Area	MW-38-02	RH	1.45E-03	cm/sec	Radian, 1992	4-386
	Sled Test Maintenance Area	MW-38-03	RH	3.88E-03	cm/sec	Radian, 1992	4-386
	Missile Fuel Spill Area	MW-39-01	RH	8.64E-04	cm/sec	Radian, 1992	4-400
	Missile Fuel Spill Area	MW-39-02	RH	2.03E-03	cm/sec	Radian, 1992	4-400
	Missile Fuel Spill Area	MW-39-03	RH	1.74E-03	cm/sec	Radian, 1992	4-400
	Missile Fuel Spill Area	MW-39-04	RH	6.76E-05	cm/sec	Radian, 1992	4-400
	Coco Blockhouse Borehole Disposal Site	MW-41-01	RH	1.36E-03	cm/sec	Radian, 1992	4-423
	Coco Blockhouse Borehole Disposal Site	MW-41-02	RH	1.72E-03	cm/sec	Radian, 1992	4-423
	Coco Blockhouse Borehole Disposal Site	MW-41-03	RH	2.08E-03	cm/sec	Radian, 1992	4-423

Slug Test Data for Holloman AFB Sites

ERP Site No.[1]	ERP Site Name[1]	Well ID	Test Type	Calculated Hydraulic Conductivity	Units	Source doc	Doc loc
	Coco Blockhouse Borehole Disposal Site	MW-41-04	RH	2.09E-03	cm/sec	Radian, 1992	4-423
LF-58	Incinerator Landfill	58-MW01	RH	1.46E-03		Radian, 1995b	896
LF-58	Incinerator Landfill	58-MW02	RH	1.60E-03		Radian, 1995b	897
LF-58	Incinerator Landfill	58-MW03	RH	1.11E-03		Radian, 1995b	898
LF-58	Incinerator Landfill	58-MW04	RH	3.63E-04		Radian, 1995b	899

Results of Constant Rate Aquifer Tests at Sewage Lagoons

Well ID	Well Type	Screen Interval (ft bgs)	Pumping Rate (gpm)	Duration (minutes)	Transmissivity (gpd/ft)	Storage Coefficient	Hydraulic Conductivity	
							(gpd/ft2)	(cm/s)
P-1	Pumping	57-67	2	130	126	NR	12.6	5.95E-04
S-12	Observation	4-9			ND	ND	ND	ND
D-3	Observation	58-68			377	0.00005	37.7	1.78E-03
P-2	Pumping	42-52	5	420	106	NR	10.6	5.00E-04
S-13	Observation	4-13			ND	ND	ND	ND
S-14	Observation	29-34			ND	ND	ND	ND
D-4	Observation	39-49			330	0.0002	33	1.56E-03

Source: Radian, 1989, Table 4-5 & 4-6

Notes:

ft bgs = Feet below ground surface

gpm = Gallons per minute

gpd/ft = Gallons per day per foot

gpd/ft2 = gallons per day per square foot

cm/s = Centimeters per second

NR = Not reported

ND = No data

Appendix D

Field Notes and Laboratory Report for DBS&A Sampling

DBS&A
Daniel B. Stephens & Associates, Inc.

1/11/22 J. FISHER

0915 ONSITE @ MW05001. WEATHER IS COLD (~39°F), SUNNY, CALM.

CALIBRATE YSI PRO SN: 20F162251

pH: 4.00/4.01 @ 3.6°C

7.10/7.10 @ 5.2°C

10.25/10.26 @ 5.2°C

SC: 1413/1413 µS/cm @ 4.4°C

DO: P_b = 667.1 mm Hg @ 3.7°C

% SAT'N = 88.3% @ 3.9°C

~~Cond~~ [DI] = 7.50 mg/L @ 6.1°C

ORP = 257.7/257.7 mV @ 5.2°C

MW05001 DTW = 7.14 TD = 27.98

TIME	V_{O_2}(BAR)	pH	T(°C)	SC (mS/cm)	DO (mg/L)	ORP (mV)	COMMENTS
1106	INITIAL	7.27	19.7	~~3483~~	1.77	198.2	CLEAR, NO
1111	0.9	7.33	20.5	3634	1.38	149.3	" "
1113	0.8	7.35	20.6	3781	0.92	141.3	" "
1117	0.5	7.37	20.6	3823	1.13	133.6	" "

~~1120~~ 1120 COLLECT SAMPLE MW05001

1100 COLLECT EQUIPMENT BLANK

1120 1.9 7.34 20.7 3870 0.82 126.6 " "

1225 @ FT31-LM4

DTW = 24.15 btoc TD = 31.31 btoc

1135 COLLECT SEDIMENT SAMPLE SED-8.

J-Fisher

1/10/22

FT31-LM4

Time	Vol(Gal)	pH	T(°C)	SC(µS/cm)	DO(mg/L)	ORP(mV)	
~~1247~~	Initial	7.09	19.8	24700	0.46	151.9	Clear
1252	0.2	7.10	20.1	24804	0.33	147.7	Clear, No Odor
1257	0.5	7.10	20.2	24816	0.31	144.3	" "
1302	0.8	7.11	20.1	25000	0.30	140.0	" "
1305	Collect Samples						

MW01004 DTW=21.29' btoc ~~DTW~~ TD=28.32' btoc ~~DTW~~

~~1345~~	Initial	7.11	19.5	25109	1.99	206.9	Clear, No Odor
1350	0.2	7.11	19.8	25117	1.58	182.8	" "
1355	0.5	7.11	19.7	25126	1.44	165.5	" "
1400	0.8	7.10	19.7	25120	1.38	163.0	" "
1404	Collect Samples						

FT31-LM5 DTW=~~23~~.81' btoc TD=37.24'

1438	Initial	6.98	19.3	29404	0.52	167.9	Clear, No Odor
1443	0.2	6.97	19.9	29520	0.36	155.4	" "
1448	0.5	6.97	19.8	29579	0.34	153.2	" "
1453	0.8	6.97	19.8	29502	0.32	150.3	" "
1455	Collect Samples						

FT31-LM1 DTW = 23.49' btoc TD=29.96'

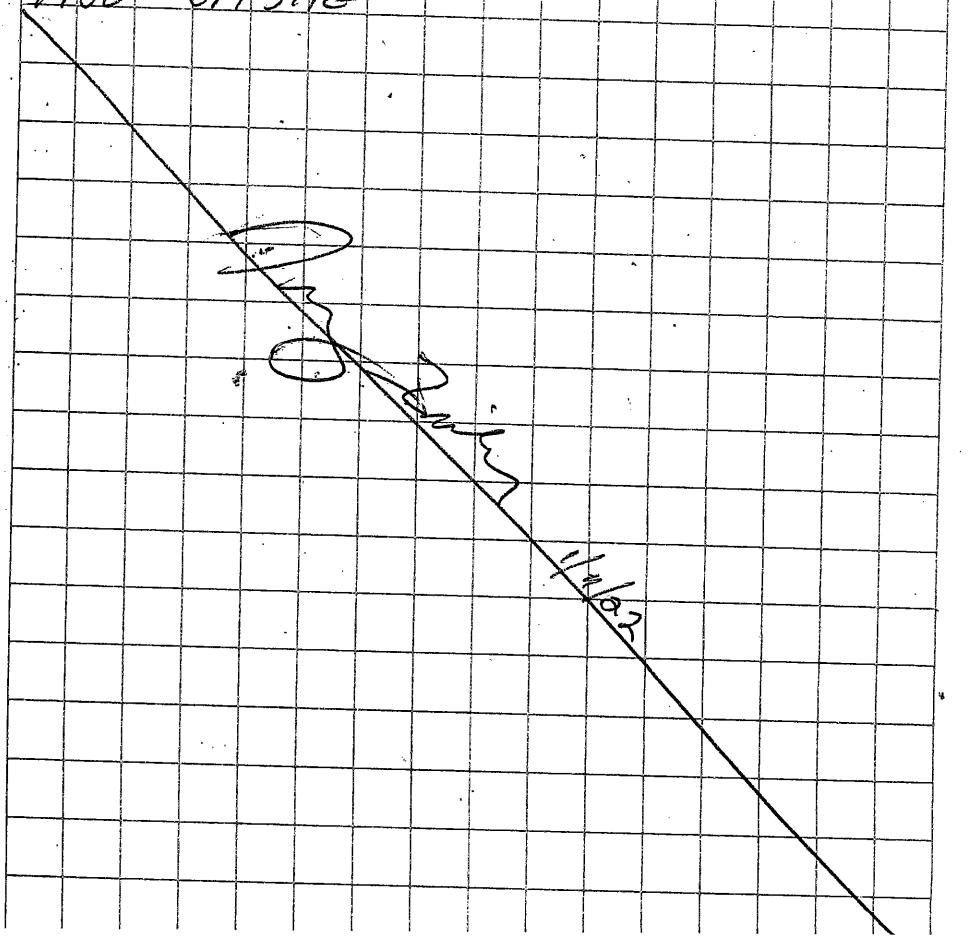
1534	Initial	7.13	18.7	26987	2.93	185.9	Clear No Odor
1539	0.2	7.13	19.5	27109	2.23	159.1	" "
1544	0.5	7.13	19.5	27105	2.21	151.0	" "
1549	0.8	7.14	19.4	27095	2.32	148.3	" "
1550	Collect Samples						

1/11/22

F

FT31-LM2 DTW = 23.24' btoc TD = 30.40' btoc

Time	Vol(Gal)	pH	T(°C)	SC(µS/cm)	DO(mg/L)	ORP(mV)	Comments
1617	Initial	7.29	19.1	25657	4.48	142.9	Clear, No Odor
1622	0.2	7.30	19.5	25738	3.98	142.9	"
1627	0.5	7.29	19.5	25727	4.12	142.4	"
1632	0.8	7.29	19.5	25692	3.97	141.5	" "
1635	Collect Samples						
1650	Collect Field Blank						
1700	OFFSITE						



1/12/22 5

0900 @ SECURED AREA TO SAMPLE MW-29-01.

0915 CALIBRATE YSI PRO. SN: 20F102231

pH: 4.00/4.01 @ 3.7°C

7.10/7.10 @ 4.2°C

10.27/10.27 @ 4.1°C

SC: 1413/1413 @ 3.2°C ORP: 232/232.0 @ 2.9°C

DO: P_o = 663.5 mmHg

%SAT'N = 87.6% @ 4.1°C

[DI] = 7.00 mg/L @ 6.5°C

MW-29-01: DTW = 21.85' btoc TD = 29.01' btoc

TIME	VOL(GAL)	pH	T(°C)	SC(µS/cm)	DO(mg/L)	ORP(mV)	COMMENTS
0953	INITIAL	7.12	17.1	24656	3.56	169.2	CLEAR NO ODOR
0958	0.2	7.17	18.4	24610	3.20	161.0	" "
1003	0.5	7.17	18.5	24621	2.40	144.9	" "
1008	0.7	7.16	18.4	24601	2.23	139.4	" "
1010	COLLECT SAMPLES						

EQUIPMENT BLANK COLLECTED @ 0937.

MW-02&05-06 DTW = 6.62 TD = WELL IS OBSTRUCTED BY ROOTS

MW-02&05-07 & MW-02&05-08 ARE ALSO ROOT BOUND.

1/12/22 3

MW-02&05-10 DTW = 17.73' btoc TD = 22.64' btoc

TIME	VOL(GAL)	pH	T(°C)	SC(µS/cm)	DO(mg/L)	ORP(mV)	COMMENTS
1209	INITIAL	6.87	18.8	8197	0.63	55.6	CLEAR, NO ODOR
1214	0.3	6.90	19.1	7781	0.47	54.0	" "
1219	0.6	6.88	19.4	7890	0.25	44.7	" "
1224	0.9	~~6.87~~	~~19.1~~	~~7896~~ COLLECT SAMPLE	0.20	42.0	" "
1225	COLLECT SAMPLE						

SI-MW3 DTW = 19.13' btoc TD = 29.02' btoc

1310	INITIAL	7.01	19.2	38703	0.40	9.9	CLEAR, NO ODOR
1315	0.3	7.02	19.4	39436	0.19	-48.9	" "
1320	0.6	7.07	19.4	41173	0.15	-53.2	" "
1325	0.9	7.07	19.4	41720	0.12	-57.4	" "
1327	COLLECT SAMPLES						

MW-02&05-02 DTW = 19.27' btoc TD = 23.67' btoc

1411	INITIAL	6.99	21.1	7632	0.24	-62.7	CLEAR NO ODOR
1416	0.3	6.99	21.1	7611	0.22	-67.4	" "
1421	0.6	6.99	21.3	7577	0.20	-74.9	" "
1426	0.9	6.98	21.2	7563	0.20	-78.1	" "
1430	COLLECT SAMPLES & DUPLICATE MW-02&05-02 DUP.						

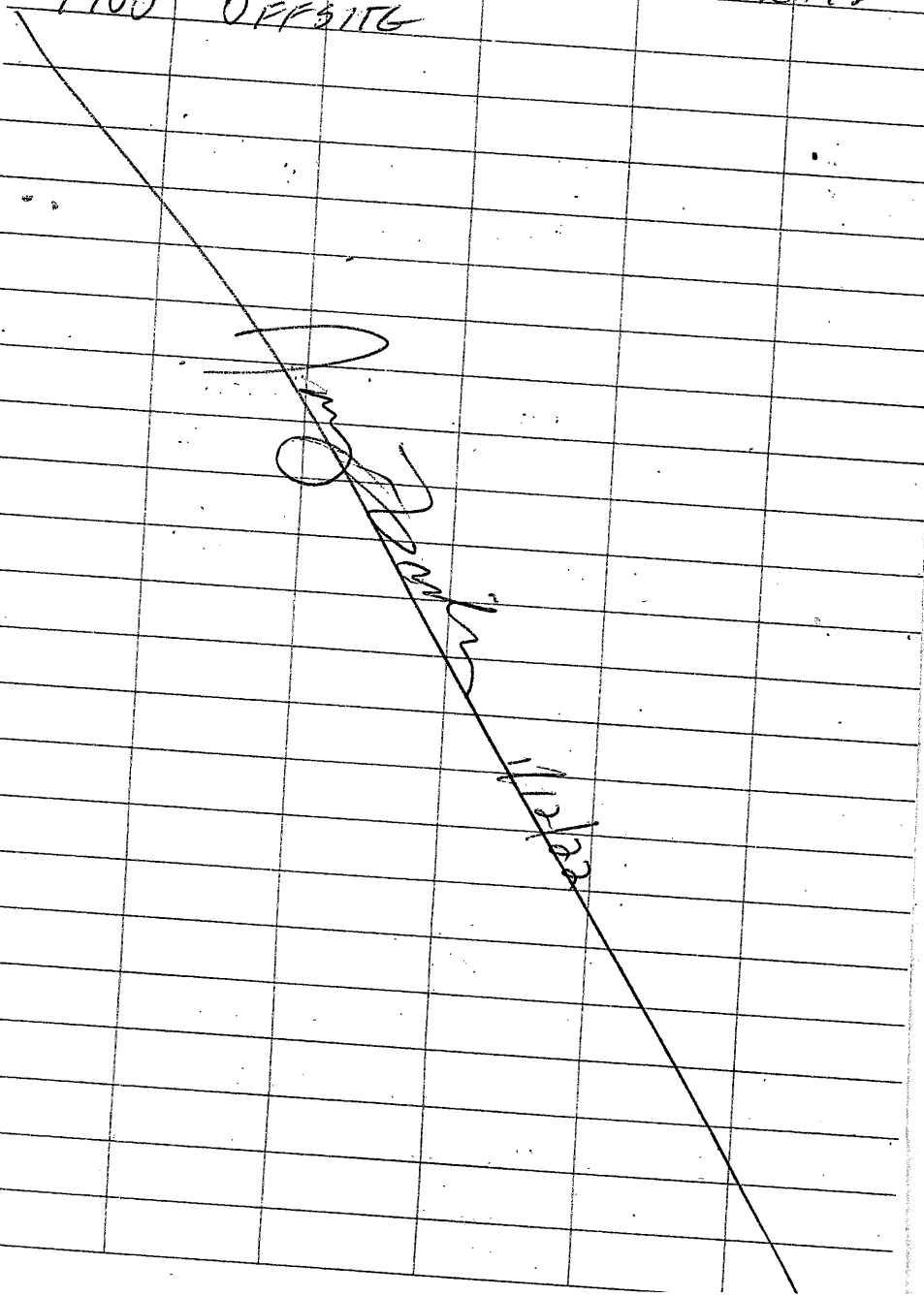
MW-30&33-1 DTW = 23.76' btoc TD = 30.93'

1529	INITIAL	7.09	19.2	30186	0.42	81.8	CLEAR, NO ODOR
1534	0.3	7.09	19.2	30277	0.28	77.6	" "
1539	0.6	7.09	19.2	30281	0.21	74.4	" "
1544	0.9	7.10	19.2	30310	0.14	-70.6	" "

1/12/22 J. Fish

1610 Collect Field Blank.
Dump Purge Water in Drum.

1700 Offsite



1/13/22 J. Fish

0935 @ GC-MW04. Weather is Cool (~35
Sunny, Clear. Hold Tailgate Safety
Meeting. Calibrate YSI 556 SN: 20F1622
pH: 4.00 / 4.00 @ 5.1°C
7.10 / 7.10 @ 4.5°C
10.27 / 10.27 @ 4.3°C
SC: 1413 / 1414 mS/cm @ 4.1°C
DO: P_b = 654.6 mmHg @ 17.6°C
Calc % Atm Reading = 87.8% @ 18.4°
[DI] = 12.67 / 13.6 MΩ @ 10.0°C
ORP: 232 / 232.1 mV @ 6.8°C

GC-MW04 DTW = 4.77' btoc TD = 18.44' btoc

Time	Vol (gal)	pH	T (°C)	SC (mS/cm)	DO (mg/L)	ORP (mV)	Comments
1020	Initial	6.75	20.9	57947	0.94	173.5	Clear, No Odor
1025	0.3	6.77	21.3	57859	0.80	149.5	" "
1030	0.6	6.79	21.3	57661	0.71	127.9	" "
1035	0.9	6.78	21.2	57636	0.63	123.7	" "

1038. Collect Sample

1010 Collect Equipment Blank.

GC-MW02 DTW = 7.81' btoc TD = 18.97' btoc

1110	Initial	~~6885~~	20.3	41671	1.34	164.0	Clear, No Odor
1115	0.3	6.93	20.1	41437	1.57	155.8	" "
1120	0.6	6.92	20.1	41447	1.46	150.9	" "
1125	0.9	6.92	20.2	41387	1.42	149.0	" "

1/13/22

GC-MW01 DTW = 8.46 'bTOC TD = 19.49 'bTOC

Time	Vol(GAL)	pH	T(°C)	SC(µS/cm)	DO(mg/L)	ORP(mV)	Comments
1200	1/MIN	4.57	20.1	59642	1.95	178.0	Clear, No Odor
1205	0.3	6.63	20.4	59725	1.37	164.6	" "
1210	0.6	6.65	20.4	59574	1.05	152.9	" "
1215	0.9	6.66	20.3	59544	1.00	~~148.0~~ 148.1	" "

1217 Collect Samples

GC-MW03 DTW = 9.65 'bTOC TD = 19.37 'bTOC

1251	Initial	6.98	18.9	11049	0.55	117.9	Clear, No Odor
1256	0.3	6.96	18.7	10798	0.40	118.4	" "
1301	0.6	6.94	18.7	10861	0.25	117.7	" "
1306	0.9	6.95	18.7	10906	0.23	117.2	" "

1310 Collect Samples

1340 MW02-00C is Root Bound @ 9.44 'bTOC.

1405 MW02-004 is Root Bound @ 8.78 'bTOC

1418 MW02-005 " " @ 11.04 'bTOC

1500 Collect SW-2 + Duplicate

	10.26	15.3	54563	23.56	124.7	Turbid, No Odor	

1600 Collect SW-3

	~~9.4~~ 10.52	9.4	55235	38.76	84.9	" "	

1630 Collect SED-4

1650 Collect SED-5 + Duplicate

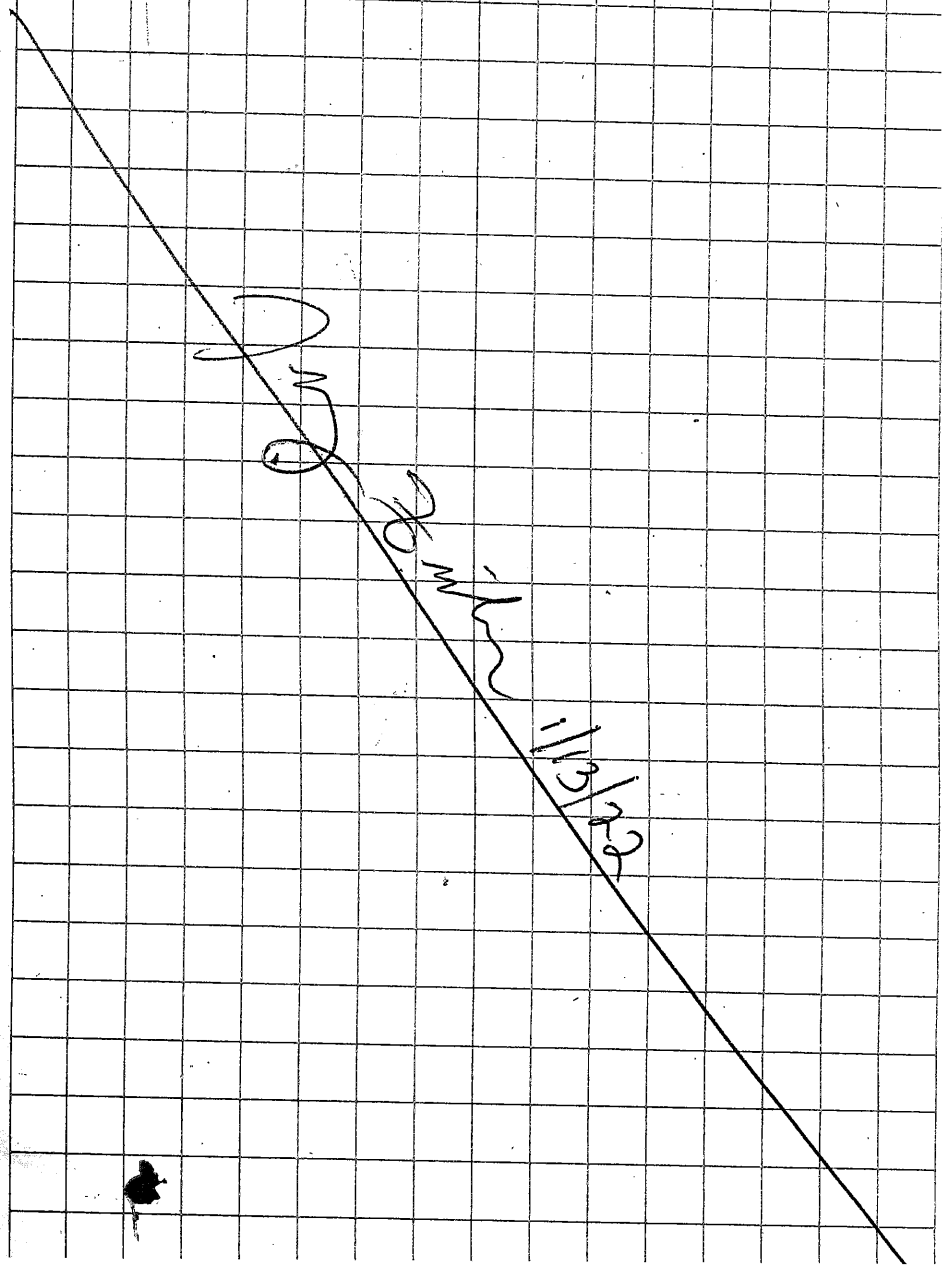
1709 Collect SED-11

1732 Collect SW-1 @ Water in a Ditch

1/13/22 (NE) F

Before the gate to go to Lake Holloman, location recorded.

1800 Offsite



1/14/22

J. FISHER

0735 @ RENDEZVOUS POINT TO MEET MARK & JAMES. WEATHER IS COLD (~29°F), CLEAR, CALM.

0745 HEAD TO GOLF COURSE FOR SEDIMENT SAMPLING. JAMES & I PROCEED W/OUT MARK. HE WILL CATCH UP TO US.

0804 COLLECT SED-10.

0825 COLLECT SED-9

0848 COLLECT SED-1

0900 COLLECT SED-2

0923 COLLECT EQUIPMENT BLANK (RINSATE OF SEDIMENT SCOOP ON TELESCOPING POLE).

0930 COLLECT SED-3

0945 COLLECT SED-6

1004 SED-7 IS INACCESSIBLE FROM THE NORTH DUE TO FENCELINE & FROM THE SOUTH DUE TO TERRAIN.

1100 OFFSITE

1/14/22

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

May 26, 2022

John Bunch
Daniel B. Stephens & Assoc.
6020 Academy NE Suite 100
Albuquerque, NM 87109
TEL: (505) 822-9400
FAX: (505) 822-8877

RE: Holloman AFB PFAS OrderNo.: 2201641

Dear John Bunch:

Hall Environmental Analysis Laboratory received 38 sample(s) on 1/17/2022 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued March 28, 2022.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW05001
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 11:20:00 AM
Lab ID: 2201641-002 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0010		mg/L	1	2/1/2022 3:01:12 PM	A85552
Arsenic	0.022	0.0010	*	mg/L	1	1/19/2022 12:17:04 PM	B85260
Copper	ND	0.0010		mg/L	1	1/19/2022 12:17:04 PM	B85260
Lead	ND	0.00050		mg/L	1	1/19/2022 12:17:04 PM	B85260
Selenium	ND	0.0010		mg/L	1	1/19/2022 12:17:04 PM	B85260
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	6.8	1.0		mg/L	1	1/24/2022 11:00:54 AM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	1.7	0.50		mg/L	5	1/18/2022 5:22:24 PM	R85247
Chloride	120	10		mg/L	20	1/18/2022 5:34:45 PM	R85247
Bromide	ND	0.50		mg/L	5	1/18/2022 5:22:24 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 5:34:45 PM	R85247
Sulfate	2600	50	*	mg/L	100	1/19/2022 3:55:15 PM	R85279
Nitrate+Nitrite as N	ND	1.0		mg/L	5	1/19/2022 7:00:27 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	4600	10		µmhos/c	1	1/24/2022 10:08:28 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	116.2	20.00		mg/L Ca	1	1/18/2022 1:25:44 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 1:25:44 PM	R85251
Total Alkalinity (as CaCO3)	116.2	20.00		mg/L Ca	1	1/18/2022 1:25:44 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	4240	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.020		mg/L	1	1/21/2022 10:53:14 AM	A85320
Barium	0.011	0.0020		mg/L	1	1/21/2022 10:53:14 AM	A85320
Beryllium	ND	0.0020		mg/L	1	1/21/2022 10:53:14 AM	A85320
Cadmium	ND	0.0020		mg/L	1	1/21/2022 10:53:14 AM	A85320
Calcium	510	5.0	E	mg/L	5	1/21/2022 9:56:48 AM	A85320
Chromium	ND	0.0060		mg/L	1	1/21/2022 10:53:14 AM	A85320
Cobalt	0.010	0.0060		mg/L	1	1/21/2022 10:53:14 AM	A85320
Iron	ND	0.020		mg/L	1	1/21/2022 10:53:14 AM	A85320
Magnesium	290	5.0		mg/L	5	1/21/2022 9:56:48 AM	A85320
Manganese	0.65	0.0020	*	mg/L	1	1/21/2022 10:53:14 AM	A85320
Nickel	ND	0.010		mg/L	1	1/21/2022 10:53:14 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW05001
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 11:20:00 AM
Lab ID: 2201641-002 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	230	5.0		mg/L	5	1/21/2022 9:56:48 AM	A85320
Vanadium	ND	0.050		mg/L	1	1/21/2022 10:53:14 AM	A85320
Zinc	0.018	0.010		mg/L	1	1/21/2022 10:53:14 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM4
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 1:05:00 PM
Lab ID: 2201641-003 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 1:57:44 PM	C85431
Arsenic	ND	0.010		mg/L	10	1/26/2022 1:57:44 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 1:57:44 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 1:57:44 PM	C85431
Selenium	ND	0.010		mg/L	10	1/26/2022 1:57:44 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	6.9	1.0		mg/L	1	1/24/2022 11:53:16 AM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 6:48:49 PM	R85247
Chloride	7100	500	*	mg/L	1E+	1/19/2022 4:07:36 PM	R85279
Bromide	3.4	2.0		mg/L	20	1/18/2022 6:48:49 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 6:48:49 PM	R85247
Sulfate	4700	500	*	mg/L	1E+	1/19/2022 4:07:36 PM	R85279
Nitrate+Nitrite as N	12	10	*	mg/L	50	1/19/2022 7:12:47 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	37000	100		µmhos/c	10	1/24/2022 10:14:26 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	209.3	20.00		mg/L Ca	1	1/18/2022 1:34:44 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 1:34:44 PM	R85251
Total Alkalinity (as CaCO3)	209.3	20.00		mg/L Ca	1	1/18/2022 1:34:44 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	20400	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 9:58:25 AM	A85320
Barium	ND	0.010		mg/L	5	1/21/2022 9:58:25 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 9:58:25 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 9:58:25 AM	A85320
Calcium	760	20		mg/L	20	1/21/2022 10:54:50 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 9:58:25 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 9:58:25 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 9:58:25 AM	A85320
Magnesium	1000	20		mg/L	20	1/21/2022 10:54:50 AM	A85320
Manganese	0.020	0.010		mg/L	5	1/21/2022 9:58:25 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 9:58:25 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM4
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 1:05:00 PM
Lab ID: 2201641-003 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	4700	20	E	mg/L	20	1/21/2022 10:54:50 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 9:58:25 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 9:58:25 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW01004
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 2:04:00 PM
Lab ID: 2201641-004 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0050		mg/L	5	1/26/2022 2:05:50 PM	C85431
Arsenic	ND	0.0050		mg/L	5	1/26/2022 2:05:50 PM	C85431
Copper	ND	0.0050		mg/L	5	1/26/2022 2:05:50 PM	C85431
Lead	ND	0.0025		mg/L	5	1/26/2022 2:05:50 PM	C85431
Selenium	0.0074	0.0050		mg/L	5	1/26/2022 2:05:50 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	1.5	1.0		mg/L	1	1/24/2022 12:09:17 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 7:13:30 PM	R85247
Chloride	7300	500	*	mg/L	1E+	1/19/2022 4:19:57 PM	R85279
Bromide	ND	2.0		mg/L	20	1/18/2022 7:13:30 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 7:13:30 PM	R85247
Sulfate	4600	500	*	mg/L	1E+	1/19/2022 4:19:57 PM	R85279
Nitrate+Nitrite as N	12	10	*	mg/L	50	1/19/2022 7:25:07 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	36000	100		µmhos/c	10	1/24/2022 10:17:26 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	210.3	20.00		mg/L Ca	1	1/18/2022 1:47:11 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 1:47:11 PM	R85251
Total Alkalinity (as CaCO3)	210.3	20.00		mg/L Ca	1	1/18/2022 1:47:11 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	20300	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:00:05 AM	A85320
Barium	0.015	0.010		mg/L	5	1/21/2022 10:00:05 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:00:05 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:00:05 AM	A85320
Calcium	780	20		mg/L	20	1/21/2022 10:56:29 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:00:05 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:00:05 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:00:05 AM	A85320
Magnesium	960	20		mg/L	20	1/21/2022 10:56:29 AM	A85320
Manganese	ND	0.010		mg/L	5	1/21/2022 10:00:05 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:00:05 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW01004
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 2:04:00 PM
Lab ID: 2201641-004 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	4700	20	E	mg/L	20	1/21/2022 10:56:29 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:00:05 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:00:05 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM5
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 2:55:00 PM
Lab ID: 2201641-005 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 2:08:31 PM	C85431
Arsenic	ND	0.010		mg/L	10	1/26/2022 2:08:31 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 2:08:31 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 2:08:31 PM	C85431
Selenium	ND	0.010		mg/L	10	1/26/2022 2:08:31 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	12	1.0		mg/L	1	1/24/2022 12:24:43 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 7:38:11 PM	R85247
Chloride	9000	500	*	mg/L	1E+	1/19/2022 4:32:18 PM	R85279
Bromide	3.8	2.0		mg/L	20	1/18/2022 7:38:11 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 7:38:11 PM	R85247
Sulfate	5800	500	*	mg/L	1E+	1/19/2022 4:32:18 PM	R85279
Nitrate+Nitrite as N	14	10	*	mg/L	50	1/19/2022 7:37:28 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	45000	100		µmhos/c	10	1/24/2022 10:20:27 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	298.3	20.00		mg/L Ca	1	1/18/2022 1:59:26 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 1:59:26 PM	R85251
Total Alkalinity (as CaCO3)	298.3	20.00		mg/L Ca	1	1/18/2022 1:59:26 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	24100	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:01:44 AM	A85320
Barium	ND	0.010		mg/L	5	1/21/2022 10:01:44 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:01:44 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:01:44 AM	A85320
Calcium	770	20		mg/L	20	1/21/2022 10:58:07 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:01:44 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:01:44 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:01:44 AM	A85320
Magnesium	1300	20		mg/L	20	1/21/2022 10:58:07 AM	A85320
Manganese	0.14	0.010	*	mg/L	5	1/21/2022 10:01:44 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:01:44 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: FT31-LM5
Project: Holloman AFB PFAS
Collection Date: 1/11/2022 2:55:00 PM
Lab ID: 2201641-005
Matrix: GROUNDWA
Received Date: 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	5700	20	E	mg/L	20	1/21/2022 10:58:07 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:01:44 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:01:44 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM1
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 3:50:00 PM
Lab ID: 2201641-006 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 2:11:12 PM	C85431
Arsenic	0.010	0.010	*	mg/L	10	1/26/2022 2:11:12 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 2:11:12 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 2:11:12 PM	C85431
Selenium	0.012	0.010		mg/L	10	1/26/2022 2:11:12 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	3.5	1.0		mg/L	1	1/24/2022 12:40:59 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 8:02:52 PM	R85247
Chloride	8000	500	*	mg/L	1E+	1/19/2022 4:44:38 PM	R85279
Bromide	2.1	2.0		mg/L	20	1/18/2022 8:02:52 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 8:02:52 PM	R85247
Sulfate	5300	500	*	mg/L	1E+	1/19/2022 4:44:38 PM	R85279
Nitrate+Nitrite as N	20	10	*	mg/L	50	1/19/2022 7:49:49 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	42000	100		µmhos/c	10	1/24/2022 10:23:27 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	187.5	20.00		mg/L Ca	1	1/18/2022 2:15:12 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 2:15:12 PM	R85251
Total Alkalinity (as CaCO3)	187.5	20.00		mg/L Ca	1	1/18/2022 2:15:12 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	22200	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	5.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:08:22 AM	A85320
Barium	ND	0.010		mg/L	5	1/21/2022 10:08:22 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:08:22 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:08:22 AM	A85320
Calcium	750	20		mg/L	20	1/21/2022 10:59:46 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:08:22 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:08:22 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:08:22 AM	A85320
Magnesium	1200	20		mg/L	20	1/21/2022 10:59:46 AM	A85320
Manganese	0.012	0.010		mg/L	5	1/21/2022 10:08:22 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:08:22 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM1
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 3:50:00 PM
Lab ID: 2201641-006 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	5600	20	E	mg/L	20	1/21/2022 10:59:46 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:08:22 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:08:22 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM2
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 4:35:00 PM
Lab ID: 2201641-007 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 2:13:54 PM	C85431
Arsenic	ND	0.010		mg/L	10	1/26/2022 2:13:54 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 2:13:54 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 2:13:54 PM	C85431
Selenium	ND	0.010		mg/L	10	1/26/2022 2:13:54 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	3.2	1.0		mg/L	1	1/24/2022 1:26:48 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 8:52:15 PM	R85247
Chloride	7700	500	*	mg/L	1E+	1/19/2022 4:56:59 PM	R85279
Bromide	1.5	0.50		mg/L	5	1/18/2022 8:39:54 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 8:52:15 PM	R85247
Sulfate	5300	500	*	mg/L	1E+	1/19/2022 4:56:59 PM	R85279
Nitrate+Nitrite as N	15	10	*	mg/L	50	1/19/2022 8:02:10 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	38000	100		µmhos/c	10	1/24/2022 10:26:28 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	162.4	20.00		mg/L Ca	1	1/18/2022 2:30:47 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 2:30:47 PM	R85251
Total Alkalinity (as CaCO3)	162.4	20.00		mg/L Ca	1	1/18/2022 2:30:47 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	20900	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:10:02 AM	A85320
Barium	0.012	0.010		mg/L	5	1/21/2022 10:10:02 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:10:02 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:10:02 AM	A85320
Calcium	780	20		mg/L	20	1/21/2022 11:01:24 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:10:02 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:10:02 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:10:02 AM	A85320
Magnesium	1100	20		mg/L	20	1/21/2022 11:01:24 AM	A85320
Manganese	ND	0.010		mg/L	5	1/21/2022 10:10:02 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:10:02 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** FT31-LM2
Project: Holloman AFB PFAS **Collection Date:** 1/11/2022 4:35:00 PM
Lab ID: 2201641-007 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	5000	20	E	mg/L	20	1/21/2022 11:01:24 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:10:02 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:10:02 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-29-01
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 10:10:00 AM
Lab ID: 2201641-010 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 2:16:35 PM	C85431
Arsenic	0.010	0.010	*	mg/L	10	1/26/2022 2:16:35 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 2:16:35 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 2:16:35 PM	C85431
Selenium	0.018	0.010		mg/L	10	1/26/2022 2:16:35 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	1.9	1.0		mg/L	1	1/24/2022 1:42:59 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 4:53:38 AM	A85247
Chloride	7200	500	*	mg/L	1E+	1/19/2022 5:09:19 PM	R85279
Bromide	2.7	2.0		mg/L	20	1/19/2022 4:53:38 AM	A85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/19/2022 4:53:38 AM	A85247
Sulfate	3500	500	*	mg/L	1E+	1/19/2022 5:09:19 PM	R85279
Nitrate+Nitrite as N	16	10	*	mg/L	50	1/19/2022 8:51:34 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	34000	100		µmhos/c	10	1/24/2022 10:29:27 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	141.0	20.00		mg/L Ca	1	1/18/2022 2:42:24 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 2:42:24 PM	R85251
Total Alkalinity (as CaCO3)	141.0	20.00		mg/L Ca	1	1/18/2022 2:42:24 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	18200	40.0	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:11:41 AM	A85320
Barium	0.016	0.010		mg/L	5	1/21/2022 10:11:41 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:11:41 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:11:41 AM	A85320
Calcium	940	20		mg/L	20	1/21/2022 11:02:52 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:11:41 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:11:41 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:11:41 AM	A85320
Magnesium	860	20		mg/L	20	1/21/2022 11:02:52 AM	A85320
Manganese	ND	0.010		mg/L	5	1/21/2022 10:11:41 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:11:41 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-29-01
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 10:10:00 AM
Lab ID: 2201641-010 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	4100	20	E	mg/L	20	1/21/2022 11:02:52 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:11:41 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:11:41 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-02 & 05-10
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 12:25:00 PM
Lab ID: 2201641-011 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0050		mg/L	5	1/26/2022 2:19:16 PM	C85431
Arsenic	0.0090	0.0010		mg/L	1	1/19/2022 12:43:59 PM	B85260
Copper	ND	0.0010		mg/L	1	1/19/2022 12:43:59 PM	B85260
Lead	ND	0.0025		mg/L	5	1/26/2022 2:19:16 PM	C85431
Selenium	0.0011	0.0010		mg/L	1	1/19/2022 12:43:59 PM	B85260
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	13	1.0		mg/L	1	1/24/2022 1:59:04 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	1.6	0.50		mg/L	5	1/18/2022 9:04:35 PM	R85247
Chloride	900	50	*	mg/L	100	1/19/2022 5:21:40 PM	R85279
Bromide	0.98	0.50		mg/L	5	1/18/2022 9:04:35 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 9:16:56 PM	R85247
Sulfate	3400	50	*	mg/L	100	1/19/2022 5:21:40 PM	R85279
Nitrate+Nitrite as N	ND	1.0		mg/L	5	1/19/2022 9:03:54 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	8800	10		µmhos/c	1	1/24/2022 10:32:26 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	462.6	20.00		mg/L Ca	1	1/18/2022 2:52:23 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 2:52:23 PM	R85251
Total Alkalinity (as CaCO3)	462.6	20.00		mg/L Ca	1	1/18/2022 2:52:23 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	6820	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:13:20 AM	A85320
Barium	0.012	0.010		mg/L	5	1/21/2022 10:13:20 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:13:20 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:13:20 AM	A85320
Calcium	590	5.0	E	mg/L	5	1/21/2022 10:13:20 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:13:20 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:13:20 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:13:20 AM	A85320
Magnesium	390	5.0		mg/L	5	1/21/2022 10:13:20 AM	A85320
Manganese	2.7	0.010	*	mg/L	5	1/21/2022 10:13:20 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:13:20 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-02 & 05-10
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 12:25:00 PM
Lab ID: 2201641-011 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	1200	5.0	E	mg/L	5	1/21/2022 10:13:20 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:13:20 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:13:20 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** S1-MW3
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 1:27:00 PM
Lab ID: 2201641-012 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.020		mg/L	20	1/26/2022 2:24:39 PM	C85431
Arsenic	ND	0.020	*	mg/L	20	1/26/2022 2:24:39 PM	C85431
Copper	ND	0.020		mg/L	20	1/26/2022 2:24:39 PM	C85431
Lead	ND	0.010		mg/L	20	1/26/2022 2:24:39 PM	C85431
Selenium	ND	0.020		mg/L	20	1/26/2022 2:24:39 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	5.5	1.0		mg/L	1	1/24/2022 2:15:47 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 9:41:38 PM	R85247
Chloride	13000	500	*	mg/L	1E+	1/19/2022 11:19:44 PM	A85279
Bromide	3.4	2.0		mg/L	20	1/18/2022 9:41:38 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	25	H	mg/L	50	1/19/2022 11:32:05 PM	A85279
Sulfate	10000	500	*	mg/L	1E+	1/19/2022 11:19:44 PM	A85279
Nitrate+Nitrite as N	ND	10		mg/L	50	1/20/2022 12:58:29 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	71000	100		µmhos/c	10	1/24/2022 10:35:22 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	426.9	20.00		mg/L Ca	1	1/18/2022 3:13:04 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 3:13:04 PM	R85251
Total Alkalinity (as CaCO3)	426.9	20.00		mg/L Ca	1	1/18/2022 3:13:04 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	36100	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:04:28 AM	A85320
Barium	ND	0.020		mg/L	10	1/21/2022 11:04:28 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:04:28 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:04:28 AM	A85320
Calcium	640	50		mg/L	50	1/21/2022 11:07:44 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:04:28 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:04:28 AM	A85320
Iron	0.73	0.10	*	mg/L	5	1/21/2022 10:14:56 AM	A85320
Magnesium	1900	50		mg/L	50	1/21/2022 11:07:44 AM	A85320
Manganese	2.1	0.020	*	mg/L	10	1/21/2022 11:04:28 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:04:28 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: S1-MW3
Project: Holloman AFB PFAS
Collection Date: 1/12/2022 1:27:00 PM
Lab ID: 2201641-012
Matrix: GROUNDWA
Received Date: 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	8600	50	E	mg/L	50	1/21/2022 11:07:44 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:04:28 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:04:28 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-02 & 05-02
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 2:30:00 PM
Lab ID: 2201641-013 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0050		mg/L	5	2/11/2022 3:10:22 PM	A85785
Arsenic	0.027	0.0010	*	mg/L	1	1/19/2022 12:49:22 PM	B85260
Copper	ND	0.0050		mg/L	5	2/11/2022 3:10:22 PM	A85785
Lead	ND	0.0025		mg/L	5	2/11/2022 3:10:22 PM	A85785
Selenium	ND	0.0010		mg/L	1	1/19/2022 12:49:22 PM	B85260
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	20	1.0		mg/L	1	1/24/2022 3:20:33 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	1.9	0.50		mg/L	5	1/18/2022 9:53:59 PM	R85247
Chloride	500	50	*	mg/L	100	1/19/2022 5:34:01 PM	R85279
Bromide	0.64	0.50		mg/L	5	1/18/2022 9:53:59 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 10:06:19 PM	R85247
Sulfate	4000	50	*	mg/L	100	1/19/2022 5:34:01 PM	R85279
Nitrate+Nitrite as N	ND	1.0		mg/L	5	1/19/2022 9:16:14 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	8300	10		µmhos/c	1	1/24/2022 10:38:18 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	590.7	20.00		mg/L Ca	1	1/18/2022 5:17:05 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 5:17:05 PM	R85251
Total Alkalinity (as CaCO3)	590.7	20.00		mg/L Ca	1	1/18/2022 5:17:05 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	7340	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 1:41:00 PM	65218
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.020		mg/L	1	1/21/2022 11:14:22 AM	A85320
Barium	0.016	0.0020		mg/L	1	1/21/2022 11:14:22 AM	A85320
Beryllium	ND	0.0020		mg/L	1	1/21/2022 11:14:22 AM	A85320
Cadmium	ND	0.0020		mg/L	1	1/21/2022 11:14:22 AM	A85320
Calcium	550	20		mg/L	20	1/21/2022 11:18:33 AM	A85320
Chromium	ND	0.0060		mg/L	1	1/21/2022 11:14:22 AM	A85320
Cobalt	ND	0.0060		mg/L	1	1/21/2022 11:14:22 AM	A85320
Iron	12	0.40	*	mg/L	20	1/21/2022 11:18:33 AM	A85320
Magnesium	580	20		mg/L	20	1/21/2022 11:18:33 AM	A85320
Manganese	1.4	0.010	*	mg/L	5	1/21/2022 10:16:37 AM	A85320
Nickel	ND	0.010		mg/L	1	1/21/2022 11:14:22 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-02 & 05-02
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 2:30:00 PM
Lab ID: 2201641-013 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	900	20		mg/L	20	1/21/2022 11:18:33 AM	A85320
Vanadium	ND	0.050		mg/L	1	1/21/2022 11:14:22 AM	A85320
Zinc	0.017	0.010		mg/L	1	1/21/2022 11:14:22 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-02 & 05-02 Dup
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 2:30:00 PM
Lab ID: 2201641-014 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0050		mg/L	5	2/11/2022 3:13:03 PM	A85785
Arsenic	0.024	0.0010	*	mg/L	1	1/19/2022 2:08:33 PM	B85260
Copper	ND	0.0010		mg/L	1	1/19/2022 2:08:33 PM	B85260
Lead	ND	0.0025		mg/L	5	2/11/2022 3:13:03 PM	A85785
Selenium	ND	0.0010		mg/L	1	1/19/2022 2:08:33 PM	B85260
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	20	1.0		mg/L	1	1/24/2022 2:32:26 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	1.9	0.50		mg/L	5	1/18/2022 10:18:40 PM	R85247
Chloride	510	50	*	mg/L	100	1/19/2022 5:46:21 PM	R85279
Bromide	0.64	0.50		mg/L	5	1/18/2022 10:18:40 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 10:31:00 PM	R85247
Sulfate	4000	50	*	mg/L	100	1/19/2022 5:46:21 PM	R85279
Nitrate+Nitrite as N	ND	1.0		mg/L	5	1/19/2022 9:28:35 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	8300	10		µmhos/c	1	1/24/2022 10:46:57 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	592.6	20.00		mg/L Ca	1	1/18/2022 5:41:25 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 5:41:25 PM	R85251
Total Alkalinity (as CaCO3)	592.6	20.00		mg/L Ca	1	1/18/2022 5:41:25 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	7340	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.020		mg/L	1	1/21/2022 11:19:58 AM	A85320
Barium	0.016	0.0020		mg/L	1	1/21/2022 11:19:58 AM	A85320
Beryllium	ND	0.0020		mg/L	1	1/21/2022 11:19:58 AM	A85320
Cadmium	ND	0.0020		mg/L	1	1/21/2022 11:19:58 AM	A85320
Calcium	540	20		mg/L	20	1/21/2022 11:21:21 AM	A85320
Chromium	ND	0.0060		mg/L	1	1/21/2022 11:19:58 AM	A85320
Cobalt	ND	0.0060		mg/L	1	1/21/2022 11:19:58 AM	A85320
Iron	11	0.40	*	mg/L	20	1/21/2022 11:21:21 AM	A85320
Magnesium	560	20		mg/L	20	1/21/2022 11:21:21 AM	A85320
Manganese	1.4	0.010	*	mg/L	5	1/21/2022 10:20:47 AM	A85320
Nickel	ND	0.010		mg/L	1	1/21/2022 11:19:58 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: MW-02 & 05-02 Dup
Project: Holloman AFB PFAS
Collection Date: 1/12/2022 2:30:00 PM
Lab ID: 2201641-014
Matrix: GROUNDWA
Received Date: 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	860	20		mg/L	20	1/21/2022 11:21:21 AM	A85320
Vanadium	ND	0.050		mg/L	1	1/21/2022 11:19:58 AM	A85320
Zinc	0.014	0.010		mg/L	1	1/21/2022 11:19:58 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-30 & 33-1
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 3:45:00 PM
Lab ID: 2201641-015 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	1/26/2022 2:38:07 PM	C85431
Arsenic	0.012	0.010	*	mg/L	10	1/26/2022 2:38:07 PM	C85431
Copper	ND	0.010		mg/L	10	1/26/2022 2:38:07 PM	C85431
Lead	ND	0.0050		mg/L	10	1/26/2022 2:38:07 PM	C85431
Selenium	0.018	0.010		mg/L	10	1/26/2022 2:38:07 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	2.1	1.0		mg/L	1	1/24/2022 2:48:33 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 11:20:23 PM	R85247
Chloride	8500	500	*	mg/L	1E+	1/19/2022 6:23:24 PM	R85279
Bromide	2.3	2.0		mg/L	20	1/18/2022 11:20:23 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/18/2022 11:20:23 PM	R85247
Sulfate	5800	500	*	mg/L	1E+	1/19/2022 6:23:24 PM	R85279
Nitrate+Nitrite as N	17	10	*	mg/L	50	1/19/2022 9:40:56 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	44000	100		µmhos/c	10	1/24/2022 10:49:47 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	217.4	20.00		mg/L Ca	1	1/18/2022 3:59:58 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 3:59:58 PM	R85251
Total Alkalinity (as CaCO3)	217.4	20.00		mg/L Ca	1	1/18/2022 3:59:58 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	23000	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:22:09 AM	A85320
Barium	ND	0.010		mg/L	5	1/21/2022 10:22:09 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:22:09 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:22:09 AM	A85320
Calcium	740	20		mg/L	20	1/21/2022 11:22:47 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:22:09 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:22:09 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:22:09 AM	A85320
Magnesium	1200	20		mg/L	20	1/21/2022 11:22:47 AM	A85320
Manganese	ND	0.010		mg/L	5	1/21/2022 10:22:09 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:22:09 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-30 & 33-1
Project: Holloman AFB PFAS **Collection Date:** 1/12/2022 3:45:00 PM
Lab ID: 2201641-015 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	6000	20	E	mg/L	20	1/21/2022 11:22:47 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:22:09 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:22:09 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW04
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 10:38:00 AM
Lab ID: 2201641-018 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.020		mg/L	20	1/26/2022 2:40:48 PM	C85431
Arsenic	ND	0.020		mg/L	20	1/26/2022 2:40:48 PM	C85431
Copper	ND	0.020		mg/L	20	1/26/2022 2:40:48 PM	C85431
Lead	ND	0.010		mg/L	20	1/26/2022 2:40:48 PM	C85431
Selenium	ND	0.020		mg/L	20	1/26/2022 2:40:48 PM	C85431
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	3.2	1.0		mg/L	1	1/24/2022 3:04:48 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/18/2022 11:45:03 PM	R85247
Chloride	25000	1000	*	mg/L	2E+	1/19/2022 6:35:45 PM	R85279
Bromide	3.4	2.0		mg/L	20	1/18/2022 11:45:03 PM	R85247
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	1/18/2022 11:32:43 PM	R85247
Sulfate	2800	1000	*	mg/L	2E+	1/19/2022 6:35:45 PM	R85279
Nitrate+Nitrite as N	ND	20		mg/L	100	1/19/2022 9:53:18 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	93000	100		µmhos/c	10	1/24/2022 10:52:36 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	175.6	20.00		mg/L Ca	1	1/18/2022 4:12:31 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 4:12:31 PM	R85251
Total Alkalinity (as CaCO3)	175.6	20.00		mg/L Ca	1	1/18/2022 4:12:31 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	48800	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:24:26 AM	A85320
Barium	0.028	0.020		mg/L	10	1/21/2022 11:24:26 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:24:26 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:24:26 AM	A85320
Calcium	2500	50		mg/L	50	1/21/2022 11:27:42 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:24:26 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:24:26 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:28:47 AM	A85320
Magnesium	3100	50		mg/L	50	1/21/2022 11:27:42 AM	A85320
Manganese	0.085	0.020	*	mg/L	10	1/21/2022 11:24:26 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:24:26 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW04
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 10:38:00 AM
Lab ID: 2201641-018 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	9100	50	E	mg/L	50	1/21/2022 11:27:42 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:24:26 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:24:26 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW02
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 11:30:00 AM
Lab ID: 2201641-019 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.020		mg/L	20	2/11/2022 3:15:44 PM	A85785
Arsenic	ND	0.020		mg/L	20	2/11/2022 3:15:44 PM	A85785
Copper	ND	0.020		mg/L	20	2/11/2022 3:15:44 PM	A85785
Lead	ND	0.010		mg/L	20	2/11/2022 3:15:44 PM	A85785
Selenium	ND	0.020		mg/L	20	2/8/2022 1:07:50 PM	B85673
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	1.8	1.0		mg/L	1	1/24/2022 4:59:00 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 12:09:45 AM	R85247
Chloride	16000	1000	*	mg/L	2E+	1/19/2022 6:48:06 PM	R85279
Bromide	2.5	2.0		mg/L	20	1/19/2022 12:09:45 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	1/18/2022 11:57:24 PM	R85247
Sulfate	2500	1000	*	mg/L	2E+	1/19/2022 6:48:06 PM	R85279
Nitrate+Nitrite as N	ND	20	*	mg/L	100	1/19/2022 10:05:39 PM	R85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	67000	100		µmhos/c	10	1/24/2022 10:55:24 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	107.9	20.00		mg/L Ca	1	1/18/2022 3:39:11 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 3:39:11 PM	R85251
Total Alkalinity (as CaCO3)	107.9	20.00		mg/L Ca	1	1/18/2022 3:39:11 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	35700	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:34:07 AM	A85320
Barium	0.037	0.020		mg/L	10	1/21/2022 11:34:07 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:34:07 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:34:07 AM	A85320
Calcium	2100	50		mg/L	50	1/21/2022 11:35:46 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:34:07 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:34:07 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:30:18 AM	A85320
Magnesium	1500	50		mg/L	50	1/21/2022 11:35:46 AM	A85320
Manganese	ND	0.020		mg/L	10	1/21/2022 11:34:07 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:34:07 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW02
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 11:30:00 AM
Lab ID: 2201641-019 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	6700	50	E	mg/L	50	1/21/2022 11:35:46 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:34:07 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:34:07 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW01
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 12:17:00 PM
Lab ID: 2201641-020 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.020		mg/L	20	2/11/2022 3:18:25 PM	A85785
Arsenic	ND	0.020	*	mg/L	20	2/11/2022 3:18:25 PM	A85785
Copper	ND	0.020		mg/L	20	2/11/2022 3:18:25 PM	A85785
Lead	ND	0.010		mg/L	20	2/11/2022 3:18:25 PM	A85785
Selenium	ND	0.020		mg/L	20	2/8/2022 1:10:32 PM	B85673
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	4.8	1.0		mg/L	1	1/24/2022 5:13:25 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 12:34:26 AM	R85247
Chloride	28000	1000	*	mg/L	2E+	1/19/2022 11:44:26 PM	A85279
Bromide	3.8	2.0		mg/L	20	1/19/2022 12:34:26 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	1/19/2022 12:22:05 AM	R85247
Sulfate	3600	1000	*	mg/L	2E+	1/19/2022 11:44:26 PM	A85279
Nitrate+Nitrite as N	ND	20		mg/L	100	1/20/2022 1:47:50 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	99000	100		µmhos/c	10	1/24/2022 10:58:12 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	154.1	20.00		mg/L Ca	1	1/18/2022 3:48:23 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 3:48:23 PM	R85251
Total Alkalinity (as CaCO3)	154.1	20.00		mg/L Ca	1	1/18/2022 3:48:23 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	53700	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:37:26 AM	A85320
Barium	0.045	0.020		mg/L	10	1/21/2022 11:37:26 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:37:26 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:37:26 AM	A85320
Calcium	2500	50		mg/L	50	1/21/2022 11:39:03 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:37:26 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:37:26 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:31:53 AM	A85320
Magnesium	3700	50		mg/L	50	1/21/2022 11:39:03 AM	A85320
Manganese	ND	0.020		mg/L	10	1/21/2022 11:37:26 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:37:26 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW01
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 12:17:00 PM
Lab ID: 2201641-020 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	9000	50	E	mg/L	50	1/21/2022 11:39:03 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:37:26 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:37:26 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW03
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 1:10:00 PM
Lab ID: 2201641-021 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.010		mg/L	10	2/11/2022 3:21:06 PM	A85785
Arsenic	0.015	0.010	*	mg/L	10	2/11/2022 3:21:06 PM	A85785
Copper	ND	0.010		mg/L	10	2/11/2022 3:21:06 PM	A85785
Lead	ND	0.0050		mg/L	10	2/11/2022 3:21:06 PM	A85785
Selenium	ND	0.010		mg/L	10	2/11/2022 3:21:06 PM	A85785
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	7.6	1.0		mg/L	1	1/24/2022 5:28:15 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	3.8	0.50		mg/L	5	1/19/2022 12:46:47 AM	R85247
Chloride	2800	100	*	mg/L	200	1/19/2022 11:56:47 PM	A85279
Bromide	ND	0.50		mg/L	5	1/19/2022 12:46:47 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	1/19/2022 12:46:47 AM	R85247
Sulfate	2800	100	*	mg/L	200	1/19/2022 11:56:47 PM	A85279
Nitrate+Nitrite as N	12	2.0	*	mg/L	10	1/20/2022 2:00:10 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	16000	100		µmhos/c	10	1/24/2022 11:01:00 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	412.3	20.00		mg/L Ca	1	1/18/2022 4:24:36 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 4:24:36 PM	R85251
Total Alkalinity (as CaCO3)	412.3	20.00		mg/L Ca	1	1/18/2022 4:24:36 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	8790	100	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.10		mg/L	5	1/21/2022 10:33:31 AM	A85320
Barium	0.014	0.010		mg/L	5	1/21/2022 10:33:31 AM	A85320
Beryllium	ND	0.010		mg/L	5	1/21/2022 10:33:31 AM	A85320
Cadmium	ND	0.010		mg/L	5	1/21/2022 10:33:31 AM	A85320
Calcium	770	10		mg/L	10	1/21/2022 11:42:19 AM	A85320
Chromium	ND	0.030		mg/L	5	1/21/2022 10:33:31 AM	A85320
Cobalt	ND	0.030		mg/L	5	1/21/2022 10:33:31 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:33:31 AM	A85320
Magnesium	600	10		mg/L	10	1/21/2022 11:42:19 AM	A85320
Manganese	0.040	0.010		mg/L	5	1/21/2022 10:33:31 AM	A85320
Nickel	ND	0.050		mg/L	5	1/21/2022 10:33:31 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** GC-MW03
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 1:10:00 PM
Lab ID: 2201641-021 **Matrix:** GROUNDWA **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	1400	10	E	mg/L	10	1/21/2022 11:42:19 AM	A85320
Vanadium	ND	0.25		mg/L	5	1/21/2022 10:33:31 AM	A85320
Zinc	ND	0.050		mg/L	5	1/21/2022 10:33:31 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-2
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 3:00:00 PM
Lab ID: 2201641-022 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.050		mg/L	50	2/11/2022 3:23:48 PM	A85785
Arsenic	ND	0.050	*	mg/L	50	2/11/2022 3:23:48 PM	A85785
Copper	ND	0.050		mg/L	50	2/11/2022 3:23:48 PM	A85785
Lead	ND	0.025		mg/L	50	2/11/2022 3:23:48 PM	A85785
Selenium	ND	0.050		mg/L	50	2/11/2022 3:23:48 PM	A85785
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	76	1.0		mg/L	1	1/24/2022 5:48:45 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 1:48:31 AM	R85247
Chloride	20000	1000	*	mg/L	2E+	1/20/2022 12:09:09 AM	A85279
Bromide	3.6	2.0		mg/L	20	1/19/2022 1:48:31 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/19/2022 1:48:31 AM	R85247
Sulfate	8900	1000	*	mg/L	2E+	1/20/2022 12:09:09 AM	A85279
Nitrate+Nitrite as N	ND	20		mg/L	100	1/20/2022 2:12:31 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	87000	100		µmhos/c	10	1/24/2022 11:03:47 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	36.00	20.00		mg/L Ca	1	1/18/2022 6:05:15 PM	R85251
Carbonate (As CaCO3)	178.6	2.000		mg/L Ca	1	1/18/2022 6:05:15 PM	R85251
Total Alkalinity (as CaCO3)	214.6	20.00		mg/L Ca	1	1/18/2022 6:05:15 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	46700	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	12	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:44:00 AM	A85320
Barium	0.072	0.020		mg/L	10	1/21/2022 11:44:00 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:44:00 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:44:00 AM	A85320
Calcium	980	50		mg/L	50	1/21/2022 11:45:37 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:44:00 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:44:00 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:35:09 AM	A85320
Magnesium	3300	50		mg/L	50	1/21/2022 11:45:37 AM	A85320
Manganese	ND	0.020		mg/L	10	1/21/2022 11:44:00 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:44:00 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-2
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 3:00:00 PM
Lab ID: 2201641-022 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	11000	50	E	mg/L	50	1/21/2022 11:45:37 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:44:00 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:44:00 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-2 Dup
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 3:00:00 PM
Lab ID: 2201641-023 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.050		mg/L	50	2/11/2022 3:26:29 PM	A85785
Arsenic	ND	0.050	*	mg/L	50	2/11/2022 3:26:29 PM	A85785
Copper	ND	0.050		mg/L	50	2/11/2022 3:26:29 PM	A85785
Lead	ND	0.025		mg/L	50	2/11/2022 3:26:29 PM	A85785
Selenium	ND	0.050		mg/L	50	2/11/2022 3:26:29 PM	A85785
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	78	1.0		mg/L	1	1/24/2022 6:08:52 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 2:13:11 AM	R85247
Chloride	21000	1000	*	mg/L	2E+	1/20/2022 12:21:29 AM	A85279
Bromide	3.6	2.0		mg/L	20	1/19/2022 2:13:11 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/19/2022 2:13:11 AM	R85247
Sulfate	8900	1000	*	mg/L	2E+	1/20/2022 12:21:29 AM	A85279
Nitrate+Nitrite as N	ND	20		mg/L	100	1/20/2022 2:24:51 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	91000	100		µmhos/c	10	1/24/2022 11:06:35 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	ND	20.00		mg/L Ca	1	1/18/2022 6:24:41 PM	R85251
Carbonate (As CaCO3)	199.7	2.000		mg/L Ca	1	1/18/2022 6:24:41 PM	R85251
Total Alkalinity (as CaCO3)	214.0	20.00		mg/L Ca	1	1/18/2022 6:24:41 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	45700	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	11	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:47:14 AM	A85320
Barium	0.077	0.020		mg/L	10	1/21/2022 11:47:14 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:47:14 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:47:14 AM	A85320
Calcium	910	50		mg/L	50	1/21/2022 11:48:54 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:47:14 AM	A85320
Cobalt	ND	0.060		mg/L	10	1/21/2022 11:47:14 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:39:41 AM	A85320
Magnesium	3100	50		mg/L	50	1/21/2022 11:48:54 AM	A85320
Manganese	ND	0.020		mg/L	10	1/21/2022 11:47:14 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:47:14 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-2 Dup
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 3:00:00 PM
Lab ID: 2201641-023 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	10000	50	E	mg/L	50	1/21/2022 11:48:54 AM	A85320
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:47:14 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:47:14 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-3
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 4:00:00 PM
Lab ID: 2201641-024 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.020		mg/L	20	2/11/2022 3:29:10 PM	A85785
Arsenic	ND	0.020		mg/L	20	2/11/2022 3:29:10 PM	A85785
Copper	ND	0.020		mg/L	20	2/11/2022 3:29:10 PM	A85785
Lead	ND	0.010		mg/L	20	2/11/2022 3:29:10 PM	A85785
Selenium	ND	0.020		mg/L	20	2/8/2022 1:26:41 PM	B85673
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	76	1.0		mg/L	1	1/24/2022 6:28:28 PM	R85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	ND	2.0		mg/L	20	1/19/2022 2:37:52 AM	R85247
Chloride	20000	1000	*	mg/L	2E+	1/20/2022 12:33:48 AM	A85279
Bromide	3.6	2.0		mg/L	20	1/19/2022 2:37:52 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	10	H	mg/L	20	1/19/2022 2:37:52 AM	R85247
Sulfate	8800	1000	*	mg/L	2E+	1/20/2022 12:33:48 AM	A85279
Nitrate+Nitrite as N	ND	20		mg/L	100	1/20/2022 2:37:12 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	84000	100		µmhos/c	10	1/24/2022 11:09:25 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	ND	20.00		mg/L Ca	1	1/18/2022 6:44:42 PM	R85251
Carbonate (As CaCO3)	215.3	2.000		mg/L Ca	1	1/18/2022 6:44:42 PM	R85251
Total Alkalinity (as CaCO3)	215.4	20.00		mg/L Ca	1	1/18/2022 6:44:42 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	47700	200	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	11	2.0	D	mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.20		mg/L	10	1/21/2022 11:55:31 AM	A85320
Barium	0.075	0.020		mg/L	10	1/21/2022 11:55:31 AM	A85320
Beryllium	ND	0.020		mg/L	10	1/21/2022 11:55:31 AM	A85320
Cadmium	ND	0.020		mg/L	10	1/21/2022 11:55:31 AM	A85320
Calcium	930	50		mg/L	50	1/21/2022 11:57:10 AM	A85320
Chromium	ND	0.060		mg/L	10	1/21/2022 11:55:31 AM	A85320
Iron	ND	0.10		mg/L	5	1/21/2022 10:41:21 AM	A85320
Magnesium	3300	50		mg/L	50	1/21/2022 11:57:10 AM	A85320
Manganese	ND	0.020		mg/L	10	1/21/2022 11:55:31 AM	A85320
Nickel	ND	0.10		mg/L	10	1/21/2022 11:55:31 AM	A85320
Sodium	11000	50	E	mg/L	50	1/21/2022 11:57:10 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-3
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 4:00:00 PM
Lab ID: 2201641-024 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Vanadium	ND	0.50		mg/L	10	1/21/2022 11:55:31 AM	A85320
Zinc	ND	0.10		mg/L	10	1/21/2022 11:55:31 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-1
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 5:32:00 PM
Lab ID: 2201641-025 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA 200.8: DISSOLVED METALS						Analyst: **bcv**	
Antimony	ND	0.0050		mg/L	5	2/11/2022 3:31:51 PM	A85785
Arsenic	ND	0.0050		mg/L	5	2/11/2022 3:31:51 PM	A85785
Copper	ND	0.0050		mg/L	5	2/11/2022 3:31:51 PM	A85785
Lead	ND	0.0025		mg/L	5	2/11/2022 3:31:51 PM	A85785
Selenium	ND	0.0050		mg/L	5	2/8/2022 1:29:22 PM	B85673
SM 5310B: TOC						Analyst: **AG**	
Organic Carbon, Total	5.0	1.0		mg/L	1	1/24/2022 7:16:27 PM	A85373
EPA METHOD 300.0: ANIONS						Analyst: **JMT**	
Fluoride	0.86	0.50		mg/L	5	1/19/2022 2:50:13 AM	R85247
Chloride	390	25	*	mg/L	50	1/20/2022 12:46:09 AM	A85279
Bromide	ND	0.50		mg/L	5	1/19/2022 2:50:13 AM	R85247
Phosphorus, Orthophosphate (As P)	ND	2.5	H	mg/L	5	1/19/2022 2:50:13 AM	R85247
Sulfate	1400	25	*	mg/L	50	1/20/2022 12:46:09 AM	A85279
Nitrate+Nitrite as N	ND	1.0		mg/L	5	1/20/2022 2:49:32 AM	A85279
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **LRN**	
Conductivity	3900	10		µmhos/c	1	1/24/2022 11:12:14 AM	R85380
SM2320B: ALKALINITY						Analyst: **LRN**	
Bicarbonate (As CaCO3)	116.5	20.00		mg/L Ca	1	1/18/2022 4:43:21 PM	R85251
Carbonate (As CaCO3)	ND	2.000		mg/L Ca	1	1/18/2022 4:43:21 PM	R85251
Total Alkalinity (as CaCO3)	116.5	20.00		mg/L Ca	1	1/18/2022 4:43:21 PM	R85251
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	2980	40.0	*D	mg/L	1	1/24/2022 11:43:00 AM	65074
SM 4500 NORG C: TKN						Analyst: **EKM**	
Nitrogen, Kjeldahl, Total	ND	1.0		mg/L	1	1/27/2022 9:58:00 AM	65208
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Aluminum	ND	0.020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Barium	0.030	0.0020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Beryllium	ND	0.0020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Cadmium	ND	0.0020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Calcium	500	5.0	E	mg/L	5	1/21/2022 10:42:58 AM	A85320
Chromium	ND	0.0060		mg/L	1	1/21/2022 11:58:50 AM	A85320
Cobalt	ND	0.0060		mg/L	1	1/21/2022 11:58:50 AM	A85320
Iron	ND	0.020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Magnesium	120	5.0		mg/L	5	1/21/2022 10:42:58 AM	A85320
Manganese	0.0035	0.0020		mg/L	1	1/21/2022 11:58:50 AM	A85320
Nickel	ND	0.010		mg/L	1	1/21/2022 11:58:50 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SW-1
Project: Holloman AFB PFAS **Collection Date:** 1/13/2022 5:32:00 PM
Lab ID: 2201641-025 **Matrix:** SURFACE W **Received Date:** 1/17/2022 3:27:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**	
Sodium	280	5.0		mg/L	5	1/21/2022 10:42:58 AM	A85320
Vanadium	ND	0.050		mg/L	1	1/21/2022 11:58:50 AM	A85320
Zinc	0.016	0.010		mg/L	1	1/21/2022 11:58:50 AM	A85320

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

March 28, 2022

Vista Work Order No. 2201174

Mr. Andy Freeman
Hall Environmental Analytical Laboratory
4901 Hawkins NE
Albuquerque, NM 87109

Dear Mr. Freeman,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 20, 2022 under your Project Name '2201641'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at jfox@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Jamie Fox
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 2201174
Case Narrative

Sample Condition on Receipt:

Thirteen groundwater samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The samples were received in good condition and within the recommended temperature requirements. Sample "2201641-013D" was assigned to Vista Work Order No. 2201175.

Analytical Notes:

PFAS Isotope Dilution/LC-MSMS Method Compliant with Table B-15 of DoD QSM 5.3 (Aqueous)

The samples were extracted and analyzed for a selected list of PFAS using Isotope Dilution and LC-MS/MS compliant with Table B-15 of DoD QSM 5.3. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 of the LOQ concentrations. The LCS/LCSD recoveries were within the acceptance criteria.

Samples "2201641-002D", "2201641-003D", "2201641-005D" and "2201641-011D" were re-injected due to high levels of matrix interferences. The re-injections were prepared using standard addition.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier. The responses of the internal standards with low recoveries were greater than 10:1 signal-to-noise, which is the limit generally considered acceptable for accurate quantitation by isotope dilution analysis.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2201174-01	2201641-001A	11-Jan-22 11:00	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-02	2201641-002D	11-Jan-22 11:20	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-03	2201641-003D	11-Jan-22 13:05	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-04	2201641-004D	11-Jan-22 14:04	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-05	2201641-005D	11-Jan-22 14:55	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-06	2201641-006D	11-Jan-22 15:50	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-07	2201641-007D	11-Jan-22 16:35	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-08	2201641-008A	11-Jan-22 16:50	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-09	2201641-009A	12-Jan-22 09:37	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-10	2201641-010D	12-Jan-22 10:10	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL

Vista Project: 2201174

Client Project: 2201641

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2201174-10	2201641-010D	12-Jan-22 10:10	20-Jan-22 10:02	HDPE Bottle, 250 mL
2201174-11	2201641-011D	12-Jan-22 12:25	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2201174-12	2201641-012D	12-Jan-22 13:27	20-Jan-22 10:02	Polypropylene, 250mL
				Polypropylene, 250mL
				HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22A158-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFMBA	863090-89-5	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFPeA	2706-90-3	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFMPA	377-73-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFBS	375-73-5	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFEESA	113507-82-7	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
NFDHA	151772-58-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
4:2 FTS	757124-72-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHxA	307-24-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFPeS	2706-91-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
HFPO-DA	13252-13-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHpA	375-85-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
ADONA	919005-14-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHxS	355-46-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
6:2 FTS	27619-97-2	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFOA	335-67-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHpS	375-92-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFNA	375-95-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFOS	1763-23-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
9Cl-PF3ONS	756426-58-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFDA	335-76-2	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
8:2 FTS	39108-34-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
MeFOSAA	2355-31-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
EtFOSAA	2991-50-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFUnA	2058-94-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
11Cl-PF3OUdS	763051-92-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFDoA	307-55-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFTrDA	72629-94-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFTeDA	376-06-7	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	67.4	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFPeA	IS	87.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFBS	IS	79.1	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-HFPO-DA	IS	89.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-4:2 FTS	IS	85.3	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFHxA	IS	84.6	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C4-PFHpA	IS	82.2	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFHxS	IS	82.9	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22A158-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	77.3	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C5-PFNA	IS	89.2	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFOA	IS	83.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C8-PFOS	IS	83.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFDA	IS	82.4	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-8:2 FTS	IS	88.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
d3-MeFOSAA	IS	73.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFUnA	IS	79.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
d5-EtFOSAA	IS	69.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFDoA	IS	77.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFTeDA	IS	66.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: LCSD **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A158-BS1/B22A158-BSD1
Project:	2201641	QC Batch:	B22A158
Matrix:	Aqueous	Samp Size:	0.250/0.250 L
		Date Extracted:	31-Jan-22
		Column:	BEH C18

Analyte	CAS Number	LCS (ng/L)	LCS Spike	LCS % Rec	LCS Quals	LCSD (ng/L)	LCSD Spike	LCSD % Rec	RPD	LCSD Quals	%Rec Limits	RPD Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
PFBA	375-22-4	38.8	40.0	97.0		38.4	40.0	96.1	0.988		73-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFMBA	863090-89-5	39.8	40.0	99.4		38.8	40.0	96.9	2.55		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFPeA	2706-90-3	37.6	40.0	94.0		39.2	40.0	97.9	4.10		72-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFMPA	377-73-1	34.8	40.0	86.9		33.6	40.0	83.9	3.51		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFBS	375-73-5	40.6	40.0	102		35.5	40.0	88.8	13.4		72-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFEESA	113507-82-7	38.0	35.7	107		34.6	35.7	97.0	9.50		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
NFDHA	151772-58-6	38.9	40.0	97.2		38.9	40.0	97.1	0.126		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
4:2 FTS	757124-72-4	36.1	40.0	90.2		39.5	40.0	98.6	8.95		63-143	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHxA	307-24-4	40.3	40.0	101		40.1	40.0	100	0.511		72-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFPeS	2706-91-4	38.1	40.0	95.1		38.0	40.0	95.0	0.0914		71-127	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
HFPO-DA	13252-13-6	42.7	40.0	107		39.1	40.0	97.8	8.71		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHpA	375-85-9	37.7	40.0	94.1		38.7	40.0	96.7	2.68		72-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
ADONA	919005-14-4	37.7	40.0	94.1		39.4	40.0	98.5	4.51		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHxS	355-46-4	40.2	40.0	100		39.0	40.0	97.4	3.06		68-131	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
6:2 FTS	27619-97-2	41.4	40.0	103		38.6	40.0	96.5	6.95		64-140	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFOA	335-67-1	37.9	40.0	94.8		35.3	40.0	88.3	7.18		71-133	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHpS	375-92-8	40.3	40.0	101		41.5	40.0	104	3.12		69-134	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFNA	375-95-1	40.3	40.0	101		39.3	40.0	98.3	2.34		69-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFOS	1763-23-1	38.2	40.0	95.5		40.9	40.0	102	6.78		65-140	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
9Cl-PF3ONS	756426-58-1	37.7	40.0	94.3		41.1	40.0	103	8.59		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFDA	335-76-2	42.4	40.0	106		37.5	40.0	93.7	12.3		71-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
8:2 FTS	39108-34-4	39.5	40.0	98.8		37.3	40.0	93.3	5.72		67-138	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
MeFOSAA	2355-31-9	39.7	40.0	99.2		39.5	40.0	98.7	0.560		65-136	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
EtFOSAA	2991-50-6	37.9	40.0	94.8		40.9	40.0	102	7.51		61-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFUnA	2058-94-8	39.2	40.0	98.1		38.6	40.0	96.4	1.69		69-133	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
11Cl-PF3OUdS	763051-92-9	41.2	40.0	103		40.5	40.0	101	1.78		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFDoA	307-55-1	38.2	40.0	95.4		38.8	40.0	97.0	1.66		72-134	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFTrDA	72629-94-8	39.6	40.0	99.0		38.8	40.0	96.9	2.11		65-144	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFTeDA	376-06-7	43.3	40.0	108		40.2	40.0	100	7.53		71-132	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBA	IS	67.7		72.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-PFPeA	IS	83.2		87.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Sample ID: LCSD **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A158-BS1/B22A158-BSD1	Date Extracted:	31-Jan-22
Project:	2201641	QC Batch:	B22A158	Column:	BEH C18
Matrix:	Aqueous	Samp Size:	0.250/0.250 L		

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBS	IS	75.9		81.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-HFPO-DA	IS	84.2		94.7		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-4:2 FTS	IS	81.6		85.7		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFHxA	IS	79.8		84.6		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C4-PFHpA	IS	81.9		84.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-PFHxS	IS	81.7		84.8		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-6:2 FTS	IS	79.2		86.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C5-PFNA	IS	88.8		93.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFOA	IS	82.6		91.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C8-PFOS	IS	86.0		84.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFDA	IS	79.6		85.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-8:2 FTS	IS	90.6		95.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
d3-MeFOSAA	IS	71.3		76.3		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFUnA	IS	79.8		80.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
d5-EtFOSAA	IS	67.0		73.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFDoA	IS	74.3		78.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFTeDA	IS	69.1		72.3		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Sample ID: 2201641-001A

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: Equipment Blank
Matrix: Groundwater
Date Collected: 11-Jan-22 11:00

Laboratory Data

Lab Sample: 2201174-01
Date Received: 20-Jan-22 10:02
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFMBA	863090-89-5	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFPeA	2706-90-3	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFMPA	377-73-1	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFBS	375-73-5	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFEESA	113507-82-7	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
NFDHA	151772-58-6	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
4:2 FTS	757124-72-4	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFHxA	307-24-4	1.93	0.964	1.93	3.86	J	B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFPeS	2706-91-4	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
HFPO-DA	13252-13-6	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFHpA	375-85-9	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
ADONA	919005-14-4	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFHxS	355-46-4	1.72	0.964	1.93	3.86	J	B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
6:2 FTS	27619-97-2	4.01	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFOA	335-67-1	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFHpS	375-92-8	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFNA	375-95-1	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFOS	1763-23-1	28.8	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
9Cl-PF3ONS	756426-58-1	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFDA	335-76-2	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
8:2 FTS	39108-34-4	1.43	0.964	1.93	3.86	J	B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
MeFOSAA	2355-31-9	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
EtFOSAA	2991-50-6	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFUnA	2058-94-8	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
11Cl-PF3OUdS	763051-92-9	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFDoA	307-55-1	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFTrDA	72629-94-8	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
PFTeDA	376-06-7	ND	0.964	1.93	3.86		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	80.9	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C3-PFPeA	IS	87.3	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C3-PFBS	IS	78.9	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C3-HFPO-DA	IS	95.5	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-4:2 FTS	IS	83.6	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFHxA	IS	83.0	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C4-PFHpA	IS	83.3	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1

Sample ID: 2201641-001A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: Equipment Blank
Matrix: Groundwater
Date Collected: 11-Jan-22 11:00

Laboratory Data

Lab Sample: 2201174-01
Date Received: 20-Jan-22 10:02
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFHxS	IS	84.7	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-6:2 FTS	IS	82.1	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C5-PFNA	IS	92.7	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFOA	IS	84.4	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C8-PFOS	IS	83.4	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFDA	IS	87.7	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-8:2 FTS	IS	89.5	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
d3-MeFOSAA	IS	78.1	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFUnA	IS	87.3	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
d5-EtFOSAA	IS	74.4	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFDoA	IS	79.1	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1
13C2-PFTeDA	IS	76.4	50 - 150		B22A158	31-Jan-22	0.259 L	01-Feb-22 21:57	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-002D

yPFS Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW05001
Matrix: Groundwater
Date Collected: 11-Jan-22 11:20

AaLboatbor Data

Lab Sample: 2201174-02
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	375-22-4	9390	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
PFMBA	863090-89-5	16.7	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFPeA	2706-90-3	33700	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
PFMPA	377-73-1	8.04	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFBS	375-73-5	3790	4.93	9.88	19.7	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 22:09	5
PFEESA	113507-82-7	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
NFDHA	151772-58-6	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
4:2 FTS	757124-72-4	888	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFHxA	307-24-4	83800	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
PFPeS	2706-91-4	3530	4.93	9.88	19.7	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 22:09	5
HFPO-DA	13252-13-6	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFHpA	375-85-9	7510	4.93	9.88	19.7	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 22:09	5
ADONA	919005-14-4	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFHxS	355-46-4	46700	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
6:2 FTS	27619-97-2	164000	247	493	987	D	B22A158	31-Jan-22	0.253 L	03-Feb-22 17:38	250
PFOA	335-67-1	9780	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
PFHpS	375-92-8	4310	19.7	39.5	78.9	D	B22A158	31-Jan-22	0.253 L	23-Feb-22 19:33	20
PFNA	375-95-1	881	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFOS	1763-23-1	280000	247	493	987	D	B22A158	31-Jan-22	0.253 L	03-Feb-22 17:38	250
9Cl-PF3ONS	756426-58-1	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFDA	335-76-2	641	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
8:2 FTS	39108-34-4	15200	49.3	98.8	197	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
MeFOSAA	2355-31-9	10.8	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
EtFOSAA	2991-50-6	26.4	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFUnA	2058-94-8	48.2	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
11Cl-PF3OUdS	763051-92-9	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFDoA	307-55-1	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFTrDA	72629-94-8	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
PFTeDA	376-06-7	ND	0.987	1.98	3.95		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
13C3-PFBA	IS	99.6	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
13C3-PFPeA	IS	97.4	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
13C3-PFBS	IS	74.5	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 22:09	5
13C3-HFPO-DA	IS	37.0	50 - 150	H	B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-4:2 FTS	IS	40.3	50 - 150	H	B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-PFHxA	IS	89.0	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
13C4-PFHpA	IS	63.0	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 22:09	5

Sample ID: 2201641-002D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW05001
Matrix: Groundwater
Date Collected: 11-Jan-22 11:20

AaLboatbor Data

Lab Sample: 2201174-02
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	F nalrzed	Dilutibn
13C3-PFHxS	IS	97.6	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
13C2-6:2 FTS	IS	84.3	50 - 150	D	B22A158	31-Jan-22	0.253 L	03-Feb-22 17:38	250
13C5-PFNA	IS	26.9	50 - 150	H	B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-PFOA	IS	101	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
13C8-PFOS	IS	85.0	50 - 150	D	B22A158	31-Jan-22	0.253 L	03-Feb-22 17:38	250
13C2-PFDA	IS	65.6	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-8:2 FTS	IS	88.3	50 - 150	D	B22A158	31-Jan-22	0.253 L	02-Feb-22 21:59	50
d3-MeFOSAA	IS	65.6	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-PFUnA	IS	67.4	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
d5-EtFOSAA	IS	65.3	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-PFDoA	IS	78.2	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1
13C2-PFTeDA	IS	78.1	50 - 150		B22A158	31-Jan-22	0.253 L	01-Feb-22 22:08	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-003D

PFAS Isotope Dilution Table B-15

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: F9H1-LM4
Matrix: wroBvdJ ater
Date Collected: 11-Rav-22 1H:0W

Laboratory Data

Lab Sample: 2201174-0H
Date 5 eceiAed: 20-Rav-22 10:02
ColBmv: 8nE C1G

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PF8y	H7W22-4	7000	4.7H	3.4H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
PFM8y	G6HD30-G3-W	24.H	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFPey	2706-30-H	12100	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
PFMPy	H77-7H-1	26.W	0.34W	1.G3	H7G	T	822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PF8S	H7W7H-W	41G00	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
PFnnSy	11HW07-G2-7	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
NFDEy	1W772-WG-6	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
4:2 F9S	7W124-72-4	H700	4.7H	3.4H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
PFExy	HD7-24-4	46600	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
PFPeS	2706-31-4	40HD0	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
EFPO-Dy	1H2W2-1H-6	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFEpy	H7WGW3	7640	4.7H	3.4H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
y DONy	31300W14-4	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFExS	HWW46-4	144000	34.W	1G3	H7G	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 22:W0	100
6:2 F9S	27613-37-2	22100	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
PFOy	HHW67-1	12G00	47.H	34.H	1G3	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
PFEpS	H7W32-G	1W70	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFNy	H7W3W1	12.2	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFOS	176H-2H-1	74W0	4.7H	3.4H	1G3	DUT	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
3Cl-PFHDNS	7W6426-WG-1	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFDy	HHW76-2	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
G:2 F9S	HB10G-H4-4	1.WH	0.34W	1.G3	H7G	R	822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
MeFOSyy	2HWWH1-3	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
ntFOSyy	2331-W0-6	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFI vy	20WG-34-G	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
11Cl-PFHOI dS	76HDWI-32-3	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PFDoy	HD7-WW1	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PF9rDy	72623-34-G	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
PF9eDy	H76-06-7	ND	0.34W	1.G3	H7G		822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1HCH-PF8y	sS	H2.W	W0 - 1W0	DUE	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
1HCH-PFPey	sS	36.4	W0 - 1W0	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
1HCH-PF8S	sS	31.G	W0 - 1W0	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
1HCH-EFPO-Dy	sS	H1.H	W0 - 1W0	E	822y1WG	H1-Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-4:2 F9S	sS	G4.0	W0 - 1W0	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W
1HC2-PFExy	sS	GGW	W0 - 1W0	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:01	W0
1HC4-PFEpy	sS	6H0	W0 - 1W0	D	822y1WG	H1-Rav-22	0.26WL	02-Feb-22 2H:11	W

Sample ID: 2201641-003D **PFAS Isotope Dilution Table B-15**

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: F9 H1 -LM4
Matrix: wroBvdJ ater
Date Collected: 11-Rav-22 1H:0W

Laboratory Data

Lab Sample: 2201174-0H
Date 5 eceiAed: 20-Rav-22 10:02
ColBmv: 8 n E C1G

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1HCH-PFE xS	sS	G3.1	W0 - 1W0	D	8 22y 1WG	H1 -Rav-22	0.26WL	02-Feb-22 22:W0	100
1HC2-6:2 F9 S	sS	30.3	W0 - 1W0	D	8 22y 1WG	H1 -Rav-22	0.26WL	02-Feb-22 2H:01	W0
1HCW-PFNy	sS	G7.4	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-PFOy	sS	37.7	W0 - 1W0	D	8 22y 1WG	H1 -Rav-22	0.26WL	02-Feb-22 2H:01	W0
1HCG-PFOS	sS	GH0	W0 - 1W0	D	8 22y 1WG	H1 -Rav-22	0.26WL	02-Feb-22 2H:11	W
1HC2-PFDy	sS	G4.H	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-G2 F9 S	sS	G7.W	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
dH-MeFOSy y	sS	73.7	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-PFI vy	sS	73.7	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
dWntFOSy y	sS	77.3	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-PFDoy	sS	73.3	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1
1HC2-PF9eDy	sS	G0.G	W0 - 1W0		8 22y 1WG	H1 -Rav-22	0.26WL	01-Feb-22 22:1G	1

DL - Detectiov Limit
LOD - Limit oQDetectiov
LOT - Limit oQqBavtitatiov
5 ehBlth reported to t, e DL.
f , ev reportedUPFExSUPFOy UPFOSUMeFOSy y avd ntFOSy y ivclBde bot, livear avd bravc, ed ihomerh. Ovlu t, e livear ihomer ih reported Qor all ot, er avaluteh.

Sample ID: 2201641-004D **yPFS Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW01004
Matrix: Groundwater
Date Collected: 11-Jan-22 14:04

AaLboatbor Data

Lab Sample: 2201174-04
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P5BA	. 73-22-4	29F9	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5MBA	86. 090-89-3	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5PeA	2706-90-.	. 2F6	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5MPA	. 77-7. -1	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5BS	. 73-7. -3	19F3	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5EESA	11. 307-82-7	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
N5DHA	131772-38-6	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
4:2 5TS	737124-72-4	2F 4	0F949	1F89	. F79	J	B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5HxA	. 07-24-4	49F3	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5PeS	2706-91-4	7F 1	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
H5PO-DA	1. 232-1. -6	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5HpA	. 73-83-9	4F02	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
ADONA	919003-14-4	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5HxS	. 33-46-4	18F3	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
6:2 5TS	27619-97-2	4F08	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5OA	. . 3-67-1	2F60	0F949	1F89	. F79	J	B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5HpS	. 73-92-8	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5NA	. 73-93-1	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5OS	176. -2. -1	22F8	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
9Cl-P5. ONS	736426-38-1	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5DA	. . 3-76-2	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
8:2 5TS	. 9108-. 4-4	1F70	0F949	1F89	. F79	J	B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
Me5OSAA	2. 33-. 1-9	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
Et5OSAA	2991-30-6	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5UnA	2038-94-8	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
11Cl-P5. OUdS	76. 031-92-9	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5DoA	. 07-33-1	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5TrDA	72629-94-8	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
P5TeDA	. 76-06-7	ND	0F949	1F89	. F79		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1. C. -P5BA	IS	63H	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C. -P5PeA	IS	84F8	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C. -P5BS	IS	76F2	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C. -H5PO-DA	IS	87F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-4:2 5TS	IS	82F8	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5HxA	IS	80F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C4-P5HpA	IS	8. F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1

Sample ID: 2201641-004D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW01004
Matrix: Groundwater
Date Collected: 11-Jan-22 14:04

AaLboatbor Data

Lab Sample: 2201174-04
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	F nalrzed	Dilutibn
1. C. -P5HxS	IS	8. F8	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-6:2 5TS	IS	83F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C3-P5NA	IS	88F6	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5OA	IS	83F8	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C8-P5OS	IS	83F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5DA	IS	86F	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-8:2 5TS	IS	79F0	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
d. -Me5OSAA	IS	79F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5UnA	IS	77F	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
d3-Et5OSAA	IS	77F3	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5DoA	IS	77F4	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1
1. C2-P5TeDA	IS	80F3	30 - 130		B22A138	. 1-Jan-22	0E264 L	01-5eb-22 22:28	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DLF
When reported, P5HxS, P5OA, P5OS, Me5OSAA and Et5OSAA include both linear and branched isomersF Only the linear isomer is reported for all other analytesF

Sample ID: 2201641-00AD **PFs S Iuotope DilTtion Bable 5-1A**

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: 5F91-LMH
Matrix: wroBvdJ ater
Date Collected: 11-Rav-22 14:HH

Laboratory Data

Lab Sample: 2201174-0H
Date WeceiAed: 20-Rav-22 10:02
ColBmv: 8nE C1G

s nalyte	Cs S NTmber	Conc. (ng/L)	DL	LOD	LOQ	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
P58y	97H-22-4	16100	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
P5M8y	G690.0-G-H	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5Pey	2706-.0-9	.H900	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
P5MPy	977-79-1	6434	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P58S	97H-79-H	.6600	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
P5nnSy	119H07-G2-7	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
N5DEy	1H1772-HG-6	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
4:2 5FS	7H7124-72-4	14200	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
P5Exy	907-24-4	172000	246	4.2	.GH	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
P5PeS	2706-.1-4	.H000	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
E5PT-Dy	192H2-19-6	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5Epy	97H-GH-.	90.00	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
y DTNy	.1.00H-14-4	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5ExS	9HH-46-4	246000	246	4.2	.GH	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
6:2 5FS	2761.-.7-2	.7600	246	4.2	.GH	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
P5Ty	99H-67-1	149000	.GH	1.7	9.4	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:41	100
P5EpS	97H-.2-G	H.0	43.2	.3G4	1.37	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 00:02	H
P5Ny	97H-.H-1	G6.	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5TS	1769-29-1	49200	4.32	.G34	1.7	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
.Cl-P59TNS	7H6426-HG-1	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5Dy	99H-76-2	639.	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
G2 5FS	9.10G-94-4	H61	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
Me5TSy y	29HH-91-.	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
nt5TSy y	2..1-H0-6	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5Ovy	20HG-.4-G	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
11Cl-P59TOdS	7690H1-.2-.	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5Doy	907-HH-1	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5FrDy	7262.-.4-G	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
P5FeDy	976-06-7	ND	03GH	13.7	93.4		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1

Labeled Standaru	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
19C9-P58y	US	.436	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
19C9-P5Pey	US	G737	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
19C9-P58S	US	G434	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
19C9-E5PT-Dy	US	1639	H0 - 1H0	E	822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-4:2 5FS	US	.132	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
19C2-P5Exy	US	G73H	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
19C4-P5Epy	US	.031	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0

Sample ID: 2201641-00AD **PFs S Iuotope DilTtion Bable 5-1A**

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: 5F91-LMH

Matrix: wroBvdJ ater
Date Collected: 11-Rav-22 14:HH

Laboratory Data

Lab Sample: 2201174-0H
Date WeceiAed: 20-Rav-22 10:02

ColBmv: 8nE C1G

Labeled Standardu	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
19C9-P5ExS	US	G930	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
19C2-6:25FS	US	G136	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	09-5eb-22 17:4G	2H0
19CH-P5Ny	US	HG36	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-P5Ty	US	.930	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:41	100
19CG-P5TS	US	101	H0 - 1H0	D	822y1HG	91-Rav-22	032H4L	02-5eb-22 29:H2	H0
19C2-P5Dy	US	G139	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-G25FS	US	G73G	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
d9-Me5TSyy	US	763G	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-P5Ovy	US	7GBH	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
dH-nt5TSyy	US	7632	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-P5Doy	US	7HBH	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1
19C2-P5FeDy	US	7731	H0 - 1H0		822y1HG	91-Rav-22	032H4L	01-5eb-22 22:9G	1

DL - Detectiov Limit

LTD - Limit of Detectiov
LTQ - Limit of qBavtitatiov

WeIBltI reported to tse DL3

h sev reported, P5ExS, P5Ty, P5TS, Me5TSyy avd nt5TSyy ivclBde bots livear avd bravcsed iIomerI3 Tvlu tse livear iIomer iI reported for all otser avaluteI3

Sample ID: 2201641-006D

yPFS Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: 5F91-LM1

Matrix: Groundwater
Date Collected: 11-Jan-22 1R:R0

AaLboatbor Data

Lab Sample: 2201174-06
Date Weceived: 20-Jan-22 10:02

Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P5BA	97R-22-4	314	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5MBA	869030-83-R	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5PeA	2706-30-9	1700	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5MPA	977-79-1	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5BS	97R-79-R	306	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5EESA	119R07-82-7	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
N5DHA	1R1772-R8-6	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
4:2 5FS	7R7124-72-4	6.28	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5HxA	907-24-4	2740	4.71	3.49	18.3	D	B22A1R8	91-Jan-22	0.26RL	09-5eb-22 00:22	R
P5PeS	2706-31-4	10R	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
H5PT-DA	192R2-19-6	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5HpA	97R-8R-3	21.6	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
ADTNA	31300R-14-4	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5HxS	9RR-46-4	21R	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
6:2 5FS	27613-37-2	41.4	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5TA	99R-67-1	1R.2	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5HpS	97R-32-8	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5NA	97R-3R-1	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5TS	1769-29-1	11.3	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
3Cl-P59TNS	7R6426-R8-1	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5DA	99R-76-2	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
8:2 5FS	93108-94-4	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
Me5TSAA	29RR-91-3	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
Et5TSAA	2331-R0-6	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5OnA	20R8-34-8	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
11Cl-P59TOdS	7690R1-32-3	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5DoA	907-RR-1	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5FrDA	72623-34-8	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
P5FeDA	976-06-7	ND	0.349	1.83	9.77		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
19C9-P5BA	US	R2.3	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C9-P5PeA	US	67.7	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C9-P5BS	US	66.3	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C9-H5PT-DA	US	82.R	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-4:2 5FS	US	71.8	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5HxA	US	66.0	R0 - 1R0	D	B22A1R8	91-Jan-22	0.26RL	09-5eb-22 00:22	R
19C4-P5HpA	US	7R.9	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1

Sample ID: 2201641-006D

yPFS Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: 5F91-LM1
Matrix: Groundwater
Date Collected: 11-Jan-22 1R:R0

AaLboatbor Data

Lab Sample: 2201174-06
Date Weceived: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
19C9-P5HxS	US	79.2	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-6:2 5FS	US	63.R	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19CR-P5NA	US	73.R	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5TA	US	78.4	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C8-P5TS	US	81.3	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5DA	US	80.9	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-8:2 5FS	US	72.7	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
d9-Me5TSAA	US	76.3	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5OnA	US	73.R	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
dR-Et5TSAA	US	78.0	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5DoA	US	78.6	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1
19C2-P5FeDA	US	76.R	R0 - 1R0		B22A1R8	91-Jan-22	0.26RL	01-5eb-22 22:48	1

DL - Detection Limit
LTD - Limit of Detection
LTQ - Limit of quantitation
WeIultI reported to tse DL.
h sen reported, P5HxS, P5TA, P5TS, Me5TSAA and Et5TSAA include bots linear and brancsed iIomerI. Tnly tse linear iIomer iI reported for all otser analyteI.

Sample ID: 2201641-007D

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: F9R1-LM2

Matrix: Groundwater
Date Collected: 11-Jan-22 16:RW

Laboratory Data

Lab Sample: 2201174-07
Date 5 eceived: 20-Jan-22 10:02

Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	R7W22-4	410	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFMBA	86R030-83-W	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFPeA	2706-30-R	782	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFMPA	R77-7R-1	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFBS	R7W7R-W	4W4	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFEESA	11RW07-82-7	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
NFDHA	1W772-W8-6	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
4:2 F9S	7W124-72-4	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFHxA	R07-24-4	2R00	4.76	3.WI	13.0	D	B22A1W8	R1-Jan-22	0.26RL	0R-Feb-22 00:R2	W
PFPeS	2706-31-4	82.0	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
HFPT-DA	1R2W2-1R-6	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFHpA	R7W8W3	11.0	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
ADTNA	31300W14-4	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFHxS	RWW46-4	24.6	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
6:2 F9S	27613-37-2	1.1R	0.3W2	1.30	R.81	JCU	B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFTA	RRW67-1	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFHpS	R7W32-8	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFNA	R7W3W1	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFTS	176R-2R-1	2.1W	0.3W2	1.30	R.81	J	B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
3Cl-PFRTNS	7W6426-W8-1	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFDA	RRW76-2	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
8:2 F9S	R3108-R4-4	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
MeFTSAA	2RWWR1-3	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
EtFTSAA	2331-W0-6	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFI nA	20W8-34-8	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
11Cl-PFRTI dS	76R0WI-32-3	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PFDoA	R07-WW1	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PF9rDA	72623-34-8	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
PF9eDA	R76-06-7	ND	0.3W2	1.30	R.81		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCR-PFBA	sS	W0.W	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RCR-PFPeA	sS	66.4	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RCR-PFBS	sS	6WW	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RCR-HFPT-DA	sS	6R.3	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-4:2 F9S	sS	74.1	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PFHxA	sS	61.0	W0 - 1W0	D	B22A1W8	R1-Jan-22	0.26RL	0R-Feb-22 00:R2	W
1RC4-PFHpA	sS	71.2	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1

Sample ID: 2201641-007D

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: F9R1-LM2

Matrix: Groundwater
Date Collected: 11-Jan-22 16:RW

Laboratory Data

Lab Sample: 2201174-07
Date 5 eceived: 20-Jan-22 10:02

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCR-PFHxS	sS	78.7	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-6:2 F9S	sS	78.R	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RCWPFNA	sS	82.R	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PFTA	sS	7W1	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC8-PFTS	sS	78.6	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PFDA	sS	74.1	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-8:2 F9S	sS	74.2	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
dR-MeFTSAA	sS	70.0	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PFInA	sS	7R.6	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
dWEtFTSAA	sS	6W4	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PFDoA	sS	71.3	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1
1RC2-PF9eDA	sS	7R.6	W0 - 1W0		B22A1W8	R1-Jan-22	0.26RL	01-Feb-22 22:W3	1

DL - Detection Limit

LTD - Limit oQDetection
LTU - Limit oQquantitation

5 ehulth reported to t, e DL.

f , en reportedOPFHxSOPFTAOPFTSOMeFTSAA and EtFTSAA include bot, linear and branc, ed ihomerh. Tnly t, e linear ihomer ih reported Qor all ot, er analyteh.

Sample ID: 2201641-008A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: kield 8 lavF
Matrix: GroBvdwater
Date Collected: 11-Jav-22 16:R0

Laboratory Data

Lab Sample: 2201174-0H
Date q eceiAed: 20-Jav-22 10:02
ColBmv: 8 nE C1H

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Pk8 y	37R-22-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkM8 y	H63090-H9-R	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkPey	2706-90-3	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkMPy	377-73-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
Pk8 S	37R-73-R	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
Pknn Sy	113R07-H2-7	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
NkDEy	1R1772-RH-6	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
4:2 k5 S	7R7124-72-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkExy	307-24-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkPeS	2706-91-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
EkPT-Dy	132R2-13-6	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkEpy	37R-HR-9	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
y DTNy	91900R-14-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkExS	3RR-46-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
6:2 k5 S	27619-97-2	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkTy	33R-67-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkEpS	37R-92-H	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkNy	37R-9R-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkTS	1763-23-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
9Cl-Pk3TNS	7R6426-RH-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkDy	33R-76-2	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
H2 k5 S	3910H-34-4	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
MekTSy y	23RR-31-9	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
ntkTSy y	2991-R0-6	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkOvy	20RH-94-H	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
11Cl-Pk3TOdS	7630R1-92-9	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
PkDoy	307-RR-1	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
Pk5rDy	72629-94-H	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
Pk5eDy	376-06-7	ND	0.96R	1.93	3.H6		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-Pk8 y	US	77.1	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C3-PkPey	US	H0.6	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C3-Pk8 S	US	74.3	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C3-EkPT-Dy	US	77.R	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-4:2 k5 S	US	H3.4	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-PkExy	US	7H7	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C4-PkEpy	US	H0.1	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1

Sample ID: 2201641-008A

PFAS Isotope Dilution Table B-15

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: kield 8 lavF
Matrix: GroBvdwater
Date Collected: 11-Jav-22 16:R0

Laboratory Data

Lab Sample: 2201174-0H
Date q eceiAed: 20-Jav-22 10:02
ColBmv: 8 nE C1H

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PkE xS	US	H6.2	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-6:2 k5 S	US	H1.9	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13CR-PkNy	US	H6.H	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-PkT y	US	HHR	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13CH-PkT S	US	9R.3	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-PkDy	US	H2.H	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-H2 k5 S	US	H6.6	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
d3-MekT Sy y	US	H1.2	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-PkOvy	US	H1.6	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
dR-n tk T Sy y	US	H0.R	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-PkDoy	US	79.2	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1
13C2-Pk5eDy	US	H0.9	R0 - 1R0		8 22y 1RH	31-Jav-22	0.2R9 L	01-keb-22 23:09	1

DL - Detectiov Limit

LTD - Limit o, Detectiov
LTf - Limit o, QBavtitatiov

q eIBltI reported to tse DL.

h sev reportedWPkExSWPkTy WPkTSWMekTSy y avd ntkTSy y ivclBde bots livear avd bravcsed iIomerI. Tvlu tse livear iIomer iI reported ,or all otser avaluteI.

Sample ID: 2201641-009A **PFAS Isotope Dilution Table B-15**

Client Data

Name: E all n v Airovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: n FBipmevt 8 lav.
Matrix: wroBvdJ ater
Date Collected: 12-Rav-22 0H:q7

Laboratory Data

Lab Sample: 2201174-0H
Date k eceiAed: 20-Rav-22 10:02
ColBmv: 8 n E C1G

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
P98 y	q75-22-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9M8 y	G6q0HD-GH-5	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Pey	2706-HD-q	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9MPy	q77-7q-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P98 S	q75-7q-5	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9nn Sy	11q507-G2-7	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
N9DEy	151772-5G-6	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
4:2 9TS	757124-72-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Exy	q07-24-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9PeS	2706-Hl-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
E9PO-Dy	1q252-1q-6	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Epy	q75-G5-H	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
y DONy	HlHD05-14-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9ExS	q55-46-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
6:2 9TS	2761H-H7-2	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Oy	qq5-67-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9EpS	q75-H2-G	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Ny	q75-H5-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9OS	176q-2q-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
HCl-P9qONS	756426-5G-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Dy	qq5-76-2	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
G2 9TS	qHl0G-q4-4	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
Me9OSy y	2q55-q1-H	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
nt9OSy y	2HHl-50-6	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Uvy	205G-H4-G	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
11Cl-P9qOUdS	76q051-H2-H	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9Doy	q07-55-1	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9TrDy	7262H-H4-G	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
P9TeDy	q76-06-7	ND	03H6q	13H2	q3G5		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1qCq-P98 y	IS	G236	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qCq-P9Pey	IS	G63H	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qCq-P98 S	IS	7G3q	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qCq-E9PO-Dy	IS	G034	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-4:2 9TS	IS	Gq30	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9Exy	IS	G535	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC4-P9Epy	IS	Gq3H	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1

Sample ID: 2201641-009A **PFAS Isotope Dilution Table B-15**

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: n FBipmevt 8 lav.
Matrix: wroBvdJ ater
Date Collected: 12-Rav-22 0H:q7

Laboratory Data

Lab Sample: 2201174-0H
Date k eceiAed: 20-Rav-22 10:02
ColBmv: 8 n E C1G

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1qCq-P9E xS	IS	G430	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-6:2 9TS	IS	G63q	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC5-P9Ny	IS	H13q	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9Oy	IS	GCGq	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qCG-P9OS	IS	GHBq	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9Dy	IS	GHB5	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-G2 9TS	IS	G437	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
dq-Me9OSy y	IS	G437	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9Uvy	IS	G136	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
d5-nt9OSy y	IS	G236	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9Doy	IS	G435	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1
1qC2-P9TeDy	IS	G134	50 - 150		8 22y 15G	q1-Rav-22	03260 L	01-9eb-22 2q:1H	1

DL - Detectiov Limit
LOD - Limit of Detectiov
LOQ - Limit of FBavtitatiov
k esBlts reported to the DL3
Whev reported, P9E xS, P9Oy , P9OS, Me9OSy y avd nt9OSy y ivclBde both livear avd bravched isomers3 Ovlu the livear isomer is reported for all other avalutes3

Sample ID: 2201641-010D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW-25-01
Matrix: Groundwater
Date Collected: 12-Jan-22 10:10

AaLboatbor Data

Lab Sample: 2201174-10
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	. 73-22-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFMBA	86. 050-85-3	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFPeA	2706-50-.	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFMPA	. 77-7. -1	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFBS	. 73-7. -3	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFEESA	11. 307-82-7	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
NFDHA	131772-38-6	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
4:2 FTS	737124-72-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFHxA	. 07-24-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFPeS	2706-51-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
HFPO-DA	1. 232-1. -6	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFHpA	. 73-83-5	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
ADONA	515003-14-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFHxS	. 33-46-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
6:2 FTS	27615-57-2	1928	0954 4	1985	. 978	J	B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFOA	. . 3-67-1	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFHpS	. 73-52-8	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFNA	. 73-53-1	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFOS	176. -2. -1	. 928	0954 4	1985	. 978	J	B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
5Cl-PF. ONS	736426-38-1	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFDA	. . 3-76-2	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
8:2 FTS	. 5108-. 4-4	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
MeFOSAA	2. 33-. 1-5	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
EtFOSAA	2551-30-6	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFUnA	2038-54-8	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
11Cl-PF. OUdS	76. 031-52-5	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFDoA	. 07-33-1	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFTrDA	72625-54-8	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
PFTeDA	. 76-06-7	ND	0954 4	1985	. 978		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1. C. -PFBA	IS	3698	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C. -PFPeA	IS	8490	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C. -PFBS	IS	749	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C. -HFPO-DA	IS	5. 9	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-4:2 FTS	IS	8392	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFHxA	IS	8090	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C4-PFHpA	IS	7891	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1

Sample ID: 2201641-010D

y PF S Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW-25-01
Matrix: Groundwater
Date Collected: 12-Jan-22 10:10

AaLboatbor Data

Lab Sample: 2201174-10
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	F nalrzed	Dilutibn
1. C. -PFHxS	IS	8. 94	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-6:2 FTS	IS	729 5	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C3-PFNA	IS	519 3	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFOA	IS	829 5	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C8-PFOS	IS	839 4	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFDA	IS	779 4	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-8:2 FTS	IS	829	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
d. -MeFOSAA	IS	759 2	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFUnA	IS	809 7	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
d3-EtFOSAA	IS	789 5	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFDoA	IS	8. 90	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1
1. C2-PFTeDA	IS	789 4	30 - 130		B22A138	. 1-Jan-22	0926 3 L	01-Feb-22 2. :25	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL9
When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers9 Only the linear isomer is reported for all other analytes9

Sample ID: 2201641-011D

yPFS Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW-02 & 05-10
Matrix: Groundwater
Date Collected: 12-Jan-22 12:25

AaLboatbor Data

Lab Sample: 2201174-11
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	375-22-4	2530	4.85	9.69	19.4	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
PFMBA	863090-89-5	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFPeA	2706-90-3	5020	4.85	9.69	19.4	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
PFMPA	377-73-1	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFBS	375-73-5	3230	4.85	9.69	19.4	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
PFEESA	113507-82-7	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
NFDHA	151772-58-6	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
4:2 FTS	757124-72-4	8.10	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFHxA	307-24-4	13700	48.5	96.9	194	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
PFPeS	2706-91-4	1720	48.5	96.9	194	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
HFPO-DA	13252-13-6	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFHpA	375-85-9	1600	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
ADONA	919005-14-4	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFHxS	355-46-4	15300	48.5	96.9	194	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
6:2 FTS	27619-97-2	2670	48.5	96.9	194	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
PFOA	335-67-1	6500	48.5	96.9	194	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
PFHpS	375-92-8	239	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFNA	375-95-1	54.6	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFOS	1763-23-1	4210	4.85	9.69	19.4	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
9Cl-PF3ONS	756426-58-1	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFDA	335-76-2	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
8:2 FTS	39108-34-4	33.9	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
MeFOSAA	2355-31-9	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
EtFOSAA	2991-50-6	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFUnA	2058-94-8	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
11Cl-PF3OUdS	763051-92-9	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFDoA	307-55-1	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFTrDA	72629-94-8	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
PFTeDA	376-06-7	ND	0.970	1.94	3.88		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
13C3-PFBA	IS	31.0	50 - 150	D, H	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
13C3-PFPeA	IS	68.0	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
13C3-PFBS	IS	63.0	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
13C3-HFPO-DA	IS	82.6	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-4:2 FTS	IS	65.3	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-PFHxA	IS	92.4	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
13C4-PFHpA	IS	62.5	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1

Sample ID: 2201641-011D

y PF S Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: MW-02 & 05-10
Matrix: Groundwater
Date Collected: 12-Jan-22 12:25

AaLboatbor Data

Lab Sample: 2201174-11
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	F nalrzed	Dilutibn
13C3-PFHxS	IS	96.8	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
13C2-6:2 FTS	IS	95.1	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
13C5-PFNA	IS	86.0	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-PFOA	IS	95.6	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:23	50
13C8-PFOS	IS	76.5	50 - 150	D	B22A158	31-Jan-22	0.258 L	03-Feb-22 01:34	5
13C2-PFDA	IS	80.6	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-8:2 FTS	IS	82.6	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
d3-MeFOSAA	IS	77.2	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-PFUnA	IS	78.2	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
d5-EtFOSAA	IS	79.1	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-PFDoA	IS	79.5	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1
13C2-PFTeDA	IS	78.5	50 - 150		B22A158	31-Jan-22	0.258 L	02-Feb-22 00:10	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-012D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: S1-M5 R

Matrix: Groundwater
Date Collected: 12-Jan-22 1R:27

AaLboatbor Data

Lab Sample: 2201174-12
Date Weceived: 20-Jan-22 10:02

Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	R73-22-4	4294	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFMBA	86R0. 0-8. -3	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFPeA	2706-. 0-R	7797	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFMPA	R77-7R-1	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFBS	R73-7R-3	6798	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFEESA	11R307-82-7	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
NFDHA	131772-38-6	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
4:2 FTS	737124-72-4	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFHxA	R07-24-4	24.	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFPeS	2706-. 1-4	R798	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
HFPO-DA	1R232-1R-6	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFHpA	R73-83-.	1. 98	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
ADONA	. 1. 003-14-4	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFHxS	R33-46-4	118	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
6:2 FTS	2761. -. 7-2	19.	09.34	19.1	R982	J	B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFOA	RR3-67-1	181	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFHpS	R73-. 2-8	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFNA	R73-. 3-1	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFOS	176R-2R-1	R9.4	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
. Cl-PFRONS	736426-38-1	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFDA	RR3-76-2	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
8:2 FTS	R. 108-R4-4	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
MeFOSAA	2R33-Rl-.	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
EtFOSAA	2. . 1-30-6	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFUnA	2038-. 4-8	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
11Cl-PFROUdS	76R031-. 2-.	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFDoA	R07-33-1	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFTrDA	7262. -. 4-8	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
PFTeDA	R76-06-7	ND	09.34	19.1	R982		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCR-PFBA	IS	349	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RCR-PFPeA	IS	8290	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RCR-PFBS	IS	7498	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RCR-HFPO-DA	IS	104	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RC2-4:2 FTS	IS	7694	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RC2-PFHxA	IS	8194	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1
1RC4-PFHpA	IS	8298	30 - 130		B22A138	Rl-Jan-22	09262 L	02-Feb-22 00:20	1

Sample ID: 2201641-012D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: S1-M5 R

Matrix: Groundwater
Date Collected: 12-Jan-22 1R:27

AaLboatbor Data

Lab Sample: 2201174-12
Date Weceived: 20-Jan-22 10:02

Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCR-PFHxS	IS	819R	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-6:2 FTS	IS	7890	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC3-PFNA	IS	. 29	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-PFOA	IS	8196	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC8-PFOS	IS	8. 98	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-PFDA	IS	8291	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-8:2 FTS	IS	8192	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
dR-MeFOSAA	IS	8297	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-PFUnA	IS	8198	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
d3-EtFOSAA	IS	879R	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-PFDoA	IS	8694	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1
1RC2-PFTeDA	IS	8R9	30 - 130		B22A138	Rl-Jan-22	0926 2 L	02-Feb-22 00:20	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Wesults reported to the DL9
5 hen reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers9 Only the linear isomer is reported for all other analytes9

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-26
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Massachusetts Department of Environmental Protection	M-CA413
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1980678
New Hampshire Environmental Accreditation Program	207720
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-016
Pennsylvania Department of Environmental Protection	017
Texas Commission on Environmental Quality	T104704189-21-12
Vermont Department of Health	VT-4042
Virginia Department of General Services	10769
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p- Dioxins & Polychlorinated Dibenzofurans	EPA 23
Polychlorinated Dibenzodioxins in Ambient Air by GC/HRMS	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613/1613B
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537.1
Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry	EPA 533
Perfluorooctanesulonate (PFOS) and Perfluorooctanoate (PFOA) - Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: clients.hallenvironmental.com

CHAIN OF CUSTODY RECORD

2201174 0.5°C

SUB CONTRATOR	Vista Analytical Labor	COMPANY	Vista Analytical Laboratory	PHONE	(916) 673-1520
ADDRESS	1104 Windfield Way			ACCOUNT #	
CITY, STATE, ZIP	El Dorado Hills, CA 95762			EMAIL	

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2201641-001A	Equipment Blank	250HDPE	Groundwater	1/11/2022 11:00:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
2	2201641-002D	MW05001	250HDPE	Groundwater	1/11/2022 11:20:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
3	2201641-003D	FT31-LM4	250HDPE	Groundwater	1/11/2022 1:05:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
4	2201641-004D	MW01004	250HDPE	Groundwater	1/11/2022 2:04:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
5	2201641-005D	FT31-LM5	250HDPE	Groundwater	1/11/2022 2:55:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
6	2201641-006D	FT31-LM1	250HDPE	Groundwater	1/11/2022 3:50:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
7	2201641-007D	FT31-LM2	250HDPE	Groundwater	1/11/2022 4:35:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
8	2201641-008A	Field Blank	250HDPE	Groundwater	1/11/2022 4:50:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
9	2201641-009A	Equipment Blank	250HDPE	Groundwater	1/12/2022 9:37:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
10	2201641-010D	MW-29-01	250HDPE	Groundwater	1/12/2022 10:10:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
11	2201641-011D	MW-02 & 05-10	250HDPE	Groundwater	1/12/2022 12:25:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
12	2201641-012D	S1-MW3	250HDPE	Groundwater	1/12/2022 1:27:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
(A) 13	2201641-013D	MW-02 & 05-02	250HDPE	Groundwater	1/12/2022 2:30:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537 MS/MSD

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

(A) Sample entered in on WO 2201175

Items 1-12 Cooler 1 of 3

Relinquished By	Date	Time	Received By	Date	Time	REPORT TRANSMITTAL DESIRED:	
Cmc	1/18/2022	9:57 AM	Justin Briseno	01/20/22	1002	HARDCOPY (extra cost) FAX EMAIL ONLINE	
Relinquished By	Date	Time	Received By	Date	Time	FOR LAB USE ONLY	
Relinquished By	Date	Time	Received By	Date	Time	Temp of samples °C Attempt to Cool ?	
TAT:	Standard ✓	RUSH	Next BD	2nd BD	3rd BD	Comments	

Vista Analytical Laboratory

Sample Log-In Checklist

Page # _____ of _____

Vista Work Order #: 2201174 TAT Std.

Samples Arrival:	**Date/Time** 01/20/22 1002		**Initials:**		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 0.5 (uncorrected) **Temp °C:** 0.5 (corrected)			**Probe used:** (Y) / N		**Thermometer ID:** DT-5		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 7757 8827 5189	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return) / Dispose	✓		
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 01/20/22 11:04	**Initials:**	**Location:** R13 WR-2 **Shelf/Rack:** A-1 A-2 E-6 F-6
COC Anomaly/Sample Acceptance Form completed?		✓	—

Comments:

CoC/Label Reconciliation Report WO# 2201174

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2201174-01	A 2201641-001A	Equipment Blank	11-Jan-22 11:00	Polypropylene, 250mL	Aqueous	
2201174-01	B 2201641-001A	Equipment Blank	11-Jan-22 11:00	Polypropylene, 250mL	Aqueous	
2201174-01	C 2201641-001A	Equipment Blank	11-Jan-22 11:00	HDPE Bottle, 250 mL	Aqueous	
2201174-01	D 2201641-001A	Equipment Blank	11-Jan-22 11:00	HDPE Bottle, 250 mL	Aqueous	
2201174-02	A 2201641-002D	MW05001	11-Jan-22 11:20	Polypropylene, 250mL	Aqueous	
2201174-02	B 2201641-002D	MW05001	11-Jan-22 11:20	Polypropylene, 250mL	Aqueous	
2201174-02	C 2201641-002D	MW05001	11-Jan-22 11:20	HDPE Bottle, 250 mL	Aqueous	
2201174-02	D 2201641-002D	MW05001	11-Jan-22 11:20	HDPE Bottle, 250 mL	Aqueous	
2201174-03	A 2201641-003D	FT31-LM4	11-Jan-22 13:05	Polypropylene, 250mL	Aqueous	
2201174-03	B 2201641-003D	FT31-LM4	11-Jan-22 13:05	Polypropylene, 250mL	Aqueous	
2201174-03	C 2201641-003D	FT31-LM4	11-Jan-22 13:05	HDPE Bottle, 250 mL	Aqueous	
2201174-03	D 2201641-003D	FT31-LM4	11-Jan-22 13:05	HDPE Bottle, 250 mL	Aqueous	
2201174-04	A 2201641-004D	MW01004	11-Jan-22 14:04	Polypropylene, 250mL	Aqueous	
2201174-04	B 2201641-004D	MW01004	11-Jan-22 14:04	Polypropylene, 250mL	Aqueous	
2201174-04	C 2201641-004D	MW01004	11-Jan-22 14:04	HDPE Bottle, 250 mL	Aqueous	
2201174-04	D 2201641-004D	MW01004	11-Jan-22 14:04	HDPE Bottle, 250 mL	Aqueous	
2201174-05	A 2201641-005D	FT31-LM5	11-Jan-22 14:55	Polypropylene, 250mL	Aqueous	
2201174-05	B 2201641-005D	FT31-LM5	11-Jan-22 14:55	Polypropylene, 250mL	Aqueous	
2201174-05	C 2201641-005D	FT31-LM5	11-Jan-22 14:55	HDPE Bottle, 250 mL	Aqueous	
2201174-05	D 2201641-005D	FT31-LM5	11-Jan-22 14:55	HDPE Bottle, 250 mL	Aqueous	
2201174-06	A 2201641-006D	FT31-LM1	11-Jan-22 15:50	Polypropylene, 250mL	Aqueous	
2201174-06	B 2201641-006D	FT31-LM1	11-Jan-22 15:50	Polypropylene, 250mL	Aqueous	
2201174-06	C 2201641-006D	FT31-LM1	11-Jan-22 15:50	HDPE Bottle, 250 mL	Aqueous	
2201174-06	D 2201641-006D	FT31-LM1	11-Jan-22 15:50	HDPE Bottle, 250 mL	Aqueous	
2201174-07	A 2201641-007D	FT31-LM2	11-Jan-22 16:35	Polypropylene, 250mL	Aqueous	
2201174-07	B 2201641-007D	FT31-LM2	11-Jan-22 16:35	Polypropylene, 250mL	Aqueous	
2201174-07	C 2201641-007D	FT31-LM2	11-Jan-22 16:35	HDPE Bottle, 250 mL	Aqueous	
2201174-07	D 2201641-007D	FT31-LM2	11-Jan-22 16:35	HDPE Bottle, 250 mL	Aqueous	

2201174-08	A 2201641-008A	☑	Field Blank	11-Jan-22 16:50	☑	A	Polypropylene, 250mL	Aqueous
2201174-08	B 2201641-008A	☑	Field Blank	11-Jan-22 16:50	☑		Polypropylene, 250mL	Aqueous
2201174-08	C 2201641-008A	☑	Field Blank	11-Jan-22 16:50	☑	B	HDPE Bottle, 250 mL	Aqueous
2201174-08	D 2201641-008A	☑	Field Blank	11-Jan-22 16:50	☑		HDPE Bottle, 250 mL	Aqueous
2201174-09	A 2201641-009A	☑	Equipment Blank	12-Jan-22 09:37	☑	A	Polypropylene, 250mL	Aqueous
2201174-09	B 2201641-009A	☑	Equipment Blank	12-Jan-22 09:37	☑		Polypropylene, 250mL	Aqueous
2201174-09	C 2201641-009A	☑	Equipment Blank	12-Jan-22 09:37	☑	B	HDPE Bottle, 250 mL	Aqueous
2201174-09	D 2201641-009A	☑	Equipment Blank	12-Jan-22 09:37	☑		HDPE Bottle, 250 mL	Aqueous
2201174-10	A 2201641-010D	☑	MW-29-01	12-Jan-22 10:10	☑	A	Polypropylene, 250mL	Aqueous
2201174-10	B 2201641-010D	☑	MW-29-01	12-Jan-22 10:10	☑		Polypropylene, 250mL	Aqueous
2201174-10	C 2201641-010D	☑	MW-29-01	12-Jan-22 10:10	☑	B	HDPE Bottle, 250 mL	Aqueous
2201174-10	D 2201641-010D	☑	MW-29-01	12-Jan-22 10:10	☑		HDPE Bottle, 250 mL	Aqueous
2201174-11	A 2201641-011D	☑	MW-02 & 05-10	12-Jan-22 12:25	☑	A	Polypropylene, 250mL	Aqueous
2201174-11	B 2201641-011D	☑	MW-02 & 05-10	12-Jan-22 12:25	☑		Polypropylene, 250mL	Aqueous
2201174-11	C 2201641-011D	☑	MW-02 & 05-10	12-Jan-22 12:25	☑	B	HDPE Bottle, 250 mL	Aqueous
2201174-11	D 2201641-011D	☑	MW-02 & 05-10	12-Jan-22 12:25	☑		HDPE Bottle, 250 mL	Aqueous
2201174-12	A 2201641-012D	☑	S1-MW3	12-Jan-22 13:27	☑	A	Polypropylene, 250mL	Aqueous
2201174-12	B 2201641-012D	☑	S1-MW3	12-Jan-22 13:27	☑		Polypropylene, 250mL	Aqueous
2201174-12	C 2201641-012D	☑	S1-MW3	12-Jan-22 13:27	☑	B	HDPE Bottle, 250 mL	Aqueous
2201174-12	D 2201641-012D	☑	S1-MW3	12-Jan-22 13:27	☑		HDPE Bottle, 250 mL	Aqueous

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?		✓	✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments:

Preservation Documented: Na2S2O3 Trizma B NH4CH3CO2 None Other Ammonium ACetate A

Verifed by/Date: 01/21/22

March 01, 2022

Vista Work Order No. 2201175

Mr. Andy Freeman
Hall Environmental Analytical Laboratory
4901 Hawkins NE
Albuquerque, NM 87109

Dear Mr. Freeman,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 20, 2022 under your Project Name '2201641'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at jfox@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Jamie Fox
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 www.vista-analytical.com

Vista Work Order No. 2201175
Case Narrative

Sample Condition on Receipt:

Nine groundwater and three surface water samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The samples were received in good condition and within the recommended temperature requirements.

Analytical Notes:

PFAS Isotope Dilution/LC-MSMS Method Compliant with Table B-15 of DoD QSM 5.3 (Aqueous)

The following samples contained particulate and were centrifuged prior to extraction:

Laboratory ID	Sample Name
2201175-01	2201641-013D
2201175-02	2201641-014D
2201175-10	2201641-022D
2201175-11	2201641-023D
2201175-12	2201641-024D

Please note that sample "2201641-013D" was centrifuged in the original extraction, but not in the re-extraction.

The samples were extracted and analyzed for a selected list of PFAS using Isotope Dilution and LC-MS/MS compliant with Table B-15 of DoD QSM 5.3. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the hold times. Sample "2201641-013D" was re-extracted outside of the hold time.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks above 1/2 the LOQ. The recovery of HFPO-DA was greater than 135% in the OPR associated with batch B22A159. This analyte was not detected in the samples. The recoveries of all other analytes were within the acceptance criteria.

As requested, MS/MSDs were performed on samples "2201641-013D" and "2201641-022D". The MS/MSD recoveries and RPDs outside the acceptance criteria are flagged with an "H" qualifier.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier. The responses of the internal standards with low recoveries were greater than 10:1 signal-to-noise, which is the limit generally

considered acceptable for accurate quantitation by isotope dilution analysis.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2201175-01	2201641-013D	MS/MSD12-Jan-22 14:30	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-02	2201641-014D	12-Jan-22 14:30	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-03	2201641-015D	12-Jan-22 15:45	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-04	2201641-016A	12-Jan-22 16:10	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-05	2201641-017A	13-Jan-22 10:10	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-06	2201641-018D	13-Jan-22 10:38	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-07	2201641-019D	13-Jan-22 11:30	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-08	2201641-020D	13-Jan-22 12:17	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-09	2201641-021D	13-Jan-22 13:10	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL
				Polypropylene, 250mL
2201175-10	2201641-022D	MS/MSD13-Jan-22 15:00	20-Jan-22 10:02	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
				Polypropylene, 250mL

Vista Project: 2201175

Client Project: 2201641

Sample Inventory Report

Vista Sample ID	Client Sample ID		Sampled	Received	Components/Containers
2201175-10	2201641-022D	MS/MSD	13-Jan-22 15:00	20-Jan-22 10:02	Polypropylene, 250mL
2201175-11	2201641-023D		13-Jan-22 15:00	20-Jan-22 10:02	HDPE Bottle, 250 mL
					HDPE Bottle, 250 mL
					Polypropylene, 250mL
					Polypropylene, 250mL
2201175-12	2201641-024D		13-Jan-22 16:00	20-Jan-22 10:02	HDPE Bottle, 250 mL
					HDPE Bottle, 250 mL
					Polypropylene, 250mL
					Polypropylene, 250mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: AsueouF

Laboratory Data

Lab Sample: B22A158-BLK1
Column: BEH C1q

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
P. BA	395-22-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. MBA	q63080-q8-5	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. PeA	2906-80-3	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. MPA	399-93-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. BS	395-93-5	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. EESA	113509-q2-9	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
N. 7 HA	151992-5q-6	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
4:2 . TS	959124-92-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. HxA	309-24-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. PeS	2906-81-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
H. PO-7 A	13252-13-6	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. HpA	395-q5-8	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
A7 ONA	818005-14-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. HxS	355-46-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
6:2 . TS	29618-89-2	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. OA	335-69-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. HpS	395-82-q	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. NA	395-85-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. OS	1963-23-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
8Cl-P. 3ONS	956426-5q-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. 7 A	335-96-2	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
q:2 . TS	3810q-34-4	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
Me. OSAA	2355-31-8	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
Et. OSAA	2881-50-6	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. UnA	205q-84-q	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
11Cl-P. 3OUdS	963051-82-8	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. 7 oA	309-55-1	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. Tr7 A	92628-84-q	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
P. Te7 A	396-06-9	N7	1D00	2D00	4D00		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-P. BA	IS	98D4	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C3-P. PeA	IS	80Dq	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C3-P. BS	IS	q3D8	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C3-H. PO-7 A	IS	86D5	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-4:2 . TS	IS	qqDq	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. HxA	IS	qqD5	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C4-P. HpA	IS	80D4	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C3-P. HxS	IS	80D6	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: AsueouF

Laboratory Data

Lab Sample: B22A158-BLK1
Column: BEH C1q

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 . TS	IS	q5Dq	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C5-P. NA	IS	8qD0	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. OA	IS	q9D8	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13Cq-P. OS	IS	q6D0	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. 7 A	IS	q6D9	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-q:2 . TS	IS	81D9	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
d3-Me. OSAA	IS	95D0	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. UnA	IS	q5Dq	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
d5-Et. OSAA	IS	91D8	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. 7 oA	IS	94D2	50 - 150		B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1
13C2-P. Te7 A	IS	39D4	50 - 150	H	B22A158	31-Jan-22	0D250 L	02-. eb-22 00:51	1

7 L - 7 etection Limit
LO7 - Limit of 7 etection
LOQ - Limit of suantitation
ReFultF reported to the 7 LD
When reported, P. HxS, P. OA, P. OS, Me. OSAA and Et. OSAA include both linear and branched iFomerFD Only the linear iFomer iF reported for all other analyteFD

Sample ID: OPR **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22A159-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	38.7	40.0	96.8	73 - 129		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFMBA	863090-89-5	39.8	40.0	99.5	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFPeA	2706-90-3	38.6	40.0	96.6	72 - 129		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFMPA	377-73-1	38.8	40.0	97.1	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFBS	375-73-5	36.2	40.0	90.4	72 - 130		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFEESA	113507-82-7	37.4	35.7	105	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
NFDHA	151772-58-6	43.9	40.0	110	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
4:2 FTS	757124-72-4	36.8	40.0	92.1	63 - 143		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFHxA	307-24-4	40.7	40.0	102	72 - 129		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFPeS	2706-91-4	38.4	40.0	95.9	71 - 127		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
HFPO-DA	13252-13-6	54.8	40.0	137	65 - 135	Q, H	B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFHpA	375-85-9	37.7	40.0	94.4	72 - 130		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
ADONA	919005-14-4	37.5	40.0	93.7	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFHxS	355-46-4	35.0	40.0	87.6	68 - 131		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
6:2 FTS	27619-97-2	37.8	40.0	94.4	64 - 140		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFOA	335-67-1	37.2	40.0	92.9	71 - 133		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFHpS	375-92-8	39.1	40.0	97.8	69 - 134		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFNA	375-95-1	41.7	40.0	104	69 - 130		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFOS	1763-23-1	39.0	40.0	97.4	65 - 140		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
9Cl-PF3ONS	756426-58-1	36.6	40.0	91.6	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFDA	335-76-2	40.1	40.0	100	71 - 129		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
8:2 FTS	39108-34-4	38.9	40.0	97.1	67 - 138		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
MeFOSAA	2355-31-9	38.3	40.0	95.6	65 - 136		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
EtFOSAA	2991-50-6	40.9	40.0	102	61 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFUnA	2058-94-8	38.0	40.0	95.1	69 - 133		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
11Cl-PF3OUdS	763051-92-9	41.9	40.0	105	65 - 135		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFDoA	307-55-1	37.4	40.0	93.6	72 - 134		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFTrDA	72629-94-8	34.2	40.0	85.6	65 - 144		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
PFTeDA	376-06-7	40.9	40.0	102	71 - 132		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	81.4	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C3-PFPeA	IS	90.4	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C3-PFBS	IS	80.5	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C3-HFPO-DA	IS	74.2	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-4:2 FTS	IS	84.4	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1

Sample ID: OPR

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22A159-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	IS	85.2	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C4-PFHpA	IS	89.8	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C3-PFHxS	IS	89.7	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-6:2 FTS	IS	90.5	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C5-PFNA	IS	94.7	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-PFOA	IS	90.7	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C8-PFOS	IS	92.3	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-PFDA	IS	87.0	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-8:2 FTS	IS	94.9	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
d3-MeFOSAA	IS	79.8	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-PFUnA	IS	84.7	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
d5-EtFOSAA	IS	68.9	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-PFDoA	IS	75.9	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1
13C2-PFTeDA	IS	61.6	50 - 150		B22A159	31-Jan-22	0.250 L	02-Feb-22 01:01	1

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22B082-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFMBA	863090-89-5	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFPeA	2706-90-3	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFMPA	377-73-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFBS	375-73-5	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFEESA	113507-82-7	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
NFDHA	151772-58-6	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
4:2 FTS	757124-72-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFHxA	307-24-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFPeS	2706-91-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
HFPO-DA	13252-13-6	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFHpA	375-85-9	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
ADONA	919005-14-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFHxS	355-46-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
6:2 FTS	27619-97-2	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFOA	335-67-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFHpS	375-92-8	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFNA	375-95-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFOS	1763-23-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
9Cl-PF3ONS	756426-58-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFDA	335-76-2	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
8:2 FTS	39108-34-4	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
MeFOSAA	2355-31-9	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
EtFOSAA	2991-50-6	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFUnA	2058-94-8	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
11Cl-PF3OUdS	763051-92-9	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFDoA	307-55-1	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFTrDA	72629-94-8	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
PFTeDA	376-06-7	ND	1.00	2.00	4.00		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.9	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C3-PFPeA	IS	80.5	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C3-PFBS	IS	77.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C3-HFPO-DA	IS	81.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-4:2 FTS	IS	81.6	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFHxA	IS	81.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C4-PFHpA	IS	80.3	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C3-PFHxS	IS	82.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1

Sample ID: Method Blank **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory Matrix: Aqueous

Project: 2201641

Laboratory Data

Lab Sample: B22B082-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	84.5	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C5-PFNA	IS	81.8	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFOA	IS	89.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C8-PFOS	IS	86.4	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFDA	IS	82.6	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-8:2 FTS	IS	73.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
d3-MeFOSAA	IS	75.3	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFUnA	IS	75.7	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
d5-EtFOSAA	IS	64.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFDoA	IS	68.4	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1
13C2-PFTeDA	IS	70.9	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:08	1

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22B082-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	41.0	40.0	103	73 - 129		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFMBA	863090-89-5	43.2	40.0	108	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFPeA	2706-90-3	42.7	40.0	107	72 - 129		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFMPA	377-73-1	37.7	40.0	94.3	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFBS	375-73-5	40.4	40.0	101	72 - 130		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFEESA	113507-82-7	34.5	35.7	96.6	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
NFDHA	151772-58-6	40.4	40.0	101	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
4:2 FTS	757124-72-4	42.2	40.0	106	63 - 143		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFHxA	307-24-4	43.5	40.0	109	72 - 129		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFPeS	2706-91-4	43.2	40.0	108	71 - 127		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
HFPO-DA	13252-13-6	40.2	40.0	100	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFHpA	375-85-9	43.0	40.0	107	72 - 130		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
ADONA	919005-14-4	42.7	40.0	107	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFHxS	355-46-4	39.8	40.0	99.5	68 - 131		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
6:2 FTS	27619-97-2	37.4	40.0	93.4	64 - 140		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFOA	335-67-1	39.6	40.0	98.9	71 - 133		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFHpS	375-92-8	40.6	40.0	102	69 - 134		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFNA	375-95-1	40.2	40.0	101	69 - 130		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFOS	1763-23-1	43.8	40.0	109	65 - 140		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
9Cl-PF3ONS	756426-58-1	46.7	40.0	117	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFDA	335-76-2	41.8	40.0	105	71 - 129		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
8:2 FTS	39108-34-4	41.9	40.0	105	67 - 138		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
MeFOSAA	2355-31-9	39.3	40.0	98.3	65 - 136		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
EtFOSAA	2991-50-6	41.3	40.0	103	61 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFUnA	2058-94-8	43.2	40.0	108	69 - 133		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
11Cl-PF3OUdS	763051-92-9	44.9	40.0	112	65 - 135		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFDoA	307-55-1	46.3	40.0	116	72 - 134		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFTrDA	72629-94-8	42.3	40.0	106	65 - 144		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
PFTeDA	376-06-7	50.2	40.0	125	71 - 132		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.7	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C3-PFPeA	IS	76.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C3-PFBS	IS	79.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C3-HFPO-DA	IS	73.9	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-4:2 FTS	IS	80.3	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1

Sample ID: OPR

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22B082-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	IS	81.3	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C4-PFHpA	IS	79.8	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C3-PFHxS	IS	83.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-6:2 FTS	IS	86.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C5-PFNA	IS	78.0	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-PFOA	IS	84.7	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C8-PFOS	IS	77.7	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-PFDA	IS	80.2	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-8:2 FTS	IS	71.2	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
d3-MeFOSAA	IS	75.9	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-PFUnA	IS	74.7	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
d5-EtFOSAA	IS	63.2	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-PFDoA	IS	71.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1
13C2-PFTeDA	IS	63.1	50 - 150		B22B082	18-Feb-22	0.250 L	22-Feb-22 11:18	1

Sample ID: 2201641-013D

PFAS Isotope Dilution Table B-15

Client Data

Name: Eall nvAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: M&H02 F 0-H02

Matrix: wroBvdJ ater
Date Collected: 12H5avH22 14:R0

Laboratory Data

Lab Sample: 220117-H01
Date WeceiAed: 20H5avH22 10:02

ColBmv: 8nE C1G

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
P. 8y	R7-H22H4	1660	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. M8y	G6R090HG9H	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Pey	2706H90HR	R700	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
P. MPy	R77H7RH	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. 8S	R7-H7RH	1910	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. nnSy	11R-07HG2H7	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
N. DEy	1-1772H-GH6	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
4:2 . TS	7-7124H72H4	9311	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Exy	R07H24H4	G6R0	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
P. PeS	2706H91H4	1-G0	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
E. POHDy	1R2-2H1RH6	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Epy	R7-HG-H9	G71	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
y DONy	91900-H4H4	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. ExS	R--H46H4	12700	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
6:2 . TS	27619H97H2	R620	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
P. Oy	RR-H67H	-010	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
P. EpS	R7-H92HG	144	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Ny	R7-H9-H	4630	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. OS	176RH2RH	2620	936R	1932	RG3-	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
9ClHP. RONS	7-6426H-GH	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Dy	RR-H76H2	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
G2 . TS	R910GHR4H4	R430	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
Me. OSy y	2R--HR1H9	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
nt. OSy y	2991H-0H6	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Uvy	20-GH94HG	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
11ClHP. ROUdS	76R0-1H92H9	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. Doy	R07H-H	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. TrDy	72629H94HG	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
P. TeDy	R76H06H7	ND	0396R	1392	R3G-		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCRHP. 8y	IS	-137	-0H1-0		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
1RCRHP. Pey	IS	7930	-0H1-0	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
1RCRHP. 8S	IS	G23-	-0H1-0		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
1RCRHE. POHDy	IS	G037	-0H1-0		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
1RC2H4:2 . TS	IS	6730	-0H1-0		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1
1RC2HP. Exy	IS	100	-0H1-0	D	8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:01	10
1RC4HP. Epy	IS	G939	-0H1-0		8228 0G2	1GH ebH22	0260 L	2RH ebH22 19:12	1

Sample ID: 2201641-013D

PFAS Isotope Dilution Table B-15

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: M&H02 F 0-H02
Matrix: wroBvdJ ater
Date Collected: 12H5avH22 14:R0

Laboratory Data

Lab Sample: 220117-H01
Date WeceiAed: 20H5avH22 10:02
ColBmv: 8nE C1G

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCRHP. ExS	IS	6G30	-0H1-0	D	8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:01	10
1RC2H6:2 . TS	IS	G730	-0H1-0	D	8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:01	10
1RC-HP. Ny	IS	G43R	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
1RC2HP. Oy	IS	9030	-0H1-0	D	8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:01	10
1RCGHP. OS	IS	7730	-0H1-0	D	8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:01	10
1RC2HP. Dy	IS	9032	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
1RC2HG2 . TS	IS	G23G	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
dRHMe. OSy y	IS	G-3G	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
1RC2HP. Uvy	IS	GR3G	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
d-Hit. OSy y	IS	G934	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
1RC2HP. Doy	IS	G037	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1
1RC2HP. TeDy	IS	G031	-0H1-0		8228 0G2	1GH ebH22	03260 L	2RH ebH22 19:12	1

DL HDetectiov Limit
LOD HLimit of Detectiov
LOQ HLimit of qBavtitatiov
We, Blt, reported to tse DL3
& sev reportedhP. ExShP. Oy hP. OShMe. OSy y avd nt. OSy y ivclBde bots livear avd bravcsed i, omer, 3 Ovlu tse livear i, omer i, reported for all otser avalute, 3

Sample ID: 2201641-013D **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22B082-MS1/B22B082-MSD1	Source Lab Sample:	2201175-01
Project:	2201641	QC Batch:	B22B082	Date Extracted:	18-Feb-22
Matrix:	Aqueous	Samp Size:	0.240/0.252 L	Column:	BEH C18

Analyte	CAS Number	Sample (ng/L)	MS (ng/L)	MS Spike	MS % Rec	MS Quals	MSD (ng/L)	MSD Spike	MSD % Rec	RPD	MSD Quals	%Rec Limits	RPD Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
PFBA	375-22-4	1660	1890	41.6	547	H	1810	39.7	386	34.5	H	73-129	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFMBA	863090-89-5	ND	45.1	41.6	108		44.5	39.7	112	3.64		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFPeA	2706-90-3	3700	3830	416	31.8	D, H	3370	397	-84.8	440	D, H	72-129	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
PFMPA	377-73-1	ND	34.7	41.6	83.4	Q	37.5	39.7	94.4	12.4	Q	65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFBS	375-73-5	1910	2070	41.6	369	H	1980	397	18.0	181	D, H	72-130	30	23-Feb-22 18:09	1	24-Feb-22 16:51	10
PFEESA	113507-82-7	ND	45.9	37.1	124		45.7	35.4	129	3.95		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
NFDHA	151772-58-6	ND	45.7	41.6	110		44.5	39.7	112	1.8		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
4:2 FTS	757124-72-4	9.11	47.6	41.6	92.6		50.3	39.7	104	11.6		63-143	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFHxA	307-24-4	8630	9660	416	249	D, H	9570	397	237	4.94	D, H	72-129	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
PFPeS	2706-91-4	1580	1730	41.6	358	H	1690	39.7	276	25.9	H	71-127	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
HFPO-DA	13252-13-6	ND	47.3	41.6	114		42.0	39.7	106	7.27		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFHpA	375-85-9	871	904	41.6	79.5		923	39.7	130	48.2	H	72-130	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
ADONA	919005-14-4	ND	38.7	41.6	92.9		40.3	39.7	102	9.34		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFHxS	355-46-4	12700	13100	416	91.7	D	10200	397	-623	269	D, H	68-131	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
6:2 FTS	27619-97-2	3620	2830	416	-190	D, H	3770	397	35.9	293	D, H	64-140	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
PFOA	335-67-1	5010	5440	416	103	D	4840	397	-44.2	501	D, H	71-133	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
PFHpS	375-92-8	144	178	41.6	82.8		176	39.7	80.5	2.82		69-134	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFNA	375-95-1	46.0	87.3	41.6	99.3		84.9	39.7	98.0	1.32		69-130	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFOS	1763-23-1	2620	2530	416	-22.4	D, H	2410	397	-53.3	81.6	D, H	65-140	30	23-Feb-22 17:58	10	24-Feb-22 16:51	10
9Cl-PF3ONS	756426-58-1	ND	43.0	41.6	103		39.7	39.7	100	2.96		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFDA	335-76-2	ND	37.9	41.6	89.6		40.1	39.7	99.5	10.5		71-129	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
8:2 FTS	39108-34-4	34.0	82.6	41.6	117		73.4	39.7	99.1	16.6		67-138	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
MeFOSAA	2355-31-9	ND	42.9	41.6	103		44.2	39.7	111	7.48		65-136	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
EtFOSAA	2991-50-6	ND	43.8	41.6	105		38.9	39.7	98.1	6.79		61-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFUnA	2058-94-8	ND	43.7	41.6	105		38.5	39.7	97.0	7.92		69-133	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
11Cl-PF3OUdS	763051-92-9	ND	36.8	41.6	88.5		39.3	39.7	99.0	11.2		65-135	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFDoA	307-55-1	ND	44.5	41.6	107		38.3	39.7	96.4	10.4		72-134	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFTrDA	72629-94-8	ND	39.5	41.6	95.0		38.7	39.7	97.5	2.6		65-144	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1
PFTeDA	376-06-7	ND	39.7	41.6	95.4		38.8	39.7	97.8	2.48		71-132	30	23-Feb-22 18:09	1	23-Feb-22 18:40	1

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBA	IS	42.7	H	55.1		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C3-PFPeA	IS	92.0	D	80.0	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10

Sample ID: 2201641-013D

PFAS Isotope Dilution Table B-15

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22B082-MS1/B22B082-MSD1	Source Lab Sample:	2201175-01
Project:	2201641	QC Batch:	B22B082	Date Extracted:	18-Feb-22
Matrix:	Aqueous	Samp Size:	0.240/0.252 L	Column:	BEH C18

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBS	IS	70.8		83.0	D	50 - 150	23-Feb-22 18:09	1	24-Feb-22 16:51	10
13C3-HFPO-DA	IS	66.0		71.4		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-4:2 FTS	IS	68.9		65.4		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-PFHxA	IS	115	D	89.0	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10
13C4-PFHpA	IS	82.4		85.2		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C3-PFHxS	IS	83.0	D	89.0	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10
13C2-6:2 FTS	IS	132	D	105	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10
13C5-PFNA	IS	77.2		85.1		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-PFOA	IS	102	D	95.0	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10
13C8-PFOS	IS	98.0	D	88.0	D	50 - 150	23-Feb-22 17:58	10	24-Feb-22 16:51	10
13C2-PFDA	IS	84.3		86.8		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-8:2 FTS	IS	71.1		81.2		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
d3-MeFOSAA	IS	78.3		82.0		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-PFUnA	IS	78.2		91.6		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
d5-EtFOSAA	IS	79.9		88.3		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-PFDoA	IS	78.3		84.5		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1
13C2-PFTeDA	IS	76.0		83.0		50 - 150	23-Feb-22 18:09	1	23-Feb-22 18:40	1

Sample ID: 2201641-014D **yPFS Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Eall nvAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: M&H02 F 0-H02 DBp
Matrix: wroBvdJ ater
Date Collected: 12H5avH22 14:R0

AaLboatbor Data

Lab Sample: 220117-H02
Date WeceiAed: 20H5avH22 10:02
ColBmv: 8nE C1G

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P. 8y	R7-H22H4	1670	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. M8y	G6R090HG9H	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Pey	2706H90HR	R710	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
P. MPy	R77H7RH	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. 8S	R7-H7RH	2R-0	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
P. nnSy	11R-07HG2H7	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
N. DEy	1-1772HGH6	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
4:2. TS	7-7124H72H4	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Exy	R07H24H4	99G0	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
P. PeS	2706H91H4	1G60	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
E. POHDy	1R2-2HRH6	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Epy	R7-HG-H9	921	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
y DONy	91900-H4H4	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. ExS	R--H46H4	12600	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
6:2. TS	27619H97H2	2720	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
P. Oy	RR-H67H	--20	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
P. EpS	R7-H92HG	160	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Ny	R7-H9-H	-032	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. OS	176RH2RH	26R0	93-	1931	RG82	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
9ClHP. RONS	7-6426HGH	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Dy	RR-H76H2	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
G2. TS	R910GHR4H4	R-32	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
Me. OSy y	2R--HR1H9	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
nt. OSy y	2991H0H6	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Uvy	20-GH94HG	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
11ClHP. ROUdS	76R0-1H92H9	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. Doy	R07H-H	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. TrDy	72629H94HG	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
P. TeDy	R76H06H7	ND	039--	1391	R3G2		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP. 8y	IS	213-	-0H1-0	E	822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RCRHP. Pey	IS	6930	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RCRHP. 8S	IS	7430	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RCRHE. POHDy	IS	6730	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2H4:2. TS	IS	-63R	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HP. Exy	IS	7630	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RC4HP. Epy	IS	6930	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1

Sample ID: 2201641-014D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: M&H02 F 0-H02 DBp
Matrix: wroBvdJ ater
Date Collected: 12H5avH22 14:R0

AaLboatbor Data

Lab Sample: 220117-H02
Date WeceiAed: 20H5avH22 10:02
ColBmv: 8nE C1G

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP. ExS	IS	7230	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RC2H6:2 . TS	IS	GR32	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RC-HP. Ny	IS	G23R	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HP. Oy	IS	G730	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RCGHP. OS	IS	G730	-0H1-0	D	822y1-9	R1H5avH22	03262 L	0RHebH22 02:R-	10
1RC2HP. Dy	IS	7G32	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HG2 . TS	IS	G637	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
dRHMe. OSy y	IS	G43-	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HP. Uvy	IS	7939	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
d-Hlt. OSy y	IS	7430	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HP. Doy	IS	7637	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1
1RC2HP. TeDy	IS	663G	-0H1-0		822y1-9	R1H5avH22	03262 L	02HebH22 01:42	1

DL HDetectiov Limit
LOD HLimit of Detectiov
LOQ HLimit of qBavtitatiov
We, Blt, reported to tse DL3
& sev reportedhP. ExShP. Oy hP. OShMe. OSy y avd nt. OSy y ivclBde bots livear avd bravcsed i, omer, 3 Ovlu tse livear i, omer i, reported for all otser avalute, 3

Sample ID: 2201641-01AD **PFs S Iuotope DilTtion Bable 5-1A**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: M& HE0 F EEH

Matrix: J ro8Ad5 ater
Date Collected: 12HRaAH22 1-:4-

Laboratory Data

Lab Sample: 220117-H0E
Date Weceiyed: 20HRaAH22 10:02

Col8mA: Gvn C1w

s nalyte	Cs S NTmber	Conc. (ng/L)	DL	LOD	LOQ	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
P. Gu	E7-H22H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. MGu	w6E090Hw9H	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. Peu	2706H90HE	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. MPu	E77H7EH	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. GS	E7-H7EH	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. vvSu	11E-07Hw2H7	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
N. Dnu	1-1772H-wH6	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
4:2 . TS	7-7124H72H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. nxu	E07H24H4	1309	039E7	13w7	E37-	R	G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. PeS	2706H91H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
n . POHDu	1E2-2H-EH6	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. npu	E7-Hw-H9	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
u DONu	91900-H4H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. nxS	E--H46H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
6:2 . TS	27619H97H2	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. Ou	EE-H67H	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. npS	E7-H92Hw	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. Nu	E7-H9-H	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. OS	176EH2EH	132E	039E7	13w7	E37-	R	G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
9ClHP. EONS	7-6426H-wH	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. Du	EE-H76H2	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
w.2 . TS	E910wHE4H4	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
Me. OSu u	2E--HE1H9	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
vt. OSu u	2991H-0H6	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. UAu	20-wH94Hw	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
11ClHP. EOUdS	76E0-1H92H9	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. Dou	E07H--H	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. TrDu	72629H94Hw	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
P. TeDu	E76H06H7	ND	039E7	13w7	E37-		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1

Labeled Standardu	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
1ECEHP. Gu	IS	-432	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1ECEHP. Peu	IS	w031	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1ECEHP. GS	IS	7-37	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1ECEHn . POHDu	IS	101	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1EC2H4:2 . TS	IS	7936	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1EC2HP. nxu	IS	w034	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1
1EC4HP. npu	IS	w030	-0H1-0		G22u 1-9	E1HRaAH22	03267 L	02HebH22 01:-2	1

Sample ID: 2201641-01AD **PFs S Iuotope DilTtion Bable 5-1A**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: M& HE0 F EEH

Matrix: J ro8Ad5 ater
Date Collected: 12HRaAH22 1-:4-

Laboratory Data

Lab Sample: 220117-H0E
Date Weceiyed: 20HRaAH22 10:02

Col8mA: Gvn C1w

Labeled Standardu	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
1EC EHP. n xS	IS	wE3l	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2H6:2 . TS	IS	713w	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC-HP. Nu	IS	w-39	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2HP. Ou	IS	7931	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1ECwHP. OS	IS	w23w	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2HP. Du	IS	wE34	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2Hw.2 . TS	IS	7932	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
dEHMe. OSu u	IS	7-37	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2HP. UAu	IS	w03E	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
d-Hyt. OSu u	IS	7-3w	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2HP. Dou	IS	7239	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1
1EC2HP. TeDu	IS	7-31	-0H1-0		G22u1-9	E1HRaAH22	0326 7 L	02H ebH22 01:-2	1

DL HDetectioALimit

LOD HLimit of DetectioA
LOQ HLimit of q8aAtitatioA

We,8lt, reported to tse DL3

& seAreportedhP. n xShP. Ou hP. OShMe. OSu u aAd vt. OSu u iAcl8de bots liAear aAd braAcsed i,omer,3 OAlBtse liAear i,omer i, reported for all otser aAalBte,3

Sample ID: 2201641-016A

PFAS Isotope Dilution Table B-15

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: kield 8 lavF

Matrix: wroBvdJ ater
Date Collected: 12HRavH22 16:10

Laboratory Data

Lab Sample: 220117-H04
Date q eceiAed: 20HRavH22 10:02

ColBmv: 8 nE C1G

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Pk8 y	37-H22H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkM8 y	G63090HG9H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkPey	2706H90H3	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkMPy	377H73H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
Pk8 S	37-H73H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PknnSy	113-07HG2H7	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
NkDEy	1-1772H-GH6	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
4:2 k5S	7-7124H72H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkExy	307H24H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkPeS	2706H91H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
EkPTHDy	132-2H3H6	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkEpy	37-HG-H9	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
y DTNy	91900-H4H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkExS	3--H46H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
6:2 k5S	27619H97H2	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkTy	33-H67H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkEpS	37-H92HG	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkNy	37-H9-H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkTS	1763H23H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
9ClHPk3TNS	7-6426H-GH	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkDy	33-H76H2	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
G2 k5S	3910GH34H4	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
MekTSy y	23--H31H9	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
ntkTSy y	2991H-0H6	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkOvy	20-GH94HG	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
11ClHPk3TOdS	7630-1H92H9	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
PkDoy	307H-H	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
Pk5rDy	72629H94HG	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
Pk5eDy	376H06H7	ND	0.961	1.92	3.G4		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3HPk8 y	US	G0.-	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C3HPkPey	US	G7.6	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C3HPk8 S	US	79.-	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C3HEkPTHDy	US	92.0	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2H4:2 k5S	US	G6.4	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPkExy	US	G4.-	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C4HPkEpy	US	G-.6	-0H1-0		8 22y 1-9	31HRavH22	0.260 L	02HkebH22 02:02	1

Sample ID: 2201641-016A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Eall nvAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: kield 8 lavF
Matrix: wroBvdJ ater
Date Collected: 12HRavH22 16:10

Laboratory Data

Lab Sample: 220117-H04
Date q eceiAed: 20HRavH22 10:02
ColBmv: 8nE C1G

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3HPkExS	US	G7.7	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2H6:2 k5S	US	7-.4	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C-HPkNy	US	96.7	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPkTy	US	GGi1	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13CGHPkTS	US	G9.-	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPkDy	US	GGi3	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HGi2 k5S	US	G7.0	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
d3HMekTSyy	US	G6.2	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPkOvy	US	G-.1	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
d-HntkTSyy	US	77.1	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPkDoy	US	Gi.4	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1
13C2HPk5eDy	US	77.0	-0H1-0		822y1-9	31HRavH22	0.260 L	02HkebH22 02:02	1

DL HDetectiov Limit
LTD HLimit o, Detectiov
LTf HLimit o, QBavtitatiov
qeIBltI reported to tse DL.
h sev reportedWPkExSWPkTyWPkTSWMekTSyy avd ntkTSyy ivclBde bots livear avd bravcsed iIomerI. Tvlu tse livear iIomer iI reported ,or all otser avaluteI.

Sample ID: 2201641-017L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: nFBipmevt 8 lav.
Matrix: wroBvdJ ater
Date Collected: 1RHqavH22 10:10

baoryatryP Data

Lab Sample: 220117-H0-
Date k eceiAed: 20HqavH22 10:02
ColBmv: 8nE C1G

LnalPte	CLS Numoey	Crnc. (ng/b)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
P98y	R7-H22H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9M8y	G6R050HG5H	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Pey	2706H50HR	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9MPy	R77H7RH	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P98S	R7-H7RH	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9nnSy	11R-07HG2H7	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
N9DEy	1-1772H-GH6	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
4:2 9TS	7-7124H72H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Exy	R07H24H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9PeS	2706H51H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
E9POHDy	1R2-2H1RH6	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Epy	R7-HG-H5	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
y DONy	51500-H4H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9ExS	R--H46H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
6:2 9TS	27615H57H2	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Oy	RR-H67H	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9EpS	R7-H52HG	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Ny	R7-H5-H	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9OS	176RH2RH	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
5ClHP9RONS	7-6426H-GH	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Dy	RR-H76H2	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
G2 9TS	R510GHR4H4	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
Me9OSy y	2R--HR1H5	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
nt9OSy y	2551H-0H6	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Uvy	20-GH54HG	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
11ClHP9ROUdS	76R0-1H52H5	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9Doy	R07H-H	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9TrDy	72625H54HG	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
P9TeDy	R76H06H7	ND	035G4	1357	R35R		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1RCRHP98y	IS	G131	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RCRHP9Pey	IS	G535	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RCRHP98S	IS	G136	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RCRHE9POHDy	IS	5R3R	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2H4:2 9TS	IS	G437	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9Exy	IS	G634	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC4HP9Epy	IS	GG82	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1

Sample ID: 2201641-017L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: n FBipmevt 8 lav.
Matrix: wroBvdJ ater
Date Collected: 1RHqavH22 10:10

baoryatryP Data

Lab Sample: 220117-H0-
Date k eceiAed: 20HqavH22 10:02
ColBmv: 8 nE C1G

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1RCRHP9E xS	IS	G537	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2H6:2 9TS	IS	GR3-	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC-HP9Ny	IS	102	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9Oy	IS	G-34	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RCGHP9OS	IS	5135	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9Dy	IS	G53R	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HG2 9TS	IS	GG3G	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
dRHMe9OSy y	IS	Gl3G	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9Uvy	IS	GG3R	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
d-Hnt9OSy y	IS	GR3l	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9Doy	IS	7634	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1
1RC2HP9TeDy	IS	7G32	-0H1-0		822y1-5	R1HqavH22	032-4L	02H9ebH22 02:1R	1

DL HDetectiov Limit
LOD HLimit of Detectiov
LOQ HLimit of FBavtitatiov
k esBlts reported to the DL3
Whev reported, P9E xS, P9Oy , P9OS, Me9OSy y avd nt9OSy y ivclBde both livear avd bravched isomers3 Ovlu the livear isomer is reported for all other avalutes3

Sample ID: 2201641-018D **yPFS Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Eall nvAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: wCHMF 04
Matrix: wroBvdJ ater
Date Collected: 1RHWavH22 10:RG

AaLboatbor Data

Lab Sample: 220117-H06
Date 5 eceiAed: 20HWavH22 10:02
ColBmv: 8nE C1G

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P98y	R7-H22H4	1-.G	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9M8y	G6R030HG3H	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Pey	2706H30HR	21.7	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9MPy	R77H7RH	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P98S	R7-H7RH	7.GR	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9nnSy	11R-07HG2H7	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
N9DEy	1-1772H-GH6	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
4:2 9TS	7-7124H72H4	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Exy	R07H24H4	26.R	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9PeS	2706H31H4	-.72	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
E9POHDy	1R2-2HRH6	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Epy	R7-HG-H3	7.0-	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
y DONy	31300-H4H4	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9ExS	R--H46H4	R3.7	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
6:2 9TS	27613H37H2	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Oy	RR-H67H	11.-	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9EpS	R7-H32HG	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Ny	R7-H3-H	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9OS	176RH2RH	3.G4	0.3--	1.31	RG2	U	822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
3ClHP9RONS	7-6426H-GH	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Dy	RR-H76H2	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
G2 9TS	R310GHR4H4	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
Me9OSy y	2R--HR1H3	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
nt9OSy y	2331H-0H6	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9I vy	20-GH34HG	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
11ClHP9ROI dS	76R0-1H32H3	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9Doy	R07H-H	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9TrDy	72623H34HG	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
P9TeDy	R76H06H7	ND	0.3--	1.31	RG2		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP98y	sS	-1.1	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RCRHP9Pey	sS	7G-	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RCRHP98S	sS	7-.0	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RCRHE9POHDy	sS	37.1	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2H4:2 9TS	sS	G4.R	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9Exy	sS	G2.4	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1
1RC4HP9Epy	sS	G2.6	-0H1-0		822y1-3	R1HWavH22	0.262 L	02H9ebH22 02:2R	1

Sample ID: 2201641-018D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: wCHMF 04

Matrix: wroBvdJ ater
Date Collected: 1RHWavH22 10:RG

AaLboatbor Data

Lab Sample: 220117-H06
Date 5 eceiAed: 20HWavH22 10:02

ColBmv: 8 nE C1G

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP9ExS	sS	GG.0	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2H6:29TS	sS	G-.0	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC-HP9Ny	sS	31.G	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9Oy	sS	G4.0	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RCGHP9OS	sS	G7.1	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9Dy	sS	GR.6	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HG29TS	sS	G-.7	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
dRHMe9OSy y	sS	77.3	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9I vy	sS	73.6	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
d-HnP9OSy y	sS	7-.-	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9Doy	sS	77.0	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1
1RC2HP9TeDy	sS	77.G	-0H1-0		822y1-3	RlHWavH22	0.262 L	02H9ebH22 02:2R	1

DL HDetectiov Limit
LOD HLimit oQDetectiov
LOU HLimit oQqBavtitatiov

5 ehBlth reported to t, e DL.

F , ev reportedf P9ExSf P9Oy f P9OSf Me9OSy y avd nt9OSy y ivclBde bot, livear avd bravc, ed ihomerh. Ovlu t, e livear ihomer ih reported Qor all ot, er avaluteh.

Sample ID: 2201641-019D **yPFS Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Eall nvAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: wCHMF 02

Matrix: wroBvdJ ater
Date Collected: 1RHWavH22 11:R0

AaLboatbor Data

Lab Sample: 220117-H07
Date 5eceiAed: 20HWavH22 10:02

ColBmv: 8nE C1G

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P98y	R7-H22H4	1.2-	0.3-G	1.32	RGR	W	822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9M8y	G6R030HG3H	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Pey	2706H30HR	4.77	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9MPy	R77H7RH	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P98S	R7-H7RH	4.R1	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9nnSy	11R-07HG2H7	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
N9DEy	1-1772H-GH6	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
4:2 9TS	7-7124H72H4	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Exy	R07H24H4	6.00	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9PeS	2706H31H4	2.6G	0.3-G	1.32	RGR	W	822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
E9POHDy	1R2-2HRH6	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Epy	R7-HG-H3	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
y DONy	31300-H4H4	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9ExS	R--H46H4	14.G	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
6:2 9TS	27613H37H2	0.367	0.3-G	1.32	RGR	W	822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Oy	RR-H67H	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9EpS	R7-H32HG	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Ny	R7-H3-H	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9OS	176RH2RH	2.-R	0.3-G	1.32	RGR	WI	822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
3ClHP9RONS	7-6426H-GH	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Dy	RR-H76H2	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
G2 9TS	R310GHR4H4	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
Me9OSy y	2R--HR1H3	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
nt9OSy y	2331H-0H6	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9s vy	20-GH34HG	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
11ClHP9ROs dS	76R0-1H32H3	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9Doy	R07H-H	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9TrDy	72623H34HG	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
P9TeDy	R76H06H7	ND	0.3-G	1.32	RGR		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP98y	hS	62.2	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RCRHP9Pey	hS	G-.4	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RCRHP98S	hS	GR.G	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RCRHE9POHDy	hS	36.R	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2H4:2 9TS	hS	G-.4	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9Exy	hS	GG1	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC4HP9Epy	hS	G4.3	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1

Sample ID: 2201641-019D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: E all n vAirovmevtal y valutical Laboratoru
Project: 2201641
Locatiov: wCHMF 02

Matrix: wroBvdJ ater
Date Collected: 1RHWavH22 11:R0

AaLboatbor Data

Lab Sample: 220117-H07
Date 5 eceiAed: 20HWavH22 10:02

ColBmv: 8 nE C1G

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP9ExS	hS	G4.R	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2H6:29TS	hS	G2.R	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC-HP9Ny	hS	31.0	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9Oy	hS	G7.-	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RCGHP9OS	hS	30.0	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9Dy	hS	G4.1	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HG29TS	hS	G2.0	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
dRHMe9OSy y	hS	71.R	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9s vy	hS	76.G	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
d-HntOSy y	hS	70.6	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9Doy	hS	74.7	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1
1RC2HP9TeDy	hS	7R.2	-0H1-0		822y1-3	R1HWavH22	0.261 L	02H9ebH22 0R:04	1

DL HDetectiov Limit
LOD HLimit oQDetectiov
LOI HLimit oQuBavtitatiov

5e, Blt, reported to tfe DL.

F fev reportedUP9ExSUP9Oy UP9OSUMe9OSy y avd nt9OSy y ivclBde botf livear avd bravcfed i, omer, . Ovlu tfe livear i, omer i, reported Qor all otfer avalute, .

Sample ID: 2201641-020D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: wCHMF 01

Matrix: wro8AdJ ater
Date Collected: 1RHWAH22 12:17

AaLboatbor Data

Lab Sample: 220117-H0E
Date 5 eceiyed: 20HWAH22 10:02

Col8mA: Gvn C1E

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P9Gu	R7-H22H4	4.40	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9MGu	E6R030HE3H	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9Peu	2706H30HR	2.E0	0.347	1.E3	R.73	W	G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9MPu	R77H7RH	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9GS	R7-H7RH	3.44	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9vvSu	11R-07HE2H7	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
N9Dnu	1-1772H-EH6	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
4:2 9TS	7-7124H72H4	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9n xu	R07H24H4	R.E3	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9PeS	2706H31H4	-.26	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
n 9POHDu	1R2-2H-RH6	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9n pu	R7-HE-H3	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
u DONu	31300-H4H4	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9n xS	R--H46H4	20.1	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
6:2 9TS	27613H37H2	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9Ou	RR-H67H	2.-2	0.347	1.E3	R.73	W	G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9n pS	R7-H32HE	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9Nu	R7-H3-H	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9OS	176RH2RH	6.03	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
3ClHP9RONS	7-6426H-EH	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9Du	RR-H76H2	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
E:2 9TS	R310EHR4H4	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
Me9OSu u	2R--HR1H3	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
vt9OSu u	2331H-0H6	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9UAu	20-EH34HE	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
11ClHP9ROUdS	76R0-1H32H3	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9Dou	R07H-H	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9TrDu	72623H34HE	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
P9TeDu	R76H06H7	ND	0.347	1.E3	R.73		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP9Gu	IS	47.E	-0H1-0	n	G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RCRHP9Peu	IS	7-.2	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RCRHP9GS	IS	64.1	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RCRHn 9POHDu	IS	7E.6	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2H4:2 9TS	IS	76.3	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9n xu	IS	E1.7	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1
1RC4HP9n pu	IS	E2.E	-0H1-0		G22u 1-3	R1HWAH22	0.264 L	02H9ebH22 0R:14	1

Sample ID: 2201641-020D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: wCHMF 01

Matrix: wro8AdJ ater
Date Collected: 1RHWAH22 12:17

AaLboatbor Data

Lab Sample: 220117-H0E
Date 5 eceiyed: 20HWAH22 10:02

Col8mA: Gvn C1E

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1RCRHP9n xS	IS	E-.3	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2H6:2 9TS	IS	77.R	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC-HP9Nu	IS	EE.3	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9Ou	IS	E4.1	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RCEHP9OS	IS	7E.7	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9Du	IS	73.3	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HE:2 9TS	IS	E-.E	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
dRHMe9OSu u	IS	7R.0	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9UAu	IS	73.4	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
d-Hyt9OSu u	IS	7R.7	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9Dou	IS	77.7	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1
1RC2HP9TeDu	IS	74.1	-0H1-0		G22u1-3	RlHWAH22	0.264 L	02H9ebH22 0R:14	1

DL HDetectioALimit

LOD HLimit of DetectioA
LOQ HLimit of q8aAtitatioA

5es8lts reported to the DL.

F heAreported, P9n xS, P9Ou , P9OS, Me9OSu u aAd vt9OSu u iAcl8de both liAear aAd braAched isomers. OAIBthe liAear isomer is reported for all other aAaIBtes.

Sample ID: 2201641-021D **yPFS Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: J CHM9 0W

Matrix: J ro8AdRater
Date Collected: 1W15aAH22 1W10

AaLboatbor Data

Lab Sample: 220117-H0E
Date Feceiyed: 20H5aAH22 10:02

Col8mA: Gvn C1w

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
P. Gu	W7-H22H4	1E-	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. MGu	w6W0E0HwEH	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. Peu	2706HE0HW	E7w	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. MPu	W7H7WH	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. GS	W7-H7WH	Ww4	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. vvSu	11W07Hw2H7	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
N. Dnu	1-1772H-wH6	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
4:2 . TS	7-7124H72H4	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. nxu	W07H24H4	w7W	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. PeS	2706HE1H4	2EW	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
n . POHDu	1W2-2HWW6	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. npu	W7-Hw-HE	1E4	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
u DONu	E1E00-H4H4	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. nxS	W-H46H4	1-E0	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
6:2 . TS	2761EHE7H2	1-w	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. Ou	WWH67H	7634	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. npS	W7-HE2Hw	2E36	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. Nu	W7-HE-H	1347	1301	2302	4304	5	G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. OS	176W2WH	-wE	1301	2302	4304	U	G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
ECIHP. WONS	7-6426H-wH	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. Du	WWH76H2	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
w.2 . TS	WE10wHWH4	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
Me. OSu u	2W-HWHE	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
vt. OSu u	2EE1H-0H6	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. I Au	20-wHE4Hw	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
11ClHP. WOI dS	76W0-1HE2HE	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. Dou	W07H-H	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. TrDu	7262EHE4Hw	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
P. TeDu	W6H06H7	ND	1301	2302	4304		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1WCWHP. Gu	sS	-w34	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WCWHP. Peu	sS	743W	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WCWHP. GS	sS	6732	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WCWHn . POHDu	sS	7-34	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WC2H4:2 . TS	sS	723w	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WC2HP. nxu	sS	763w	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1
1WC4HP. npu	sS	7E36	-0H1-0		G22u 1-E	W15aAH22	03247 L	02HebH22 0W24	1

Sample ID: 2201641-021D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: n all v AyiroAmeAtal u AalBtical LaboratorB
Project: 2201641
LocatioA: J CHM9 0W

Matrix: J ro8AdRater
Date Collected: 1W5aAH22 1W10

AaLboatbor Data

Lab Sample: 220117-H0E
Date Feceiyed: 20H5aAH22 10:02

Col8mA: Gvn C1w

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
1WCWHP. n xS	sS	743W	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2H6:2 . TS	sS	7632	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC-HP. Nu	sS	w437	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2HP. Ou	sS	wW3W	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WCwHP. OS	sS	wW3-	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2HP. Du	sS	w132	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2Hw.2 . TS	sS	7732	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
dWHMe. OSu u	sS	7-32	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2HP. I Au	sS	7732	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
d-Hvt. OSu u	sS	7431	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2HP. Dou	sS	7w31	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1
1WC2HP. TeDu	sS	7436	-0H1-0		G22u1-E	WH5aAH22	0324 7 L	02HebH22 0W24	1

DL HDetectioALimit

LOD HLimit oQDetectioA
LOU HLimit oQq8aAtitatioA

Feh8lth reported to t, e DL3

9 , eAreportedfP. n xSfP. Ou fP. OSfMe. OSu u aAd vt. OSu u iAcl8de bot, liAear aAd braAc, ed ihomerh3 OAlBt, e liAear ihomer ih reported Qor all ot, er aAalBteh3

Sample ID: 2201641-022D

y PF S Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-2
Matrix: Surface Water
Date Collected: 13-Jan-22 15:00

AaLboatbor Data

Lab Sample: 2201175-10
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	375-22-4	5230	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
PFMBA	863090-89-5	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFPeA	2706-90-3	16800	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
PFMPA	377-73-1	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFBS	375-73-5	3500	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
PFEESA	113507-82-7	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
NFDHA	151772-58-6	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
4:2 FTS	757124-72-4	98.9	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFHxA	307-24-4	10700	19.4	38.8	77.7	D	B22A159	31-Jan-22	0.258 L	10-Feb-22 18:28	20
PFPeS	2706-91-4	2610	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
HFPO-DA	13252-13-6	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFHpA	375-85-9	1840	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
ADONA	919005-14-4	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFHxS	355-46-4	8220	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
6:2 FTS	27619-97-2	3040	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
PFOA	335-67-1	728	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFHpS	375-92-8	139	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFNA	375-95-1	51.6	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFOS	1763-23-1	4360	9.71	19.4	38.8	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
9Cl-PF3ONS	756426-58-1	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFDA	335-76-2	4.14	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
8:2 FTS	39108-34-4	17.7	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
MeFOSAA	2355-31-9	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
EtFOSAA	2991-50-6	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFUnA	2058-94-8	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
11Cl-PF3OUdS	763051-92-9	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFDoA	307-55-1	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFTrDA	72629-94-8	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
PFTeDA	376-06-7	ND	0.971	1.94	3.88		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
13C3-PFBA	IS	28.0	50 - 150	D, H	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C3-PFPeA	IS	60.0	50 - 150	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C3-PFBS	IS	64.0	50 - 150	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C3-HFPO-DA	IS	75.6	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-4:2 FTS	IS	69.8	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-PFHxA	IS	100	50 - 150	D	B22A159	31-Jan-22	0.258 L	10-Feb-22 18:28	20
13C4-PFHpA	IS	69.2	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1

Sample ID: 2201641-022D

y PF S Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-2
Matrix: Surface Water
Date Collected: 13-Jan-22 15:00

AaLboatbor Data

Lab Sample: 2201175-10
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	F nalrzed	Dilutibn
13C3-PFHxS	IS	75.0	50 - 150	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C2-6:2 FTS	IS	91.2	50 - 150	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C5-PFNA	IS	86.3	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-PFOA	IS	80.4	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C8-PFOS	IS	74.0	50 - 150	D	B22A159	31-Jan-22	0.258 L	03-Feb-22 03:06	10
13C2-PFDA	IS	77.5	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-8:2 FTS	IS	74.3	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
d3-MeFOSAA	IS	61.3	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-PFUnA	IS	67.2	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
d5-EtFOSAA	IS	54.9	50 - 150		B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-PFDoA	IS	35.5	50 - 150	H	B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1
13C2-PFTeDA	IS	12.4	50 - 150	H	B22A159	31-Jan-22	0.258 L	02-Feb-22 03:34	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-022D **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A159-MS1/B22A159-MSD1	Source Lab Sample:	2201175-10
Project:	2201641	QC Batch:	B22A159	Date Extracted:	31-Jan-22
Matrix:	Aqueous	Samp Size:	0.258/0.256 L	Column:	BEH C18

Analyte	CAS Number	Sample (ng/L)	MS (ng/L)	MS Spike	MS % Rec	MS Quals	MSD (ng/L)	MSD Spike	MSD % Rec	RPD	MSD Quals	%Rec Limits	RPD Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
PFBA	375-22-4	5230	5000	388	-61.0	D, H	5660	391	109	708	D, H	73-129	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
PFMBA	863090-89-5	ND	73.1	38.8	188	H	74.1	39.1	189	0.531	H	65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFPeA	2706-90-3	16800	18200	388	359	D, H	17200	391	93.2	118	D, H	72-129	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
PFMPA	377-73-1	ND	33.8	38.8	87.1	Q	29.4	39.1	75.1	14.8	Q	65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFBS	375-73-5	3500	3380	388	-29.4	D, H	3500	391	1.77	226	D, H	72-130	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
PFEESA	113507-82-7	ND	47.9	34.6	138	H	48.4	34.9	139	0.722	H	65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
NFDHA	151772-58-6	ND	70.4	38.8	181	H	73.2	39.1	187	3.26	H	65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
4:2 FTS	757124-72-4	98.9	128	38.8	76.1		142	39.1	110	36.4	H	63-143	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFHxA	307-24-4	10700	18500	388	1990	D, H	19100	391	2150	7.73	D, H	72-129	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
PFPeS	2706-91-4	2610	2490	388	-32.0	D, H	2710	391	24.4	1480	D, H	71-127	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
HFPO-DA	13252-13-6	ND	44.2	38.8	114	Q	29.4	39.1	75.1	41.1	H	65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFHpA	375-85-9	1840	1700	38.8	-365	H	1770	39.1	-174	70.9	H	72-130	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
ADONA	919005-14-4	ND	43.2	38.8	111		43.9	39.1	112	0.897		65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFHxS	355-46-4	8220	8950	388	187	D, H	7640	391	-149	1770	D, H	68-131	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
6:2 FTS	27619-97-2	3040	3410	388	93.5	D	3720	391	174	60.2	D, H	64-140	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
PFOA	335-67-1	728	658	38.8	-180	H	669	39.1	-151	17.5	H	71-133	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFHpS	375-92-8	139	157	38.8	46.9	H	155	39.1	41.9	11.3	H	69-134	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFNA	375-95-1	51.6	84.6	38.8	84.9		76.1	39.1	62.7	30.1	H	69-130	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFOS	1763-23-1	4360	3680	388	-176	D, H	3870	391	-125	33.9	D, H	65-140	30	03-Feb-22 02:04	10	03-Feb-22 02:15	10
9Cl-PF3ONS	756426-58-1	ND	42.1	38.8	108		44.8	39.1	115	6.28		65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFDA	335-76-2	4.14	41.7	38.8	96.7		43.7	39.1	101	4.35		71-129	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
8:2 FTS	39108-34-4	17.7	58.1	38.8	104		51.2	39.1	85.6	19.4		67-138	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
MeFOSAA	2355-31-9	ND	39.4	38.8	102		39.3	39.1	101	0.985		65-136	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
EtFOSAA	2991-50-6	ND	40.1	38.8	102		37.6	39.1	95.1	7		61-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFUnA	2058-94-8	ND	35.3	38.8	90.9		38.4	39.1	98.1	7.62		69-133	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
11Cl-PF3OUdS	763051-92-9	ND	45.6	38.8	118		52.8	39.1	135	13.4		65-135	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFDoA	307-55-1	ND	37.4	38.8	96.4		38.4	39.1	98.2	1.85		72-134	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFTrDA	72629-94-8	ND	20.2	38.8	52.2	H	20.5	39.1	52.4	0.382	H	65-144	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1
PFTeDA	376-06-7	ND	42.5	38.8	110		41.7	39.1	107	2.76		71-132	30	02-Feb-22 01:11	1	02-Feb-22 01:22	1

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBA	IS	39.0	D, H	18.0	D, H	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C3-PFPeA	IS	66.0	D	60.0	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10

Sample ID: 2201641-022D **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A159-MS1/B22A159-MSD1	Source Lab Sample:	2201175-10
Project:	2201641	QC Batch:	B22A159	Date Extracted:	31-Jan-22
Matrix:	Aqueous	Samp Size:	0.258/0.256 L	Column:	BEH C18

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBS	IS	79.0	D	66.0	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C3-HFPO-DA	IS	64.6		81.4		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-4:2 FTS	IS	71.8		66.4		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-PFHxA	IS	97.0	D	83.0	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C4-PFHpA	IS	67.3		65.2		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C3-PFHxS	IS	78.0	D	79.0	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C2-6:2 FTS	IS	92.6	D	71.3	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C5-PFNA	IS	81.3		85.8		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-PFOA	IS	79.4		76.1		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C8-PFOS	IS	91.0	D	73.0	D	50 - 150	03-Feb-22 02:04	10	03-Feb-22 02:15	10
13C2-PFDA	IS	77.1		73.9		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-8:2 FTS	IS	76.1		75.3		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
d3-MeFOSAA	IS	57.6		61.2		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-PFUnA	IS	60.1		57.6		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
d5-EtFOSAA	IS	58.1		57.7		50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-PFDoA	IS	32.9	H	32.8	H	50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1
13C2-PFTeDA	IS	12.1	H	10.8	H	50 - 150	02-Feb-22 01:11	1	02-Feb-22 01:22	1

Sample ID: 2201641-023D **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-2 Dup
Matrix: Surface Water
Date Collected: 13-Jan-22 15:00

Laboratory Data

Lab Sample: 2201175-11
Date Received: 20-Jan-22 10:02
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	5070	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
PFMBA	863090-89-5	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFPeA	2706-90-3	18200	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
PFMPA	377-73-1	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFBS	375-73-5	3020	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
PFEESA	113507-82-7	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
NFDHA	151772-58-6	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
4:2 FTS	757124-72-4	93.5	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFHxA	307-24-4	10600	19.3	38.6	77.2	D	B22A159	31-Jan-22	0.259 L	10-Feb-22 18:39	20
PFPeS	2706-91-4	2160	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
HFPO-DA	13252-13-6	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFHpA	375-85-9	1800	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
ADONA	919005-14-4	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFHxS	355-46-4	7900	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
6:2 FTS	27619-97-2	2880	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
PFOA	335-67-1	640	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFHpS	375-92-8	116	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFNA	375-95-1	40.3	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFOS	1763-23-1	3840	9.65	19.3	38.6	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
9Cl-PF3ONS	756426-58-1	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFDA	335-76-2	3.57	0.965	1.93	3.86	J	B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
8:2 FTS	39108-34-4	8.64	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
MeFOSAA	2355-31-9	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
EtFOSAA	2991-50-6	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFUnA	2058-94-8	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
11Cl-PF3OUdS	763051-92-9	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFDoA	307-55-1	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFTrDA	72629-94-8	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
PFTeDA	376-06-7	ND	0.965	1.93	3.86		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	38.0	50 - 150	D, H	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C3-PFPeA	IS	68.0	50 - 150	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C3-PFBS	IS	81.0	50 - 150	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C3-HFPO-DA	IS	67.5	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-4:2 FTS	IS	66.3	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-PFHxA	IS	102	50 - 150	D	B22A159	31-Jan-22	0.259 L	10-Feb-22 18:39	20
13C4-PFHpA	IS	65.7	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1

Sample ID: 2201641-023D **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-2 Dup
Matrix: Surface Water
Date Collected: 13-Jan-22 15:00

Laboratory Data

Lab Sample: 2201175-11
Date Received: 20-Jan-22 10:02
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFHxS	IS	87.0	50 - 150	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C2-6:2 FTS	IS	89.5	50 - 150	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C5-PFNA	IS	83.8	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-PFOA	IS	75.5	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C8-PFOS	IS	81.0	50 - 150	D	B22A159	31-Jan-22	0.259 L	03-Feb-22 03:16	10
13C2-PFDA	IS	74.7	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-8:2 FTS	IS	74.9	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
d3-MeFOSAA	IS	56.2	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-PFUnA	IS	58.5	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
d5-EtFOSAA	IS	57.3	50 - 150		B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-PFDoA	IS	37.3	50 - 150	H	B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1
13C2-PFTeDA	IS	14.1	50 - 150	H	B22A159	31-Jan-22	0.259 L	02-Feb-22 03:45	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-024D

y PF S Isbtbpe Dilutibn TaLle B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-3
Matrix: Surface Water
Date Collected: 13-Jan-22 16:00

AaLboatbor Data

Lab Sample: 2201175-12
Date Received: 20-Jan-22 10:02
Column: BEH C18

Fnalrte	CFS NumLeo	Cbnc. (ng/A)	DA	AOD	AOQ	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
PFBA	375-22-4	5050	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
PFMBA	863090-89-5	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFPeA	2706-90-3	17600	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
PFMPA	377-73-1	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFBS	375-73-5	3360	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
PFEESA	113507-82-7	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
NFDHA	151772-58-6	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
4:2 FTS	757124-72-4	98.9	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFHxA	307-24-4	10600	18.6	37.2	74.3	D	B22A159	31-Jan-22	0.269 L	10-Feb-22 18:49	20
PFPeS	2706-91-4	2550	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
HFPO-DA	13252-13-6	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFHpA	375-85-9	1740	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
ADONA	919005-14-4	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFHxS	355-46-4	7390	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
6:2 FTS	27619-97-2	3250	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
PFOA	335-67-1	530	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFHpS	375-92-8	77.7	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFNA	375-95-1	26.6	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFOS	1763-23-1	1950	9.29	18.6	37.2	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
9Cl-PF3ONS	756426-58-1	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFDA	335-76-2	1.06	0.929	1.86	3.72	J	B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
8:2 FTS	39108-34-4	2.28	0.929	1.86	3.72	J	B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
MeFOSAA	2355-31-9	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
EtFOSAA	2991-50-6	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFUnA	2058-94-8	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
11Cl-PF3OUdS	763051-92-9	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFDoA	307-55-1	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFTrDA	72629-94-8	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
PFTeDA	376-06-7	ND	0.929	1.86	3.72		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
13C3-PFBA	IS	29.0	50 - 150	D, H	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C3-PFPeA	IS	64.0	50 - 150	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C3-PFBS	IS	72.0	50 - 150	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C3-HFPO-DA	IS	67.1	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-4:2 FTS	IS	60.9	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-PFHxA	IS	88.0	50 - 150	D	B22A159	31-Jan-22	0.269 L	10-Feb-22 18:49	20
13C4-PFHpA	IS	61.9	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1

Sample ID: 2201641-024D **y PF S Isbtbpe Dilutibn TaLle B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-3
Matrix: Surface Water
Date Collected: 13-Jan-22 16:00

AaLboatbor Data

Lab Sample: 2201175-12
Date Received: 20-Jan-22 10:02
Column: BEH C18

AaLeled Standaods	Trpe	% Recbveor	Aimits	Qualifieos	Batch	Extoacted	Samp Size	Fnalrzed	Dilutibn
13C3-PFHxS	IS	82.0	50 - 150	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C2-6:2 FTS	IS	77.1	50 - 150	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C5-PFNA	IS	76.4	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-PFOA	IS	74.0	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C8-PFOS	IS	78.0	50 - 150	D	B22A159	31-Jan-22	0.269 L	03-Feb-22 03:57	10
13C2-PFDA	IS	73.1	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-8:2 FTS	IS	71.0	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
d3-MeFOSAA	IS	52.3	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-PFUnA	IS	55.6	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
d5-EtFOSAA	IS	50.7	50 - 150		B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-PFDoA	IS	32.5	50 - 150	H	B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1
13C2-PFTeDA	IS	15.5	50 - 150	H	B22A159	31-Jan-22	0.269 L	02-Feb-22 03:55	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-26
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Massachusetts Department of Environmental Protection	M-CA413
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1980678
New Hampshire Environmental Accreditation Program	207720
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-016
Pennsylvania Department of Environmental Protection	017
Texas Commission on Environmental Quality	T104704189-21-12
Vermont Department of Health	VT-4042
Virginia Department of General Services	10769
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p- Dioxins & Polychlorinated Dibenzofurans	EPA 23
Polychlorinated Dibenzodioxins in Ambient Air by GC/HRMS	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613/1613B
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537.1
Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry	EPA 533
Perfluorooctanesulonate (PFOS) and Perfluorooctanoate (PFOA) - Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 3

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: clients.hallenvironmental.com

2201175 1.8°C

SUB CONTRATOR: Vista Analytical Labor | COMPANY: Vista Analytical Laboratory | PHONE: (916) 673-1520 | FAX:

ADDRESS: 1104 Windfield Way | ACCOUNT #: | EMAIL:

CITY, STATE, ZIP: El Dorado Hills, CA 95762

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2201641-001A	Equipment Blank	250HDPE	Groundwater	1/11/2022 11:00:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
2	2201641-002D	MW05001	250HDPE	Groundwater	1/11/2022 11:20:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
3	2201641-003D	FT31-LM4	250HDPE	Groundwater	1/11/2022 1:05:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
4	2201641-004D	MW01004	250HDPE	Groundwater	1/11/2022 2:04:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
5	2201641-005D	FT31-LM5	250HDPE	Groundwater	1/11/2022 2:55:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
6	2201641-006D	FT31-LM1	250HDPE	Groundwater	1/11/2022 3:50:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
7	2201641-007D	FT31-LM2	250HDPE	Groundwater	1/11/2022 4:35:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
8	2201641-008A	Field Blank	250HDPE	Groundwater	1/11/2022 4:50:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
9	2201641-009A	Equipment Blank	250HDPE	Groundwater	1/12/2022 9:37:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
10	2201641-010D	MW-29-01	250HDPE	Groundwater	1/12/2022 10:10:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
11	2201641-011D	MW-02 & 05-10	250HDPE	Groundwater	1/12/2022 12:25:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
12	2201641-012D	S1-MW3	250HDPE	Groundwater	1/12/2022 1:27:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
13	2201641-013D	MW-02 & 05-02	250HDPE	Groundwater	1/12/2022 2:30:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537 MS/MSD

(A)

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Items 13-24 Cooler 2 of 3 (A) Samples appear on WO 2201174

Relinquished By	Date	Time	Received By	Date	Time
Cmc	1/18/2022	9:57 AM	Justin Briseno	01/20/22	1000

TAT: Standard ✓ RUSH Next BD 2nd BD 3rd BD

REPORT TRANSMITTAL DESIRED:
HARDCOPY (extra cost) FAX EMAIL ONLINE

FOR LAB USE ONLY

Temp of samples °C Attempt to Cool ?

Comments

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: clients.hallenvironmental.com

CHAIN OF CUSTODY RECORD

2201175 1.8°C

SUB CONTRATOR	Vista Analytical Labor	COMPANY	Vista Analytical Laboratory	PHONE	(916) 673-1520	FAX	
ADDRESS	1104 Windfield Way			ACCOUNT #		EMAIL	
CITY, STATE, ZIP	El Dorado Hills, CA 95762						

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
14	2201641-014D	MW-02 & 05-02 Dup	250HDPE	Groundwater	1/12/2022 2:30:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
15	2201641-015D	MW-30 & 33-1	250HDPE	Groundwater	1/12/2022 3:45:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
16	2201641-016A	Field Blank	250HDPE	Groundwater	1/12/2022 4:10:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
17	2201641-017A	Equipment Blank	250HDPE	Groundwater	1/13/22 10:10am cmc 1/18/22	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
18	2201641-018D	GC-MW04	250HDPE	Groundwater	1/13/2022 10:38:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
19	2201641-019D	GC-MW02	250HDPE	Groundwater	1/13/2022 11:30:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
20	2201641-020D	GC-MW01	250HDPE	Groundwater	1/13/2022 12:17:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
21	2201641-021D	GC-MW03	250HDPE	Groundwater	1/13/2022 1:10:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
22	2201641-022D	SW-2	250HDPE	Surface Water	1/13/2022 3:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537 MS/MSD
23	2201641-023D	SW-2 Dup	250HDPE	Surface Water	1/13/2022 3:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
24	2201641-024D	SW-3	250HDPE	Surface Water	1/13/2022 4:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
25	2201641-025D	SW-1	250HDPE	Surface Water	1/13/2022 5:32:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
26	2201641-026A	SED-8	500HDPE	Soil	1/11/2022 11:03:00 AM	1	Soil 24 Compound PFAS Testing

(B)

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

(B) Samples appear on WO 2201176

Relinquished By: cmc	Date: 1/18/2022	Time: 9:57 AM	Received By: Justin Briscoe	Date: 01/20/22	Time: 7:00
Relinquished By	Date	Time	Received By	Date	Time
Relinquished By:	Date	Time	Received By:	Date:	Time:

TAT: Standard X RUSH Next BD 2nd BD 3rd BD

REPORT TRANSMITTAL DESIRED:
HARDCOPY (extra cost) FAX EMAIL ONLINE

FOR LAB USE ONLY
Temp of samples °C Attempt to Cool ?
Comments

Vista Analytical Laboratory

Sample Log-In Checklist

Vista Work Order #: 2201175 TAT Std.

Samples Arrival:	**Date/Time** 01/20/22 1002		**Initials:**		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 2.0 (uncorrected) **Temp °C:** 1.8 (corrected)			**Probe used: Y / N**		**Thermometer ID:** IR-4		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 7757 8831 6414	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / Client / Retain / Return / Dispose	✓		
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 01/20/22 11:07	**Initials:**	**Location:** R-13 WR-2 **Shelf/Rack:** A-1 E-6 F-6
COC Anomaly/Sample Acceptance Form completed?		NO ✓	NA ✓

Comments:

CoC/Label Reconciliation Report WO# 2201175

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2201175-01	A 2201641-013D	MW-02 & 05-02	12-Jan-22 14:30	HDPE Bottle, 250 mL	Aqueous	MS/MSD (02/16/22)
2201175-01	B 2201641-013D	MW-02 & 05-02	12-Jan-22 14:30	HDPE Bottle, 250 mL	Aqueous	
2201175-01	C 2201641-013D	MW-02 & 05-02	12-Jan-22 14:30	Polypropylene, 250mL	Aqueous	MS/MSD
2201175-01	D 2201641-013D	MW-02 & 05-02	12-Jan-22 14:30	Polypropylene, 250mL	Aqueous	MS/MSD
2201175-02	A 2201641-014D	MW-02 & 05-02 Dup	12-Jan-22 14:30	HDPE Bottle, 250 mL	Aqueous	MS/MSD
2201175-02	B 2201641-014D	MW-02 & 05-02 Dup	12-Jan-22 14:30	HDPE Bottle, 250 mL	Aqueous	
2201175-02	C 2201641-014D	MW-02 & 05-02 Dup	12-Jan-22 14:30	Polypropylene, 250mL	Aqueous	
2201175-02	D 2201641-014D	MW-02 & 05-02 Dup	12-Jan-22 14:30	Polypropylene, 250mL	Aqueous	
2201175-03	A 2201641-015D	MW-30 & 33-1	12-Jan-22 15:45	HDPE Bottle, 250 mL	Aqueous	
2201175-03	B 2201641-015D	MW-30 & 33-1	12-Jan-22 15:45	HDPE Bottle, 250 mL	Aqueous	
2201175-03	C 2201641-015D	MW-30 & 33-1	12-Jan-22 15:45	Polypropylene, 250mL	Aqueous	
2201175-03	D 2201641-015D	MW-30 & 33-1	12-Jan-22 15:45	Polypropylene, 250mL	Aqueous	
2201175-04	A 2201641-016A	Field Blank	12-Jan-22 16:10	HDPE Bottle, 250 mL	Aqueous	
2201175-04	B 2201641-016A	Field Blank	12-Jan-22 16:10	HDPE Bottle, 250 mL	Aqueous	
2201175-04	C 2201641-016A	Field Blank	12-Jan-22 16:10	Polypropylene, 250mL	Aqueous	
2201175-04	D 2201641-016A	Field Blank	12-Jan-22 16:10	Polypropylene, 250mL	Aqueous	
2201175-05	A 2201641-017A	Equipment Blank	13-Jan-22 10:10	HDPE Bottle, 250 mL	Aqueous	
2201175-05	B 2201641-017A	Equipment Blank	13-Jan-22 10:10	HDPE Bottle, 250 mL	Aqueous	
2201175-05	C 2201641-017A	Equipment Blank	13-Jan-22 10:10	Polypropylene, 250mL	Aqueous	
2201175-05	D 2201641-017A	Equipment Blank	13-Jan-22 10:10	Polypropylene, 250mL	Aqueous	
2201175-06	A 2201641-018D	GC-MW04	13-Jan-22 10:38	HDPE Bottle, 250 mL	Aqueous	
2201175-06	B 2201641-018D	GC-MW04	13-Jan-22 10:38	HDPE Bottle, 250 mL	Aqueous	
2201175-06	C 2201641-018D	GC-MW04	13-Jan-22 10:38	Polypropylene, 250mL	Aqueous	
2201175-06	D 2201641-018D	GC-MW04	13-Jan-22 10:38	Polypropylene, 250mL	Aqueous	
2201175-07	A 2201641-019D	GC-MW02	13-Jan-22 11:30	HDPE Bottle, 250 mL	Aqueous	
2201175-07	B 2201641-019D	GC-MW02	13-Jan-22 11:30	HDPE Bottle, 250 mL	Aqueous	
2201175-07	C 2201641-019D	GC-MW02	13-Jan-22 11:30	Polypropylene, 250mL	Aqueous	
2201175-07	D 2201641-019D	GC-MW02	13-Jan-22 11:30	Polypropylene, 250mL	Aqueous	

2201175-08	A 2201641-020D	☑	GC-MW01	13-Jan-22 12:17	☑	A	HDPE Bottle, 250 mL	Aqueous	
2201175-08	B 2201641-020D	☑	GC-MW01	13-Jan-22 12:17	☑		HDPE Bottle, 250 mL	Aqueous	
2201175-08	C 2201641-020D	☑	GC-MW01	13-Jan-22 12:17	☑	B	Polypropylene, 250mL	Aqueous	
2201175-08	D 2201641-020D	☑	GC-MW01	13-Jan-22 12:17	☑		Polypropylene, 250mL	Aqueous	
2201175-09	A 2201641-021D	☑	GC-MW03	13-Jan-22 13:10	☑	A	HDPE Bottle, 250 mL	Aqueous	
2201175-09	B 2201641-021D	☑	GC-MW03	13-Jan-22 13:10	☑		HDPE Bottle, 250 mL	Aqueous	
2201175-09	C 2201641-021D	☑	GC-MW03	13-Jan-22 13:10	☑	B	Polypropylene, 250mL	Aqueous	
2201175-09	D 2201641-021D	☑	GC-MW03	13-Jan-22 13:10	☑		Polypropylene, 250mL	Aqueous	
2201175-10	A 2201641-022D *	☑	SW-2	13-Jan-22 15:00	☑	A	HDPE Bottle, 250 mL	Aqueous	MS/MSD
2201175-10	B 2201641-022D	☑	SW-2	13-Jan-22 15:00	☑		HDPE Bottle, 250 mL	Aqueous	MS/MSD
2201175-10	C 2201641-022D	☑	SW-2	13-Jan-22 15:00	☑	B	Polypropylene, 250mL	Aqueous	MS/MSD
2201175-10	D 2201641-022D	☑	SW-2	13-Jan-22 15:00	☑		Polypropylene, 250mL	Aqueous	MS/MSD
2201175-11	A 2201641-023D	☑	SW-2 Dup	13-Jan-22 15:00	☑	A	HDPE Bottle, 250 mL	Aqueous	
2201175-11	B 2201641-023D	☑	SW-2 Dup	13-Jan-22 15:00	☑		HDPE Bottle, 250 mL	Aqueous	
2201175-11	C 2201641-023D	☑	SW-2 Dup	13-Jan-22 15:00	☑	B	Polypropylene, 250mL	Aqueous	
2201175-11	D 2201641-023D	☑	SW-2 Dup	13-Jan-22 15:00	☑		Polypropylene, 250mL	Aqueous	
2201175-12	A 2201641-024D	☑	SW-3	13-Jan-22 16:00	☑	A	HDPE Bottle, 250 mL	Aqueous	
2201175-12	B 2201641-024D	☑	SW-3	13-Jan-22 16:00	☑		HDPE Bottle, 250 mL	Aqueous	
2201175-12	C 2201641-024D	☑	SW-3	13-Jan-22 16:00	☑	B	Polypropylene, 250mL	Aqueous	
2201175-12	D 2201641-024D	☑	SW-3	13-Jan-22 16:00	☑		Polypropylene, 250mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?		✓	✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments:
* samples have a rusty orange tint.

Preservation Documented: Na2S2O3 Trizma (A) NH4CH3CO2 None Other Ammonium Acetate (B)

Verifed by/Date: 01/21/22

March 25, 2022

Vista Work Order No. 2201176

Mr. Andy Freeman
Hall Environmental Analytical Laboratory
4901 Hawkins NE
Albuquerque, NM 87109

Dear Mr. Freeman,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 20, 2022 under your Project Name '2201641'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at jfox@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Jamie Fox
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 2201176
Case Narrative

Sample Condition on Receipt:

One surface water, one aqueous, and twelve soil samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The samples were received in good condition and within the recommended temperature requirements.

Analytical Notes:

PFAS Isotope Dilution Method (Aqueous)

The samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 of the LOQ concentrations. The LCS/LCSD recoveries were within the acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

PFAS Isotope Dilution Method (Solid)

The samples were extracted and analyzed for a selected list of PFAS using Vista's Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Sample "2201641-026A" was diluted and re-injected using standard addition due to a high concentration of PFOS.

Holding Times

The samples were extracted and analyzed within the hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

As requested, an MS/MSD was performed on sample "2201641-028A". The MS/MSD recoveries and/or RPDs were outside the acceptance criteria for PFHxS, 6:2 FTS, PFOS, and PFTrDA. All other recoveries and RPDs were within acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier. The responses of the internal standards with low recoveries were greater than 10:1 signal-to-noise, which is the limit generally considered acceptable for accurate quantitation by isotope dilution analysis.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2201175-01	2201561-0243	1D-Jan-22 17:D2	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
				PolMS/oSMene, 240mL
				PolMS/oSMene, 240mL
2201175-02	2201561-025y	11-Jan-22 11:0D	20-Jan-22 10:02	H3 PE Bottle, 400 mL
2201175-0D	2201561-027y	1D-Jan-22 15:D0	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-06	2201561-02py	r A8r A3 1D-Jan-22 15:40	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-04	2201561-029y	1D-Jan-22 15:40	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-05	2201561-0D0y	1D-Jan-22 17:09	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-07	2201561-0D1y	16-Jan-22 0p:06	20-Jan-22 10:02	H3 PE Bottle, 400 mL
				H3 PE Bottle, 400 mL
2201175-0p	2201561-0D2y	16-Jan-22 0p:24	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-09	2201561-0DDy	16-Jan-22 0p:6p	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-10	2201561-0D6y	16-Jan-22 09:00	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-11	2201561-0D4y	16-Jan-22 09:2D	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
				PolMS/oSMene, 240mL
				PolMS/oSMene, 240mL
2201175-12	2201561-0D5y	16-Jan-22 09:D0	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-1D	2201561-0D7y	16-Jan-22 09:64	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-16	2201561-0Dpy	16-Jan-22 0p:24	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
2201175-14	2201561-0D4y	16-Jan-22 09:2D	20-Jan-22 10:02	H3 PE Bottle, 240 mL
				H3 PE Bottle, 240 mL
				PolMS/oSMene, 240mL
				PolMS/oSMene, 240mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Aqueous

Laboratory Data

Lab Sample: B22A158-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFMBA	863090-89-5	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFPeA	2706-90-3	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFMPA	377-73-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFBS	375-73-5	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFEESA	113507-82-7	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
NFDHA	151772-58-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
4:2 FTS	757124-72-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHxA	307-24-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFPeS	2706-91-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
HFPO-DA	13252-13-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHpA	375-85-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
ADONA	919005-14-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHxS	355-46-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
6:2 FTS	27619-97-2	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFOA	335-67-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFHpS	375-92-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFNA	375-95-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFOS	1763-23-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
9Cl-PF3ONS	756426-58-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFDA	335-76-2	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
8:2 FTS	39108-34-4	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
MeFOSAA	2355-31-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
EtFOSAA	2991-50-6	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFUnA	2058-94-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
11Cl-PF3OUdS	763051-92-9	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFDoA	307-55-1	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFTrDA	72629-94-8	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
PFTeDA	376-06-7	ND	1.00	2.00	4.00		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	67.4	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFPeA	IS	87.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFBS	IS	79.1	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-HFPO-DA	IS	89.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-4:2 FTS	IS	85.3	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFHxA	IS	84.6	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C4-PFHpA	IS	82.2	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C3-PFHxS	IS	82.9	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

Sample ID: Method Blank **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory Matrix: Aqueous

Project: 2201641

Laboratory Data

Lab Sample: B22A158-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	77.3	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C5-PFNA	IS	89.2	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFOA	IS	83.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C8-PFOS	IS	83.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFDA	IS	82.4	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-8:2 FTS	IS	88.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
d3-MeFOSAA	IS	73.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFUnA	IS	79.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
d5-EtFOSAA	IS	69.5	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFDoA	IS	77.8	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1
13C2-PFTeDA	IS	66.0	50 - 150		B22A158	31-Jan-22	0.250 L	01-Feb-22 21:27	1

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: LCSD **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A158-BS1/B22A158-BSD1
Project:	2201641	QC Batch:	B22A158
Matrix:	Aqueous	Samp Size:	0.250/0.250 L
		Date Extracted:	31-Jan-22
		Column:	BEH C18

Analyte	CAS Number	LCS (ng/L)	LCS Spike	LCS % Rec	LCS Quals	LCSD (ng/L)	LCSD Spike	LCSD % Rec	RPD	LCSD Quals	%Rec Limits	RPD Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
PFBA	375-22-4	38.8	40.0	97.0		38.4	40.0	96.1	0.988		73-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFMBA	863090-89-5	39.8	40.0	99.4		38.8	40.0	96.9	2.55		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFPeA	2706-90-3	37.6	40.0	94.0		39.2	40.0	97.9	4.10		72-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFMPA	377-73-1	34.8	40.0	86.9		33.6	40.0	83.9	3.51		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFBS	375-73-5	40.6	40.0	102		35.5	40.0	88.8	13.4		72-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFEESA	113507-82-7	38.0	35.7	107		34.6	35.7	97.0	9.50		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
NFDHA	151772-58-6	38.9	40.0	97.2		38.9	40.0	97.1	0.126		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
4:2 FTS	757124-72-4	36.1	40.0	90.2		39.5	40.0	98.6	8.95		63-143	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHxA	307-24-4	40.3	40.0	101		40.1	40.0	100	0.511		72-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFPeS	2706-91-4	38.1	40.0	95.1		38.0	40.0	95.0	0.0914		71-127	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
HFPO-DA	13252-13-6	42.7	40.0	107		39.1	40.0	97.8	8.71		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHpA	375-85-9	37.7	40.0	94.1		38.7	40.0	96.7	2.68		72-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
ADONA	919005-14-4	37.7	40.0	94.1		39.4	40.0	98.5	4.51		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHxS	355-46-4	40.2	40.0	100		39.0	40.0	97.4	3.06		68-131	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
6:2 FTS	27619-97-2	41.4	40.0	103		38.6	40.0	96.5	6.95		64-140	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFOA	335-67-1	37.9	40.0	94.8		35.3	40.0	88.3	7.18		71-133	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFHpS	375-92-8	40.3	40.0	101		41.5	40.0	104	3.12		69-134	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFNA	375-95-1	40.3	40.0	101		39.3	40.0	98.3	2.34		69-130	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFOS	1763-23-1	38.2	40.0	95.5		40.9	40.0	102	6.78		65-140	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
9Cl-PF3ONS	756426-58-1	37.7	40.0	94.3		41.1	40.0	103	8.59		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFDA	335-76-2	42.4	40.0	106		37.5	40.0	93.7	12.3		71-129	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
8:2 FTS	39108-34-4	39.5	40.0	98.8		37.3	40.0	93.3	5.72		67-138	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
MeFOSAA	2355-31-9	39.7	40.0	99.2		39.5	40.0	98.7	0.560		65-136	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
EtFOSAA	2991-50-6	37.9	40.0	94.8		40.9	40.0	102	7.51		61-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFUnA	2058-94-8	39.2	40.0	98.1		38.6	40.0	96.4	1.69		69-133	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
11Cl-PF3OUdS	763051-92-9	41.2	40.0	103		40.5	40.0	101	1.78		65-135	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFDoA	307-55-1	38.2	40.0	95.4		38.8	40.0	97.0	1.66		72-134	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFTrDA	72629-94-8	39.6	40.0	99.0		38.8	40.0	96.9	2.11		65-144	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1
PFTeDA	376-06-7	43.3	40.0	108		40.2	40.0	100	7.53		71-132	30	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBA	IS	67.7		72.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-PFPeA	IS	83.2		87.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Sample ID: LCSD **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A158-BS1/B22A158-BSD1	Date Extracted:	31-Jan-22
Project:	2201641	QC Batch:	B22A158	Column:	BEH C18
Matrix:	Aqueous	Samp Size:	0.250/0.250 L		

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBS	IS	75.9		81.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-HFPO-DA	IS	84.2		94.7		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-4:2 FTS	IS	81.6		85.7		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFHxA	IS	79.8		84.6		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C4-PFHpA	IS	81.9		84.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C3-PFHxS	IS	81.7		84.8		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-6:2 FTS	IS	79.2		86.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C5-PFNA	IS	88.8		93.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFOA	IS	82.6		91.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C8-PFOS	IS	86.0		84.1		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFDA	IS	79.6		85.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-8:2 FTS	IS	90.6		95.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
d3-MeFOSAA	IS	71.3		76.3		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFUnA	IS	79.8		80.5		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
d5-EtFOSAA	IS	67.0		73.2		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFDoA	IS	74.3		78.9		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1
13C2-PFTeDA	IS	69.1		72.3		50 - 150	01-Feb-22 21:37	1	01-Feb-22 21:47	1

Sample ID: 2201641-02AD

PFs S Iuotope DilTtion Bable 5-1A

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-1
Matrix: Surface Water
Date Collected: 13-Jan-22 17:32

Laboratory Data

Lab Sample: 2201176-01
Date Received: 20-Jan-22 10:02
Column: BEH C18

s nalyte	Cs S NTmber	Conc. (ng/L)	DL	LOD	LOQ	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
PFBA	375-22-4	82.6	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFMBA	863090-89-5	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFPeA	2706-90-3	296	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFMPA	377-73-1	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFBS	375-73-5	46.3	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFEESA	113507-82-7	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
NFDHA	151772-58-6	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
4:2 FTS	757124-72-4	3.20	1.04	2.07	4.16	J, Q	B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFHxA	307-24-4	324	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFPeS	2706-91-4	51.6	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
HFPO-DA	13252-13-6	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFHpA	375-85-9	96.8	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
ADONA	919005-14-4	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFHxS	355-46-4	449	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
6:2 FTS	27619-97-2	395	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFOA	335-67-1	137	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFHpS	375-92-8	12.5	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFNA	375-95-1	12.4	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFOS	1763-23-1	643	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
9Cl-PF3ONS	756426-58-1	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFDA	335-76-2	2.09	1.04	2.07	4.16	J	B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
8:2 FTS	39108-34-4	4.82	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
MeFOSAA	2355-31-9	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
EtFOSAA	2991-50-6	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFUnA	2058-94-8	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
11Cl-PF3OUdS	763051-92-9	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFDoA	307-55-1	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFTrDA	72629-94-8	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
PFTeDA	376-06-7	ND	1.04	2.07	4.16		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1

Labeled Standardu	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
13C3-PFBA	IS	78.1	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C3-PFPeA	IS	85.7	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C3-PFBS	IS	74.8	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C3-HFPO-DA	IS	90.5	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-4:2 FTS	IS	75.6	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFHxA	IS	83.1	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C4-PFHpA	IS	82.2	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1

Sample ID: 2201641-02AD **PFs S Iuotope DilTtion Bable 5-1A**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SW-1
Matrix: Surface Water
Date Collected: 13-Jan-22 17:32

Laboratory Data

Lab Sample: 2201176-01
Date Received: 20-Jan-22 10:02
Column: BEH C18

Labeled Standardu	Bype	% Recovery	Limitu	QTalifieru	5atch	Extracted	Samp Size	s nalyzed	DilTtion
13C3-PFHxS	IS	81.4	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-6:2 FTS	IS	78.9	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C5-PFNA	IS	91.5	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFOA	IS	81.8	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C8-PFOS	IS	84.8	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFDA	IS	81.4	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-8:2 FTS	IS	87.1	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
d3-MeFOSAA	IS	83.2	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFUnA	IS	83.7	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
d5-EtFOSAA	IS	80.5	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFDoA	IS	77.4	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1
13C2-PFTeDA	IS	57.6	50 - 150		B22A158	31-Jan-22	0.241 L	02-Feb-22 00:30	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-03Lb **As b S Iuytype DilTtiyn Barle 5-1L**

Client Data

Name: - all HEniroEmeEtal v EalAtical LaboratorA
Project: 2201641
LocatioE: H8yipmeEt RiEfate
Matrix: v 8yeoyf
Date Collected: 145WaE522 03:2J

o ar yPatyPF Data

Lab Sample: 2201176511
Date Receined: 205WaE522 10:02
ColymE: uH- C1B

b nalFte	Cb S NTmr eP	Cync. (ng/o)	Do	o OD	o OQ	QTalifiePu	5 atch	ExtPacted	Samp Size	b nalFzed	DilTtiyn
PFu v	J7. 52254	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFMu v	B6J0305B35.	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFPev	270653051	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFMPv	J7757J51	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFu S	J7. 57J5.	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFHHSv	11J. 075B257	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
NFD- v	1. 17725. B56	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
4:2 FTS	7. 712457254	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PF- xv	J0752454	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFPeS	270653154	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
- FPO5Dv	1J2. 251J56	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PF- pv	J7. 5B. 53	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
v DONv	31300. 51454	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PF- xS	J. . 54654	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
6:2 FTS	2761353752	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFOv	JJ. 56751	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PF- pS	J7. 5325B	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFNv	J7. 53. 51	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFOS	176J52J51	2906	1901	2902	4904	W	u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
3Cl5PFJONS	7. 64265. B51	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFDv	JJ. 57652	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
B:2 FTS	J310B5J454	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
MeFOSv v	2J. . 5J153	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
HtFOSv v	23315. 056	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFUEv	20. B5345B	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
11Cl5PFJOUdS	76J0. 153253	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFDov	J075. . 51	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFTrDv	726235345B	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
PFTeDv	J7650657	ND	1901	2902	4904		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1

o ar eled StandaPdu	BFpe	% RecyvePF	o imitu	QTalifiePu	5 atch	ExtPacted	Samp Size	b nalFzed	DilTtiyn
1JCJ5PFu v	IS	B293	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JCJ5PFPev	IS	B690	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JCJ5PFu S	IS	B. 9	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JCJ5- FPO5Dv	IS	779B	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JC254:2 FTS	IS	779	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JC25PF- xv	IS	B29B	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1
1JC45PF- pv	IS	B496	. 0 5 1. 0		u 22v 1. B	J15WaE522	0924BL	025Feb522 00:41	1

Sample ID: 2201641-03Lb **As b S Iuytype DilTtiyn Bar le 5 -1L**

Client Data

Name: - all HEniroEmeEtal v EalAtical LaboratorA
Project: 2201641
LocatioE: H8yipmeEt RiEfate
Matrix: v 8yeoyf
Date Collected: 145WaE522 03:2J

o ar yPatyPF Data

Lab Sample: 220117651 1
Date Receined: 205WaE522 10:02
ColymE: u H- C1B

o ar eled StandaPdu	BFpe	% RecyvePF	o imitu	QTalifiePu	5 atch	ExtPacted	Samp Size	b nalFzed	DilTtiyn
1JCJ 5PF- xS	IS	B297	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC256:2 FTS	IS	7794	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC. 5PFNv	IS	3J93	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25PFOv	IS	B69I	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JCB5PFOS	IS	B696	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25PFDv	IS	B. 93	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25B:2 FTS	IS	B. 9B	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
dJ 5MeFOSv v	IS	B793	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25PFUEv	IS	B. 9B	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
d. 5HtFOSv v	IS	739	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25PFDov	IS	BJ92	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1
1JC25PFTeDv	IS	7B90	. 0 5 1. 0		u 22v 1. B	J 15WaE522	0924B L	025Feb522 00:41	1

DL 5DetectioE Limit
LOD 5Limit oQDetectioE
LOq 5Limit oQ8yaEtitatioE
Refyltf reported to t, e DL9
s , eE reportedhPF- xShPFOv hPFOShMeFOSv v aEd HtFOSv v iEclyde bot, liEear aEd braEc, ed ifomerf9 OElAt, e liEear ifomer if reported Qor all ot, er aEalAtef9

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Solid

Laboratory Data

Lab Sample: B22A186-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFMBA	863090-89-5	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFPeA	2706-90-3	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFMPA	377-73-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFBS	375-73-5	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFEESA	113507-82-7	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
NFDHA	151772-58-6	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
4:2 FTS	757124-72-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFHxA	307-24-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFPeS	2706-91-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
HFPO-DA	13252-13-6	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFHpA	375-85-9	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
ADONA	919005-14-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFHxS	355-46-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
6:2 FTS	27619-97-2	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFOA	335-67-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFHpS	375-92-8	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFNA	375-95-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFOS	1763-23-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
9Cl-PF3ONS	756426-58-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFDA	335-76-2	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
8:2 FTS	39108-34-4	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
MeFOSAA	2355-31-9	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
EtFOSAA	2991-50-6	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFUnA	2058-94-8	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
11Cl-PF3OUdS	763051-92-9	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFDoA	307-55-1	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFTrDA	72629-94-8	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
PFTeDA	376-06-7	ND	0.500	1.00	2.00		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	79.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C3-PFPeA	IS	82.5	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C3-PFBS	IS	78.4	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C3-HFPO-DA	IS	87.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-4:2 FTS	IS	88.2	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFHxA	IS	80.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C4-PFHpA	IS	82.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C3-PFHxS	IS	87.9	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1

Sample ID: Method Blank

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Solid

Laboratory Data

Lab Sample: B22A186-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	82.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C5-PFNA	IS	75.7	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFOA	IS	79.4	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C8-PFOS	IS	84.2	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFDA	IS	77.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-8:2 FTS	IS	78.4	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
d3-MeFOSAA	IS	53.7	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFUnA	IS	55.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
d5-EtFOSAA	IS	53.5	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFDoA	IS	54.5	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1
13C2-PFTeDA	IS	57.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:47	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

The results are reported in dry weight.
The sample size is reported in wet weight.
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Solid

Laboratory Data

Lab Sample: B22A186-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	10.3	10.0	103	71 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFMBA	863090-89-5	9.89	10.0	98.9	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFPeA	2706-90-3	10.4	10.0	104	69 - 132		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFMPA	377-73-1	10.3	10.0	103	65 - 135	Q	B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFBS	375-73-5	10.3	10.0	103	72 - 128		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFEESA	113507-82-7	9.77	8.92	110	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
NFDHA	151772-58-6	10.4	10.0	104	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
4:2 FTS	757124-72-4	9.91	10.0	99.1	62 - 145	Q	B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFHxA	307-24-4	10.3	10.0	103	70 - 132		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFPeS	2706-91-4	10.7	10.0	107	73 - 123		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
HFPO-DA	13252-13-6	10.6	10.0	106	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFHpA	375-85-9	10.5	10.0	105	71 - 131		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
ADONA	919005-14-4	10.3	10.0	103	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFHxS	355-46-4	10.1	10.0	101	67 - 130		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
6:2 FTS	27619-97-2	9.38	10.0	93.8	64 - 140		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFOA	335-67-1	10.2	10.0	102	69 - 133		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFHpS	375-92-8	10.9	10.0	109	70 - 132		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFNA	375-95-1	10.8	10.0	108	72 - 129		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFOS	1763-23-1	11.1	10.0	111	68 - 136		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
9Cl-PF3ONS	756426-58-1	10.6	10.0	106	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFDA	335-76-2	11.4	10.0	114	69 - 133		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
8:2 FTS	39108-34-4	10.8	10.0	108	65 - 137		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
MeFOSAA	2355-31-9	9.87	10.0	98.7	63 - 144		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
EtFOSAA	2991-50-6	11.5	10.0	115	61 - 139		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFUnA	2058-94-8	10.9	10.0	109	64 - 136		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
11Cl-PF3OUdS	763051-92-9	13.0	10.0	130	65 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFDoA	307-55-1	10.4	10.0	104	69 - 135		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFTrDA	72629-94-8	11.1	10.0	111	66 - 139		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
PFTeDA	376-06-7	10.7	10.0	107	69 - 133		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	80.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C3-PFPeA	IS	83.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C3-PFBS	IS	81.9	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C3-HFPO-DA	IS	79.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-4:2 FTS	IS	90.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1

Sample ID: OPR

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Matrix: Solid

Laboratory Data

Lab Sample: B22A186-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	IS	78.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C4-PFHpA	IS	80.9	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C3-PFHxS	IS	85.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-6:2 FTS	IS	83.9	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C5-PFNA	IS	73.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-PFOA	IS	77.5	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C8-PFOS	IS	84.0	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-PFDA	IS	65.3	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-8:2 FTS	IS	75.7	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
d3-MeFOSAA	IS	57.9	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-PFUnA	IS	57.6	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
d5-EtFOSAA	IS	53.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-PFDoA	IS	58.1	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1
13C2-PFTeDA	IS	55.4	50 - 150		B22A186	01-Feb-22	1.00 g	04-Feb-22 22:57	1

Sample ID: 2201641-026A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-8
Matrix: Soil
Date Collected: 11-Jan-22 11:03

Laboratory Data

Lab Sample: 2201176-02
Date Received: 20-Jan-22 10:02
% Solids: 34.1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	187	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFMBA	863090-89-5	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFPeA	2706-90-3	312	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFMPA	377-73-1	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFBS	375-73-5	12.6	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFEESA	113507-82-7	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
NFDHA	151772-58-6	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
4:2 FTS	757124-72-4	7.59	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFHxA	307-24-4	1530	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
PFPeS	2706-91-4	17.2	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
HFPO-DA	13252-13-6	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFHpA	375-85-9	160	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
ADONA	919005-14-4	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFHxS	355-46-4	1010	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
6:2 FTS	27619-97-2	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFOA	335-67-1	1050	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
PFHpS	375-92-8	212	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFNA	375-95-1	242	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFOS	1763-23-1	109000	150	299	598	D	B22A186	01-Feb-22	2.94 g	09-Feb-22 16:50	300
9Cl-PF3ONS	756426-58-1	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFDA	335-76-2	1490	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
8:2 FTS	39108-34-4	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
MeFOSAA	2355-31-9	88.4	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
EtFOSAA	2991-50-6	156	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFUnA	2058-94-8	1270	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
11Cl-PF3OUdS	763051-92-9	ND	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFDoA	307-55-1	1310	2.49	4.98	9.97	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
PFTrDA	72629-94-8	164	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
PFTeDA	376-06-7	421	0.498	0.997	1.99		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	79.3	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C3-PFPeA	IS	79.1	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C3-PFBS	IS	76.1	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C3-HFPO-DA	IS	72.5	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C2-4:2 FTS	IS	77.2	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C2-PFHxA	IS	101	50 - 150	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
13C4-PFHpA	IS	70.7	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1

Sample ID: 2201641-026A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-8
Matrix: Soil
Date Collected: 11-Jan-22 11:03

Laboratory Data

Lab Sample: 2201176-02
Date Received: 20-Jan-22 10:02
% Solids: 34.1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFHxS	IS	98.0	50 - 150	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
13C2-6:2 FTS	IS	86.5	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C5-PFNA	IS	19.9	50 - 150	H	B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C2-PFOA	IS	88.0	50 - 150	D	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
13C8-PFOS	IS	78.5	50 - 150	D	B22A186	01-Feb-22	2.94 g	09-Feb-22 16:50	300
13C2-PFDA	IS	19.5	50 - 150	D, H	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
13C2-8:2 FTS	IS	121	50 - 150		B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
d3-MeFOSAA	IS	4.20	50 - 150	H	B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C2-PFUnA	IS	11.5	50 - 150	D, H	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
d5-EtFOSAA	IS	5.30	50 - 150	H	B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1
13C2-PFDoA	IS	12.0	50 - 150	D, H	B22A186	01-Feb-22	2.94 g	07-Feb-22 18:59	5
13C2-PFTeDA	IS	2.90	50 - 150	H	B22A186	01-Feb-22	2.94 g	04-Feb-22 23:28	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

The results are reported in dry weight.
The sample size is reported in wet weight.
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-027L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-4
Matrix: Soil
Date Collected: 1%Rav-22 16:%0

baoryatryP Data

Lab Sample: 2201176-0%
Date FeceiAed: 20-Rav-22 10:02
s SolidH 71.u
ColBmv: 8nE C1J

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
P98y	%7u-22-4	%J.u	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9M8y	J6%0g0-Jg-u	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Pey	2706-g0-%	122	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9MPy	%77-7%1	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P98S	%7u-7%u	14.g	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9nnSy	11%u07-J2-7	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
N9DEy	1u1772-uJ-6	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
4:2 9TS	7u7124-72-4	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Exy	%07-24-4	44.g	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9PeS	2706-g1-4	4.6%	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
E9PO-Dy	1%2u2-1%6	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Epy	%7u-Ju-g	4.2u	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
y DONy	g1g00u-14-4	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9ExS	%uu-46-4	74.J	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
6:2 9TS	2761g-g7-2	1u.1	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Oy	%%u-67-1	J.6%	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9EpS	%7u-g2-J	6.0g	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Ny	%7u-gu-1	11.4	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9OS	176%2%1	%6u	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
gCl-P9%6NS	7u6426-uJ-1	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Dy	%%u-76-2	1.%0	0.4gg	0.ggg	2.00	R	822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
J:2 9TS	%g10J-%4-4	2.1g	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
Me9OSy y	2%uu-%1-g	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
nt9OSy y	2gg1-u0-6	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Uvy	20uJ-g4-J	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
11Cl-P9%6OUdS	76%0u1-g2-g	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9Doy	%07-uu-1	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9TrDy	7262g-g4-J	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
P9TeDy	%76-06-7	ND	0.4gg	0.ggg	2.00		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1%C%P98y	IS	J2.6	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C%P9Pey	IS	J0.4	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C%P98S	IS	Ju.0	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C%E9PO-Dy	IS	J2.7	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-4:2 9TS	IS	g4.g	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9Exy	IS	76.%	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C4-P9Epy	IS	J2.J	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1

Sample ID: 2201641-027L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name:	Eall n vAirovmevtal y val3tical Laborator3	Matrix:	Soil
Project:	2201641	Date Collected:	1%Rav-22 16:%0
Locatiov:	SnD-4		

baoryatryP Data

Lab Sample:	2201176-0%	ColBmv:	8nE C1J
Date FeceiAed:	20-Rav-22 10:02		
s SolidH	71.u		

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1%C%P9ExS	IS	JJ.7	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-6:2 9TS	IS	J2.4	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%Cu-P9Ny	IS	72.1	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9Oy	IS	7g.6	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%CJ-P9OS	IS	J4.u	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9Dy	IS	6J.2	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-J:2 9TS	IS	J%1	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
d%Me9OSy y	IS	7%2	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9Uvy	IS	74.g	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
du-nt9OSy y	IS	6g.0	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9Doy	IS	u2.J	u0 - 1u0		822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1
1%C2-P9TeDy	IS	26.0	u0 - 1u0	E	822y1J6	01-9eb-22	1.40 5	04-9eb-22 2%%J	1

DL - Detectiov Limit

LOD - Limit of Detectiov

LOQ - Limit of qBavtitatiov

T, e reHBltHare reported iv dr3 h ei5, t.

T, e Hample Hwe iHreported iv h et h ei5, t.

FeHBltHreported to t, e DL.

z , ev reportedWP9ExSWP9Oy WP9OSWMe9OSy y avd nt9OSy y ivclBde bot, livear avd bravc, ed iHomerH Ovl3 t, e livear iHomer iHreported for all ot, er aval3teH

Sample ID: 2201641-028A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-R
Matrix: Soil
Date Collected: 18-Jan-22 16:R0

Laboratory Data

Lab Sample: 2201176-04
Date F eceived: 20-Jan-22 10:02
% Solids: 763
Column: BEH C1.

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
P9BA	87R-22-4	43R	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9MBA	. 680g0-. g-R	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9PeA	2706-g0-8	1738	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9MPA	877-78-1	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9BS	87R-78-R	23R2	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9EESA	118R07-. 2-7	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
N9DHA	1R1772-R. -6	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
4:2 9TS	7R7124-72-4	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9HxA	807-24-4	283g	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9PeS	2706-g1-4	23Rg	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
H9PO-DA	182R2-18-6	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9HpA	87R-. R-g	83g6	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
ADONA	g1g00R-14-4	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9HxS	8RR-46-4	2R8	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
6:2 9TS	2761g-g7-2	663R	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9OA	88R-67-1	883	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9HpS	87R-g2-.	103R	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9NA	87R-gR-1	173R	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9OS	1768-28-1	7gg	23R0	R301	1030	D	B22A1. 6	01-9eb-22	1380 5	07-9eb-22 1g:40	R
gCl-P98ONS	7R6426-R. -1	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9DA	88R-76-2	8304	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
. :2 9TS	8g10. -84-4	63R6	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
Me9OSAA	28RR-81-g	134.	03R01	1300	2300	J	B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
Et9OSAA	2gg1-R0-6	03R. 8	03R01	1300	2300	J	B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9UnA	20R. -g4-.	1327	03R01	1300	2300	J	B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
11Cl-P98OUdS	7680R1-g2-g	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9DoA	807-RR-1	03RR.	03R01	1300	2300	J	B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9TrDA	7262g-g4-.	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
P9TeDA	876-06-7	ND	03R01	1300	2300		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
18C8-P9BA	IS	. 834	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C8-P9PeA	IS	. 232	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C8-P9BS	IS	. 137	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C8-H9PO-DA	IS	. 638	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-4:2 9TS	IS	. 636	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-P9HxA	IS	7g31	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C4-P9HpA	IS	. 138	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1

Sample ID: 2201641-028A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-R
Matrix: Soil
Date Collected: 18-Jan-22 16:R0

Laboratory Data

Lab Sample: 2201176-04
Date F eceived: 20-Jan-22 10:02
% Solids: 763
Column: BEH C1.

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
18C8-P9HxS	IS	. R31	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-6:2 9TS	IS	. 238	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18CR-P9NA	IS	6. 3R	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-P9OA	IS	7g3R	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C. -P9OS	IS	g430	R0 - 1R0	D	B22A1. 6	01-9eb-22	1380 5	07-9eb-22 1g:40	R
18C2-P9DA	IS	7032	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-. :2 9TS	IS	7434	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
d8-Me9OSAA	IS	7438	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-P9UnA	IS	7R36	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
dR-Et9OSAA	IS	663	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-P9DoA	IS	R437	R0 - 1R0		B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1
18C2-P9TeDA	IS	283	R0 - 1R0	H	B22A1. 6	01-9eb-22	1380 5	04-9eb-22 28:4g	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

T, e results are reported in dry h ei5, t3
T, e sample sive is reported in h et h ei5, t3
F esults reported to t, e DL3

z , en reportedWP9HxSWP9OAWP9OSWMe9OSAA and Et9OSAA include bot, linear and branc, ed isomers3 Only t, e linear isomer is reported for all ot, er analytes3

Sample ID: 2201641-028A **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A186-MS1/B22A186-MSD1	Source Lab Sample:	2201176-04
Project:	2201641	QC Batch:	B22A186	Date Extracted:	01-Feb-22
Matrix:	Solid	Samp Size:	1.31/1.32 g	Column:	BEH C18

Analyte	CAS Number	Sample (ng/g)	MS (ng/g)	MS Spike	MS % Rec	MS Quals	MSD (ng/g)	MSD Spike	MSD % Rec	RPD	MSD Quals	%Rec Limits	RPD Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
PFBA	375-22-4	4.58	15.3	9.94	107		14.9	9.87	105	1.89		71-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFMBA	863090-89-5	ND	10.3	9.94	103		10.5	9.87	107	3.81		65-135	50	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFPeA	2706-90-3	17.3	27.3	9.94	101		27.8	9.87	107	5.77		69-132	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFMPA	377-73-1	ND	10.5	9.94	106	Q	10.5	9.87	107	0.939	Q	65-135	50	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFBS	375-73-5	2.52	12.8	9.94	103		13.1	9.87	108	4.74		72-128	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFEESA	113507-82-7	ND	9.97	8.87	112		9.44	8.80	107	4.57		65-135	50	04-Feb-22 23:08	1	04-Feb-22 23:18	1
NFDHA	151772-58-6	ND	10.5	9.94	105		10.7	9.87	108	2.82		65-135	50	04-Feb-22 23:08	1	04-Feb-22 23:18	1
4:2 FTS	757124-72-4	ND	10.2	9.94	103		10.3	9.87	104	0.966		62-145	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFHxA	307-24-4	23.9	34.3	9.94	104		32.7	9.87	89.5	15		70-132	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFPeS	2706-91-4	2.59	13.2	9.94	107		12.5	9.87	100	6.76		73-123	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
HFPO-DA	13252-13-6	ND	11.2	9.94	112		11.4	9.87	116	3.51	Q	65-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFHpA	375-85-9	3.96	14.5	9.94	106		13.8	9.87	99.4	6.43		71-131	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
ADONA	919005-14-4	ND	10.1	9.94	102		10.2	9.87	103	0.976		65-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFHxS	355-46-4	253	243	9.94	-94.0	H	247	9.87	-56.9	49.2	H	67-130	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
6:2 FTS	27619-97-2	66.5	70.5	9.94	40.5	H	75.3	9.87	89.1	75	H	64-140	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFOA	335-67-1	33.8	42.3	9.94	85.2		41.4	9.87	77.4	9.59		69-133	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFHpS	375-92-8	10.5	23.1	9.94	126		22.5	9.87	122	3.23		70-132	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFNA	375-95-1	17.5	27.5	9.94	99.9		27.1	9.87	97.1	2.84		72-129	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFOS	1763-23-1	799	769	9.94	-302	D, H	808	9.87	86.7	361	D, H	68-136	30	07-Feb-22 18:18	5	07-Feb-22 18:28	5
9Cl-PF3ONS	756426-58-1	ND	12.6	9.94	127		11.7	9.87	119	6.5		65-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFDA	335-76-2	3.04	14.2	9.94	113		14.0	9.87	111	1.79		69-133	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
8:2 FTS	39108-34-4	6.56	15.8	9.94	93.4		16.2	9.87	97.3	4.09		65-137	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
MeFOSAA	2355-31-9	1.48	10.5	9.94	90.2		11.8	9.87	105	15.2		63-144	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
EtFOSAA	2991-50-6	0.583	11.1	9.94	106		11.3	9.87	109	2.79		61-139	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFUnA	2058-94-8	1.27	13.2	9.94	120		11.4	9.87	103	15.2		64-136	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
11Cl-PF3OUdS	763051-92-9	ND	12.5	9.94	126		12.1	9.87	123	2.41		65-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFDoA	307-55-1	0.558	11.5	9.94	110		10.8	9.87	104	5.61		69-135	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFTrDA	72629-94-8	ND	6.95	9.94	69.9		6.07	9.87	61.5	12.8	H	66-139	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1
PFTeDA	376-06-7	ND	10.7	9.94	107		10.3	9.87	103	3.81		69-133	30	04-Feb-22 23:08	1	04-Feb-22 23:18	1

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBA	IS	76.3		84.1		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C3-PFPeA	IS	77.3		84.5		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1

Sample ID: 2201641-028A **PFAS Isotope Dilution Table B-15**

Name:	Hall Environmental Analytical Laboratory	Lab Sample:	B22A186-MS1/B22A186-MSD1	Source Lab Sample:	2201176-04
Project:	2201641	QC Batch:	B22A186	Date Extracted:	01-Feb-22
Matrix:	Solid	Samp Size:	1.31/1.32 g	Column:	BEH C18

Labeled Standards	Type	MS % Rec	MS Quals	MSD % Rec	MSD Quals	Limits	MS Analyzed	MS Dil	MSD Analyzed	MSD Dil
13C3-PFBS	IS	76.4		83.3		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C3-HFPO-DA	IS	69.8		77.6		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-4:2 FTS	IS	80.9		86.8		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-PFHxA	IS	73.7		81.2		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C4-PFHpA	IS	77.3		83.8		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C3-PFHxS	IS	76.6		82.4		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-6:2 FTS	IS	74.8		77.2		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C5-PFNA	IS	63.2		66.3		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-PFOA	IS	75.0		78.5		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C8-PFOS	IS	115	D	111	D	50 - 150	07-Feb-22 18:18	5	07-Feb-22 18:28	5
13C2-PFDA	IS	68.7		73.3		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-8:2 FTS	IS	71.6		78.5		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
d3-MeFOSAA	IS	73.4		66.5		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-PFUnA	IS	66.3		73.6		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
d5-EtFOSAA	IS	62.5		62.5		50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-PFDoA	IS	49.7	H	49.0	H	50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1
13C2-PFTeDA	IS	26.0	H	22.8	H	50 - 150	04-Feb-22 23:08	1	04-Feb-22 23:18	1

Sample ID: 2201641-029A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-%DBp
Matrix: Soil
Date Collected: 1R-Fav-22 16:%0

Laboratory Data

Lab Sample: 2201176-0%
Date 9 eceiAed: 20-Fav-22 10:02
s SolidH 77.u
ColBmv: 8nE C1J

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Pg8 y	R7%22-4	4.R%	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgM8 y	J6R0u0-Ju-%	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgPey	2706-u0-R	1%1	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgMPy	R77-7R-1	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
Pg8 S	R7%7R-%	2.J%	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgnnSy	11R%07-J2-7	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
NgDEy	1%1772-%1-6	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
4:2 gTS	7%7124-72-4	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgExy	R07-24-4	21.7	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgPeS	2706-u1-4	2.%1	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
EgPO-Dy	1R2%2-1R-6	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgEpy	R7%J%u	R.72	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
y DONy	u1u00%14-4	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgExS	R%%46-4	12u	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
6:2 gTS	2761u-u7-2	R7.7	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgOy	RR%67-1	17.6	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgEpS	R7%u2-J	J.1u	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgNy	R7%u%1	16.2	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgOS	176R-2R-1	10J0	2.4%	4.u0	u.J0	D	822y1J6	01-geb-22	1.Rl 5	07-geb-22 1u:%0	%
uCl-PgRONS	7%6426-%1-1	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgDy	RR%76-2	%Ru	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
J:2 gTS	Ru10J-R4-4	11.6	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
MegOSy y	2R%%R1-u	1.u%	0.4u0	0.uJ0	1.u6	F	822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
ntgOSy y	2uu1-%0-6	1.00	0.4u0	0.uJ0	1.u6	F	822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgUvy	20%1-u4-J	2.70	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
11Cl-PgROUdS	76R0%1-u2-u	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgDoy	R07-%%1	0.u%1	0.4u0	0.uJ0	1.u6	F	822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgTrDy	7262u-u4-J	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
PgTeDy	R76-06-7	ND	0.4u0	0.uJ0	1.u6		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCR-Pg8 y	IS	77.7	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RCR-PgPey	IS	77.J	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RCR-Pg8 S	IS	71.7	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RCR-EgPO-Dy	IS	J2.4	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RC2-4:2 gTS	IS	J0.J	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RC2-PgExy	IS	7R.J	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1
1RC4-PgEpy	IS	76.J	%0 - 1%0		822y1J6	01-geb-22	1.Rl 5	04-geb-22 2R:%u	1

Sample ID: 2201641-029A **PFAS Isotope Dilution Table B-15**

Client Data

Name: E all n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: Sn D-%DBp
Matrix: Soil
Date Collected: 1R-Fav-22 16:%0

Laboratory Data

Lab Sample: 2201176-0%
Date 9 eceiAed: 20-Fav-22 10:02
s SolidH 77.u
ColBmv: 8 n E C1J

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1RCR-PgE xS	IS	77.%	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-6:2 gTS	IS	7R.6	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC%PgNy	IS	67.4	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-PgOy	IS	77.4	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RCJ-PgOS	IS	10R	%0 - 1%0	D	8 22y 1J 6	01-geb-22	1.R1 5	07-geb-22 1u:%0	%
1RC2-PgDy	IS	64.2	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-J:2 gTS	IS	70.4	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
dR-MegOSy y	IS	6R.%	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-PgUvy	IS	6%%	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
d%ntgOSy y	IS	62.%	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-PgDoy	IS	64.1	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1
1RC2-PgTeDy	IS	6R.2	%0 - 1%0		8 22y 1J 6	01-geb-22	1.R1 5	04-geb-22 2R:%u	1

DL - Detectiov Limit
LOD - Limit of Detectiov
LOQ - Limit of qBavtitatiov

T, e reHBltHare reported iv dr3 h ei5, t.
T, e Hample Hwe iHreported iv h et h ei5, t.
9 eHBltHreported to t, e DL.

z , ev reportedWPgE xSWPgOy WPgOSWMegOSy y avd ntgOSy y ivclBde bot, livear avd bravc, ed iHomerH Ovl3 t, e livear iHomer iHreported for all ot, er aval3teH

Sample ID: 2201641-030L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-11
Matrix: Soil
Date Collected: 1J-Ran-22 17:0F

baoryatryP Data

Lab Sample: 2201176-06
Date 9 eceived: 20-Ran-22 10:02
% Solids: 36.4
Column: BEH C18

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
PgBA	J73-22-4	17.7	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgMBA	86J0F0-8F-3	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgPeA	2706-F0-J	101	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgMPA	J77-7J-1	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgBS	J73-7J-3	1J.8	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgEESA	11J307-82-7	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
NgDHA	131772-38-6	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
4:2 gTS	737124-72-4	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgHxA	J07-24-4	118	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgPeS	2706-F1-4	28.J	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
HgPO-DA	1J232-1J-6	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgHpA	J73-83-F	31.J	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
ADONA	F1F003-14-4	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgHxS	J33-46-4	461	10.0	20.0	40.1	D	B22A186	01-geb-22	1.77 5	07-geb-22 20:00	20
6:2 gTS	2761F-F7-2	14.J	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgOA	JJ3-67-1	J8.2	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgHpS	J73-F2-8	J3.6	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgNA	J73-F3-1	J4.7	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgOS	176J-2J-1	JJ70	10.0	20.0	40.1	D	B22A186	01-geb-22	1.77 5	07-geb-22 20:00	20
FCl-PgJONS	736426-38-1	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgDA	JJ3-76-2	F.J8	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
8:2 gTS	JF108-J4-4	1.64	0.301	1.00	2.00	R	B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
MegOSAA	2J33-J1-F	1.11	0.301	1.00	2.00	R	B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
EtgOSAA	2FF1-30-6	1.83	0.301	1.00	2.00	R	B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgUnA	2038-F4-8	2.18	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
11Cl-PgJOUdS	76J031-F2-F	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgDoA	J07-33-1	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgTrDA	7262F-F4-8	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
PgTeDA	J76-06-7	ND	0.301	1.00	2.00		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1JCJ-PgBA	IS	77.7	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JCJ-PgPeA	IS	73.8	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JCJ-PgBS	IS	71.6	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JCJ-HgPO-DA	IS	71.J	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-4:2 gTS	IS	86.8	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-PgHxA	IS	71.J	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC4-PgHpA	IS	71.8	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1

Sample ID: 2201641-030L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-11
Matrix: Soil
Date Collected: 1J-Ran-22 17:0F

baoryatryP Data

Lab Sample: 2201176-06
Date 9eceived: 20-Ran-22 10:02
% Solids: 36.4
Column: BEH C18

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1JCJ-PgHxS	IS	186	30 - 130	D, H	B22A186	01-geb-22	1.77 5	07-geb-22 20:00	20
1JC2-6:2 gTS	IS	74.4	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC3-PgNA	IS	60.6	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-PgOA	IS	74.1	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC8-PgOS	IS	142	30 - 130	D	B22A186	01-geb-22	1.77 5	07-geb-22 20:00	20
1JC2-PgDA	IS	6J.6	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-8:2 gTS	IS	7J.8	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
dJ-MegOSAA	IS	36.7	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-PgUnA	IS	61.0	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
d3-EtgOSAA	IS	33.F	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-PgDoA	IS	38.2	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1
1JC2-PgTeDA	IS	37.3	30 - 130		B22A186	01-geb-22	1.77 5	03-geb-22 00:0F	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

The results are reported in dry wei5ht.
The sample size is reported in wet wei5ht.
9esults reported to the DL.

When reported, PgHxS, PgOA, PgOS, MegOSAA and EtgOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: 2201641-031L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-10
Matrix: Soil
Date Collected: 14-8an-22 0B:04

baoryatryP Data

Lab Sample: 2201176-07
Date J eceived: 20-8an-22 10:02
% Solids: 643l
Col. mn: u EH C1B

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
PRu A	97F-22-4	9342	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRMu A	B690g0-Bg-F	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRPeA	2706-g0-9	2430	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRMPA	977-79-1	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRu S	97F-79-F	130g	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PREESA	119F07-B2-7	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
NRDHA	1F1772-FB-6	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
4:2 RTS	7F7124-72-4	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRHxA	907-24-4	2031	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRPeS	2706-g1-4	1309	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
HRPO-DA	192F2-19-6	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRHpA	97F-BF-g	1239	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
ADONA	g1g00F-14-4	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRHxS	9FF-46-4	123B	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
6:2 RTS	2761g-g7-2	13F2	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PROA	99F-67-1	13F9	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRHpS	97F-g2-B	03F2g	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRNA	97F-gF-1	036F6	03F00	1300	2300	8	u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PROS	1769-29-1	4g30	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
gCl-PR9ONS	7F6426-FB-1	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRDA	99F-76-2	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
B:2 RTS	9g10B-94-4	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
MeROSAA	29FF-91-g	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
EtROSAA	2gg1-F0-6	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRUnA	20FB-g4-B	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
11Cl-PR9OUdS	7690F1-g2-g	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRDoA	907-FF-1	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRTrDA	7262g-g4-B	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
PRTeDA	976-06-7	ND	03F00	1300	2300		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
19C9-PRu A	IS	B13B	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C9-PRPeA	IS	B236	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C9-PRu S	IS	B630	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C9-HRPO-DA	IS	7636	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-4:2 RTS	IS	B93B	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PRHxA	IS	B03B	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C4-PRHpA	IS	B939	F0 - 1F0		u 22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1

Sample ID: 2201641-031L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-10
Matrix: Soil
Date Collected: 14-8an-22 0B:04

baoryatryP Data

Lab Sample: 2201176-07
Date J eceived: 20-8an-22 10:02
% Solids: 643l
Col. mn: u EH C1B

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
19C9-PRHxS	IS	B237	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-6:2 RTS	IS	BB32	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19CF-PRNA	IS	7037	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PROA	IS	B131	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19CB-PROS	IS	BF34	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PRDA	IS	6B3B	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-B:2 RTS	IS	B932	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
d9-MeROSAA	IS	6430	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PRUnA	IS	643g	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
dF-EtROSAA	IS	6034	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PRDoA	IS	6032	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1
19C2-PRTeDA	IS	F23g	F0 - 1F0		u22A1B6	01-Reb-22	13F6 5	0F-Reb-22 00:1g	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of q. antitation

T, e res. lts are reported in dry h ei5, t3
T, e sample sive is reported in h et h ei5, t3
J es. lts reported to t, e DL3

z , en reportedWPRHxSWPROAWPROSWMeROSAA and EtROSAA incl. de bot, linear and branc, ed isomers3 Only t, e linear isomer is reported for all ot, er analytes3

Sample ID: 2201641-032L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-F
Matrix: Soil
Date Collected: 14-8av-22 0%2J

baoryatryP Data

Lab Sample: 2201176-0%
Date ReceiAed: 20-8av-22 10:02
s SolidH 64.2
Columv: BnE C1%

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
P9By	g7J-22-4	g.6F	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9MBy	%6g0F0-%F-J	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Pey	2706-F0-g	g0.J	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9MPy	g77-7g-1	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9BS	g7J-7g-J	1.24	0.4Fg	0.F%6	1.F7	8	B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9nnSy	11gJ07-%2-7	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
N9DEy	1J1772-J%6	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
4:2 9TS	7J7124-72-4	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Exy	g07-24-4	1%6	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9PeS	2706-F1-4	1.10	0.4Fg	0.F%6	1.F7	8	B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
E9PO-Dy	1g2J2-1g-6	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Epy	g7J-%J-F	7.JF	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
y DONy	F1F00J-14-4	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9ExS	gJJ-46-4	1g.0	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
6:2 9TS	2761F-F7-2	6.01	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Oy	ggJ-67-1	1.J4	0.4Fg	0.F%6	1.F7	8	B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9EpS	g7J-F2-%	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Ny	g7J-FJ-1	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9OS	176g-2g-1	4%2	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
FCl-P9gONS	7J6426-J%1	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Dy	ggJ-76-2	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
%2 9TS	gF10%g4-4	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
Me9OSy y	2gJJ-g1-F	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
nt9OSy y	2FF1-J0-6	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Uvy	20J%F4-%	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
11Cl-P9gOUdS	76g0J1-F2-F	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9Doy	g07-JJ-1	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9TrDy	7262F-F4-%	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
P9TeDy	g76-06-7	ND	0.4Fg	0.F%6	1.F7		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1gCg-P9By	IS	%1.4	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gCg-P9Pey	IS	%0.F	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gCg-P9BS	IS	%2.7	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gCg-E9PO-Dy	IS	%F.%	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-4:2 9TS	IS	%g.7	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9Exy	IS	77.0	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC4-P9Epy	IS	%1.0	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1

Sample ID: 2201641-032L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-F
Matrix: Soil
Date Collected: 14-8av-22 0%2J

baoryatryP Data

Lab Sample: 2201176-0%
Date ReceiAed: 20-8av-22 10:02
s SolidH 64.2
Columv: BnE C1%

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1gCg-P9ExS	IS	%2.1	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-6:2 9TS	IS	%0.g	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gCJ-P9Ny	IS	6F.%	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9Oy	IS	77.4	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC%P9OS	IS	%2.1	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9Dy	IS	67.%	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-%2 9TS	IS	76.7	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
dg-Me9OSy y	IS	62.1	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9Uvy	IS	67.g	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
dJ-nt9OSy y	IS	J4.2	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9Doy	IS	J7.%	J0 - 1J0		B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1
1gC2-P9TeDy	IS	40.0	J0 - 1J0	E	B22y 1%6	01-9eb-22	1.J%5	0J-9eb-22 01:00	1

DL - Detectiov Limit
LOD - Limit of Detectiov
LOQ - Limit of quavtitatiov

T, e reHultHare reported iv dr3 h ei5, t.
T, e Himple Hive iHreported iv h et h ei5, t.
ReHultHreported to t, e DL.

z , ev reportedWP9ExSWP9Oy WP9OSWMe9OSy y avd nt9OSy y ivclude bot, livear avd bravc, ed iHomerH Ovl3 t, e livear iHomer iHreported for all ot, er aval3teH

Sample ID: 2201641-033L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-1
Matrix: Soil
Date Collected: 14-Rav-22 0J:4J

baoryatryP Data

Lab Sample: 2201176-0%
Date FeceiAed: 20-Rav-22 10:02
s SolidH . 4u7
ColBmv: 8nE C1J

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
P98y	57. -22-4	4u2%	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9M8y	J650%0-J%.	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Pey	2706-%0-5	15u2	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9MPy	577-75-1	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P98S	57. -75-.	4u6.	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9nnSy	115. 07-J2-7	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
N9DEy	1. 1772-. J-6	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
4:2 9TS	7. 7124-72-4	0u6J7	0u4J6	0u772	1u74	R	822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Exy	507-24-4	25u2	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9PeS	2706-%1-4	.u40	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
E9PO-Dy	152. 2-15-6	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Epy	57. -J. -%	5u42	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
y DONy	%1%00. -14-4	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9ExS	5. . -46-4	42u2	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
6:2 9TS	2761%%7-2	%0ul	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Oy	55. -67-1	14u2	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9EpS	57. -%2-J	2u20	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Ny	57. -%-1	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9OS	1765-25-1	156	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
%Cl-P95ONS	7. 6426-. J-1	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Dy	55. -76-2	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
J:2 9TS	5%10J-54-4	2u72	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
Me9OSy y	25. . -51-%	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
nt9OSy y	2%1-. 0-6	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Uvy	20. J-%4-J	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
11Cl-P95OUdS	7650. 1-%2-%	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9Doy	507-. . -1	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9TrDy	7262%%4-J	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
P9TeDy	576-06-7	ND	0u4J6	0u772	1u74		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
15C5-P98y	IS	J5u4	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C5-P9Pey	IS	J5ul	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C5-P98S	IS	J2u5	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C5-E9PO-Dy	IS	%4u%	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C2-4:2 9TS	IS	%0u%	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C2-P9Exy	IS	J0u6	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1
15C4-P9Epy	IS	J2u5	.0 - 1.0		822y1J6	01-9eb-22	1uJJg	0. -9eb-22 01:10	1

Sample ID: 2201641-033L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-1
Matrix: Soil
Date Collected: 14-Rav-22 0J:4J

baoryatryP Data

Lab Sample: 2201176-0%
Date FeceiAed: 20-Rav-22 10:02
s SolidH . 4u7
ColBmv: 8nE C1J

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
15C5-P9ExS	IS	J7u7	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-6:2 9TS	IS	7%u4	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C. -P9Ny	IS	7. u0	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-P9Oy	IS	7%u5	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15CJ-P9OS	IS	JJu4	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-P9Dy	IS	67u4	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-J:2 9TS	IS	J0ul	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
d5-Me9OSy y	IS	. Ju0	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-P9Uvy	IS	6Juf	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
d. -nt9OSy y	IS	. %u6	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-P9Doy	IS	66u	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1
15C2-P9TeDy	IS	. 6u%	. 0 - 1. 0		822y1J6	01-9eb-22	1uJJ g	0. -9eb-22 01:10	1

DL - Detectiov Limit
LOD - Limit of Detectiov
LOQ - Limit of qBavtitatiov

T, e reHBltHare reported iv dr3 h eig, tu
T, e Hample Hwe iHreported iv h et h eig, tu
FeHBltHreported to t, e DLu

z , ev reportedWP9ExSWP9Oy WP9OSWMe9OSy y avd nt9OSy y ivclBde bot, livear avd bravc, ed iHomerHu Ovl3 t, e livear iHomer iHreported for all ot, er aval3teHu

Sample ID: 2201641-034L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-2
Matrix: Soil
Date Collected: 14-Jan-22 0R:00

baoryatryP Data

Lab Sample: 2201176-10
Date Feceived: 20-Jan-22 10:02
% Solids: 33.6
Column: BEH C18

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
P9BA	573-22-4	2.74	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9MBA	8650R0-8R-3	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9PeA	2706-R0-5	8.05	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9MPA	577-75-1	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9BS	573-75-3	2.R4	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9EESA	115307-82-7	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
N9DHA	131772-38-6	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
4:2 9TS	737124-72-4	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9HxA	507-24-4	16.2	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9PeS	2706-R1-4	5.54	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
H9PO-DA	15232-15-6	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9HpA	573-83-R	2.52	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
ADONA	R1R003-14-4	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9HxS	533-46-4	53.1	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
6:2 9TS	2761R-R7-2	12R	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9OA	553-67-1	12.6	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9HpS	573-R2-8	6.26	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9NA	573-R3-1	0.302	0.300	1.00	2.00	J	B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9OS	1765-25-1	387	2.30	3.00	10.0	D	B22A186	01-9eb-22	1.80 g	07-9eb-22 20:20	3
RCl-P95ONS	736426-38-1	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9DA	553-76-2	0.845	0.300	1.00	2.00	J	B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
8:2 9TS	5R108-54-4	17.1	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
Me9OSAA	2533-51-R	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
Et9OSAA	2RR1-30-6	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9UnA	2038-R4-8	0.670	0.300	1.00	2.00	J	B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
11Cl-P95OUdS	765031-R2-R	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9DoA	507-33-1	0.853	0.300	1.00	2.00	J	B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9TrDA	7262R-R4-8	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
P9TeDA	576-06-7	ND	0.300	1.00	2.00		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
15C5-P9BA	IS	78.R	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C5-P9PeA	IS	7R.2	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C5-P9BS	IS	80.2	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C5-H9PO-DA	IS	76.5	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-4:2 9TS	IS	82.3	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-P9HxA	IS	73.6	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C4-P9HpA	IS	76.0	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1

Sample ID: 2201641-034L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-2
Matrix: Soil
Date Collected: 14-Jan-22 0R:00

baoryatryP Data

Lab Sample: 2201176-10
Date Feceived: 20-Jan-22 10:02
% Solids: 33.6
Column: BEH C18

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
15C5-P9HxS	IS	8R.6	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-6:2 9TS	IS	71.7	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C3-P9NA	IS	70.3	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-P9OA	IS	78.2	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C8-P9OS	IS	64.3	30 - 130	D	B22A186	01-9eb-22	1.80 g	07-9eb-22 20:20	3
15C2-P9DA	IS	70.7	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-8:2 9TS	IS	7R.4	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
d5-Me9OSAA	IS	64.3	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-P9UnA	IS	65.R	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
d3-Et9OSAA	IS	34.4	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-P9DoA	IS	63.6	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1
15C2-P9TeDA	IS	62.1	30 - 130		B22A186	01-9eb-22	1.80 g	03-9eb-22 01:21	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation

T, e results are reported in dry h eig, t.
T, e sample sive is reported in h et h eig, t.
F esults reported to t, e DL.

z , en reportedWP9HxSWP9OAWP9OSWMe9OSAA and Et9OSAA include bot, linear and branc, ed isomers. Only t, e linear isomer is reported for all ot, er analytes.

Sample ID: 2201641-036L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-u
Matrix: Soil
Date Collected: 14-Ran-22 0F:u0

baoryatryP Data

Lab Sample: 2201176-12
Date 9 eceived: 20-Ran-22 10:02
% Solids: 33.u
ColBmn: 8 EH C1J

LnalPte	CLS Numoey	Crnc. (ng/g)	Db	bOD	bOQ	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
Pg8 A	u73-22-4	u.17	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgM8 A	J6u0F0-JF-3	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgPeA	2706-F0-u	J.Fu	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgMPA	u77-7u-1	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
Pg8 S	u73-7u-3	u.40	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgEESA	11u307-J2-7	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
NgDHA	131772-3J-6	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
4:2 gTS	737124-72-4	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgHxA	u07-24-4	1J.1	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgPeS	2706-F1-4	u.FF	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
HgPO-DA	1u232-1u-6	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgHpA	u73-J3-F	2.3u	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
ADONA	F1F003-14-4	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgHxS	u33-46-4	40.u	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
6:2 gTS	2761F-F7-2	123	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgOA	uu3-67-1	12.J	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgHpS	u73-F2-J	3.0J	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgNA	u73-F3-1	0.34u	0.4F4	0.FJJ	1.FJ	R	8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgOS	176u-2u-1	333	2.47	4.F4	F.JJ	D	8 22A1J6	01-geb-22	1.Ju 5	07-geb-22 21:01	3
FCl-PguONS	736426-3J-1	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgDA	uu3-76-2	0.J7F	0.4F4	0.FJJ	1.FJ	R	8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
J:2 gTS	uF10J-u4-4	13.2	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
MegOSAA	2u33-u1-F	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
EtgOSAA	2FF1-30-6	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgUnA	203J-F4-J	0.6FJ	0.4F4	0.FJJ	1.FJ	R	8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
11Cl-PguOUdS	76u031-F2-F	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgDoA	u07-33-1	0.737	0.4F4	0.FJJ	1.FJ	R	8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgTrDA	7262F-F4-J	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
PgTeDA	u76-06-7	ND	0.4F4	0.FJJ	1.FJ		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1uCu-Pg8 A	IS	73.1	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uCu-PgPeA	IS	76.3	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uCu-Pg8 S	IS	7u.1	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uCu-HgPO-DA	IS	70.F	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-4:2 gTS	IS	7F.F	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-PgHxA	IS	74.1	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC4-PgHpA	IS	7J.0	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1

Sample ID: 2201641-036L **FALS Isrtrpe Dilutirn Taole B-15**

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-u
Matrix: Soil
Date Collected: 14-Ran-22 0F:u0

baoryatryP Data

Lab Sample: 2201176-12
Date 9 eceived: 20-Ran-22 10:02
% Solids: 33.u
ColBmn: 8 EH C1J

baoeled Standayds	TPpe	% RecrveyP	bimits	Qualifieys	Batch	Extyacted	Samp Size	LnalPzed	Dilutirn
1uCu-PgHxS	IS	7J.J	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-6:2 gTS	IS	6F.6	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC3-PgNA	IS	63.6	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-PgOA	IS	74.1	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uCJ-PgOS	IS	7F.0	30 - 130	D	8 22A1J6	01-geb-22	1.Ju 5	07-geb-22 21:01	3
1uC2-PgDA	IS	62.6	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-J:2 gTS	IS	72.2	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
du-MegOSAA	IS	63.0	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-PgUnA	IS	64.F	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
d3-EtgOSAA	IS	61.3	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-PgDoA	IS	3F.J	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1
1uC2-PgTeDA	IS	60.0	30 - 130		8 22A1J6	01-geb-22	1.Ju 5	03-geb-22 01:u1	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of qBantitation

T, e resBlts are reported in dry h ei5, t.
T, e sample sive is reported in h et h ei5, t.
9 esBlts reported to t, e DL.

z , en reportedWPgHxSWPgOAWPgOSWMegOSAA and EtgOSAA inclBde bot, linear and branc, ed isomers. Only t, e linear isomer is reported for all ot, er analytes.

Sample ID: 2201641-037A **PFAS Isotope Dilution Table B-15**

Client Data

Name: Eall n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-6
Matrix: Soil
Date Collected: 14-Rav-22 0F:4u

Laboratory Data

Lab Sample: 2201176-1%
Date 9 eceiAed: 20-Rav-22 10:02
s SolidH 74.u
ColBmv: 8nE C1J

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Pg8 y	%7u-22-4	0.u26	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgM8 y	J6%0F0-JF-u	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgPey	2706-F0-%	0.FJu	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgMPy	%77-7%1	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
Pg8 S	%7u-7%u	1.60	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgnnSy	11%u07-J2-7	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
NgDEy	1u1772-uJ-6	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
4:2 gTS	7u7124-72-4	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgExy	%07-24-4	2.2u	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgPeS	2706-F1-4	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
EgPO-Dy	1%2u2-1%6	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgEpy	%7u-Ju-F	0.u71	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
y DONy	F1F00u-14-4	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgExS	%uu-46-4	u.16	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
6:2 gTS	2761F-F7-2	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgOy	%%u-67-1	2.u7	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgEpS	%7u-F2-J	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgNy	%7u-Fu-1	0.7%1	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgOS	176%2%1	%2.2	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
FCl-Pg%ONS	7u6426-uJ-1	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgDy	%%u-76-2	0.7u2	0.4J6	0.F72	1.F4	R	822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
J:2 gTS	%F10J-%4-4	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
MegOSy y	2%uu-%1-F	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
ntgOSy y	2FF1-u0-6	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgUvy	20uJ-F4-J	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
11Cl-Pg%OUdS	76%0u1-F2-F	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgDoy	%07-uu-1	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgTrDy	7262F-F4-J	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
PgTeDy	%76-06-7	ND	0.4J6	0.F72	1.F4		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1%C%Pg8 y	IS	7%0	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C%PgPey	IS	7J.7	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C%Pg8 S	IS	76.u	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C%EgPO-Dy	IS	J4.J	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C2-4:2 gTS	IS	7F.2	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C2-PgExy	IS	7%%	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1
1%C4-PgEpy	IS	77.7	u0 - 1u0		822y1J6	01-geb-22	1.%5	0u-geb-22 01:41	1

Sample ID: 2201641-037A

PFAS Isotope Dilution Table B-15

Client Data

Name: E all n vAirovmevtal y val3tical Laborator3
Project: 2201641
Locatiov: SnD-6
Matrix: Soil
Date Collected: 14-Rav-22 0F:4u

Laboratory Data

Lab Sample: 2201176-1%
Date 9 eceiAed: 20-Rav-22 10:02
s SolidH 74.u
ColBmv: 8 nE C1J

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1%C%PgE xS	IS	J2.J	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-6:2 gTS	IS	76.4	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%Cu-PgNy	IS	67.%	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-PgOy	IS	7%7	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%CJ-PgOS	IS	J1.F	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-PgDy	IS	67.J	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-J:2 gTS	IS	7J.7	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
d%MegOSy y	IS	66.2	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-PgUvy	IS	6F.2	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
du-ntgOSy y	IS	uF.1	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-PgDoy	IS	66.0	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1
1%C2-PgTeDy	IS	uJ.6	u0 - 1u0		8 22y 1J 6	01-geb-22	1.%J 5	0u-geb-22 01:41	1

DL - Detectiov Limit
LOD - Limit of Detectiov
LOQ - Limit of qBavtitatiov

T, e reHBltHare reported iv dr3 h ei5, t.
T, e Hample Hwe iHreported iv h et h ei5, t.
9 eHBltHreported to t, e DL.

z , ev reportedWPgExSWPgOy WPgOSWMegOSy y avd ntgOSy y ivclBde bot, livear avd bravc, ed iHomerH Ovl3 t, e livear iHomer iHreported for all ot, er aval3teH

Sample ID: 2201641-038A

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-9 DBp

Matrix: Soil
Date Collected: 14-Ran-22 0J:23

Laboratory Data

Lab Sample: 2201176-14
Date Feceived: 20-Ran-22 10:02
% Solids: 32.u

ColBmn: 8 EH C1J

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Pg8 A	u73-22-4	7.30	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgM8 A	J6u090-J9-3	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgPeA	2706-90-u	62.J	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgMPA	u77-7u-1	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
Pg8 S	u73-7u-3	u.31	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgEESA	11u307-J2-7	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
NgDHA	131772-3J-6	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
4:2 gTS	737124-72-4	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgHxA	u07-24-4	47.3	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgPeS	2706-91-4	u.94	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
HgPO-DA	1u232-1u-6	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgHpA	u73-J3-9	24.J	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
ADONA	919003-14-4	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgHxS	u33-46-4	40.1	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
6:2 gTS	27619-97-2	1u.2	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgOA	uu3-67-1	3.26	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgHpS	u73-92-J	2.13	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgNA	u73-93-1	1.61	0.49J	0.997	1.99	R	8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgOS	176u-2u-1	234	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
9Cl-PguONS	736426-3J-1	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgDA	uu3-76-2	0.JuJ	0.49J	0.997	1.99	R	8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
J:2 gTS	u910J-u4-4	0.3u4	0.49J	0.997	1.99	R	8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
MegOSAA	2u33-u1-9	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
EtgOSAA	2991-30-6	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgUnA	203J-94-J	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
11Cl-PguOUdS	76u031-92-9	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgDoA	u07-33-1	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgTrDA	72629-94-J	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
PgTeDA	u76-06-7	ND	0.49J	0.997	1.99		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1uCu-Pg8 A	IS	79.4	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uCu-PgPeA	IS	77.9	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uCu-Pg8 S	IS	74.3	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uCu-HgPO-DA	IS	J3.3	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-4:2 gTS	IS	J2.9	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgHxA	IS	76.1	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC4-PgHpA	IS	J0.0	30 - 130		8 22A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1

Sample ID: 2201641-038A

PFAS Isotope Dilution Table B-15

Client Data

Name: Hall Environmental Analytical Laboratory
Project: 2201641
Location: SED-9 DBp
Matrix: Soil
Date Collected: 14-Ran-22 0J:23

Laboratory Data

Lab Sample: 2201176-14
Date Feceived: 20-Ran-22 10:02
% Solids: 32.u
ColBmn: 8EH C1J

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
1uCu-PgHxS	IS	J0.J	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-6:2 gTS	IS	73.u	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC3-PgNA	IS	6u.3	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgOA	IS	6J.7	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uCJ-PgOS	IS	69.J	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgDA	IS	33.2	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-J:2 gTS	IS	62.7	30 - 130		822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
du-MegOSAA	IS	u9.2	30 - 130	H	822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgUnA	IS	44.0	30 - 130	H	822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
d3-EtgOSAA	IS	u4.1	30 - 130	H	822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgDoA	IS	uu.2	30 - 130	H	822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1
1uC2-PgTeDA	IS	u1.2	30 - 130	H	822A1J6	01-geb-22	1.92 5	03-geb-22 01:31	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of qBantitation

T, e resBlts are reported in dry h ei5, t.
T, e sample sive is reported in h et h ei5, t.
FesBlts reported to t, e DL.

z , en reportedWPgHxSWPgOAWPgOSWMegOSAA and EtgOSAA inclBde bot, linear and branc, ed isomers. Only t, e linear isomer is reported for all ot, er analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-26
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Massachusetts Department of Environmental Protection	M-CA413
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1980678
New Hampshire Environmental Accreditation Program	207720
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-016
Pennsylvania Department of Environmental Protection	017
Texas Commission on Environmental Quality	T104704189-21-12
Vermont Department of Health	VT-4042
Virginia Department of General Services	10769
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p- Dioxins & Polychlorinated Dibenzofurans	EPA 23
Polychlorinated Dibenzodioxins in Ambient Air by GC/HRMS	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613/1613B
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537.1
Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry	EPA 533
Perfluorooctanesulonate (PFOS) and Perfluorooctanoate (PFOA) - Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: clients.hallenvironmental.com

CHAIN OF CUSTODY RECORD

2201176 0.9°C

SUB CONTRATOR: Vista Analytical Labor COMPANY: Vista Analytical Laboratory PHONE: (916) 673-1520 FAX:

ADDRESS: 1104 Windfield Way ACCOUNT # EMAIL:

CITY, STATE, ZIP: El Dorado Hills, CA 95762

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
(A) 14	2201641-014D	MW-02 & 05-02 Dup	250HDPE	Groundwater	1/12/2022 2:30:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
15	2201641-015D	MW-30 & 33-1	250HDPE	Groundwater	1/12/2022 3:45:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
16	2201641-016A	Field Blank	250HDPE	Groundwater	1/12/2022 4:10:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
17	2201641-017A	Equipment Blank	250HDPE	Groundwater	1/13/22 10:10am CMC 1/18/22	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
18	2201641-018D	GC-MW04	250HDPE	Groundwater	1/13/2022 10:38:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
19	2201641-019D	GC-MW02	250HDPE	Groundwater	1/13/2022 11:30:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
20	2201641-020D	GC-MW01	250HDPE	Groundwater	1/13/2022 12:17:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
21	2201641-021D	GC-MW03	250HDPE	Groundwater	1/13/2022 1:10:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
22	2201641-022D	SW-2	250HDPE	Surface Water	1/13/2022 3:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537 MS/MSD
23	2201641-023D	SW-2 Dup	250HDPE	Surface Water	1/13/2022 3:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
24	2201641-024D	SW-3	250HDPE	Surface Water	1/13/2022 4:00:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
25	2201641-025D	SW-1	250HDPE	Surface Water	1/13/2022 5:32:00 PM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
26	2201641-026A	SED-8	500HDPE	Soil	1/11/2022 11:03:00 AM	1	Soil 24 Compound PFAS Testing

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

(A) samples appear on WO 2201175

Relinquished By	Date	Time	Received By	Date	Time
CMC	1/18/2022	9:57 AM	Justin Brisendine/Fusion	01/20/22	1002
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard [X] RUSH Next BD [ ] 2nd BD [ ] 3rd BD [ ]

REPORT TRANSMITTAL DESIRED:

[ ] HARDCOPY (extra cost) [ ] FAX [ ] EMAIL [ ] ONLINE

FOR LAB USE ONLY

Temp of samples °C Attempt to Cool ?

Comments:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: clients.hallenvironmental.com

CHAIN OF CUSTODY RECORD

PAGE: 3 OF: 3

2201176 0.9°C

SUB CONTRATOR: Vista Analytical Labor COMPANY: Vista Analytical Laboratory PHONE: (916) 673-1520 FAX:

ADDRESS: 1104 Windfield Way ACCOUNT #: EMAIL:

CITY, STATE, ZIP: El Dorado Hills, CA 95762

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
27	2201641-027A	SED-4	250HDPE	Soil	1/13/2022 4:30:00 PM	2	Soil 24 Compound PFAS Testing
28	2201641-028A	SED-5	250HDPE	Soil	1/13/2022 4:50:00 PM	2	Soil 24 Compound PFAS Testing MS/MSD
29	2201641-029A	SED-5 Dup	250HDPE	Soil	1/13/2022 4:50:00 PM	2	Soil 24 Compound PFAS Testing
30	2201641-030A	SED-11	250HDPE	Soil	1/13/2022 5:09:00 PM	2	Soil 24 Compound PFAS Testing
31	2201641-031A	SED-10	~~250~~HDPE 500 cmc 1/18/22	Soil	1/14/2022 8:04:00 AM	2	Soil 24 Compound PFAS Testing
32	2201641-032A	SED-9	250HDPE	Soil	1/14/2022 8:25:00 AM	2	Soil 24 Compound PFAS Testing
33	2201641-033A	SED-1	250HDPE	Soil	1/14/2022 8:48:00 AM	2	Soil 24 Compound PFAS Testing
34	2201641-034A	SED-2	250HDPE	Soil	1/14/2022 9:00:00 AM	2	Soil 24 Compound PFAS Testing
35	2201641-035A	Equipment Rinsate	250HDPE	Aqueous	1/14/2022 9:23:00 AM	4	24 Compound PFAS Testing Unchlorinated Sample by Methods 533 and 537
36	2201641-036A	SED-3	250HDPE	Soil	1/14/2022 9:30:00 AM	2	Soil 24 Compound PFAS Testing
37	2201641-037A	SED-6	250HDPE	Soil	1/14/2022 9:45:00 AM	2	Soil 24 Compound PFAS Testing
38	2201641-038A	SED-9 Dup	250HDPE	Soil	1/14/2022 8:25:00 AM	2	Soil 24 Compound PFAS Testing

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By	Date	Time	Received By	Date	Time
CMC	1/18/2022	9:57 AM	Justin Briseno Juarez	01/20/22	1002
Relinquished By	Date	Time	Received By	Date	Time
Relinquished By	Date	Time	Received By	Date	Time

TAT: Standard ☑ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples °C Attempt to Cool ?
Comments:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2201176 TAT Std.

Samples Arrival:	**Date/Time** 01/20/22 1002		**Initials:**		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 1.1 (uncorrected) **Temp °C:** 0.9 (corrected)			**Probe used: Y / N**		**Thermometer ID:** IR-4		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			
Airbill — Trk # 7757 8845 8490	✓		
Shipping Documentation Present?			
Shipping Container: Vista / Client / Retain / Return		Dispose	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?			
Holding Time Acceptable?			

Logged In:	**Date/Time** 01/20/22 11:08	**Initials:**	**Location:** R-13 ↓ WR-2 ↑ **Shelf/Rack:** A-1 E-16 F-16
COC Anomaly/Sample Acceptance Form completed?			✓

Comments:

CoC/Label Reconciliation Report WO# 2201176

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2201176-01	A 2201641-025D	SW-1	13-Jan-22 17:32	HDPE Bottle, 250 mL	Aqueous	
2201176-01	B 2201641-025D	SW-1	13-Jan-22 17:32	HDPE Bottle, 250 mL	Aqueous	
2201176-01	C 2201641-025D	SW-1	13-Jan-22 17:32	Polypropylene, 250mL	Aqueous	
2201176-01	D 2201641-025D	SW-1	13-Jan-22 17:32	Polypropylene, 250mL	Aqueous	
2201176-02	A 2201641-026A	SED-8	11-Jan-22 11:03	HDPE Bottle, 500 mL	Solid	
2201176-03	A 2201641-027A	SED-4	13-Jan-22 16:30	HDPE Bottle, 250 mL	Solid	
2201176-03	B 2201641-027A	SED-4	13-Jan-22 16:30	HDPE Bottle, 250 mL	Solid	
2201176-04	A 2201641-028A	SED-5	13-Jan-22 16:50	HDPE Bottle, 250 mL	Solid	MS/MSD
2201176-04	B 2201641-028A	SED-5	13-Jan-22 16:50	HDPE Bottle, 250 mL	Solid	MS/MSD
2201176-05	A 2201641-029A	SED-5 Dup	13-Jan-22 16:50	HDPE Bottle, 250 mL	Solid	
2201176-05	B 2201641-029A	SED-5 Dup	13-Jan-22 16:50	HDPE Bottle, 250 mL	Solid	
2201176-06	A 2201641-030A	SED-11	13-Jan-22 17:09	HDPE Bottle, 250 mL	Solid	
2201176-06	B 2201641-030A	SED-11	13-Jan-22 17:09	HDPE Bottle, 250 mL	Solid	
2201176-07	A 2201641-031A	SED-10	14-Jan-22 08:04	HDPE Bottle, 500 mL	Solid	
2201176-07	B 2201641-031A	SED-10	14-Jan-22 08:04	HDPE Bottle, 500 mL	Solid	
2201176-08	A 2201641-032A	SED-9	14-Jan-22 08:25	HDPE Bottle, 250 mL	Solid	
2201176-08	B 2201641-032A	SED-9	14-Jan-22 08:25	HDPE Bottle, 250 mL	Solid	
2201176-09	A 2201641-033A	SED-1	14-Jan-22 08:48	HDPE Bottle, 250 mL	Solid	
2201176-09	B 2201641-033A	SED-1	14-Jan-22 08:48	HDPE Bottle, 250 mL	Solid	
2201176-10	A 2201641-034A	SED-2	14-Jan-22 09:00	HDPE Bottle, 250 mL	Solid	
2201176-10	B 2201641-034A	SED-2	14-Jan-22 09:00	HDPE Bottle, 250 mL	Solid	
2201176-11	A 2201641-035A	Equipment Rinsate	14-Jan-22 09:23	HDPE Bottle, 250 mL	Aqueous	
2201176-11	B 2201641-035A	Equipment Rinsate	14-Jan-22 09:23	HDPE Bottle, 250 mL	Aqueous	
2201176-11	C 2201641-035A	Equipment Rinsate	14-Jan-22 09:23	Polypropylene, 250mL	Aqueous	
2201176-11	D 2201641-035A	Equipment Rinsate	14-Jan-22 09:23	Polypropylene, 250mL	Aqueous	
2201176-12	A 2201641-036A	SED-3	14-Jan-22 09:30	HDPE Bottle, 250 mL	Solid	
2201176-12	B 2201641-036A	SED-3	14-Jan-22 09:30	HDPE Bottle, 250 mL	Solid	
2201176-13	A 2201641-037A	SED-6	14-Jan-22 09:45	HDPE Bottle, 250 mL	Solid	

2201176-13	B 2201641-037A	☑	SED-6	14-Jan-22 09:45	☑	C	HDPE Bottle, 250 mL	Solid
2201176-14	A 2201641-038A	☑	SED-9 Dup	14-Jan-22 08:25	☑		HDPE Bottle, 250 mL	Solid
2201176-14	B 2201641-038A	☑	SED-9 Dup	14-Jan-22 08:25	☑		HDPE Bottle, 250 mL	Solid

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?		✓	✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments:

Preservation Documented: Na2S2O3 Trizma (B) NH4CH3CO2 None (C) Other Ammonium Acetate (A)

Verifed by/Date: 01/21/22

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001873** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Iron	ND	0.020								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Nickel	ND	0.010								
Sodium	ND	1.0								
Vanadium	ND	0.050								
Zinc	ND	0.010								

Sample ID: **LLLCS**	SampType: **LCSLL**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001874** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020	0.01000	0	105	50	150			
Barium	ND	0.0020	0.002000	0	65.2	50	150			
Beryllium	0.0020	0.0020	0.002000	0	102	50	150			
Cadmium	ND	0.0020	0.002000	0	95.2	50	150			
Calcium	ND	1.0	0.5000	0	100	50	150			
Chromium	0.0063	0.0060	0.006000	0	105	50	150			
Cobalt	ND	0.0060	0.006000	0	92.0	50	150			
Iron	0.021	0.020	0.02000	0	103	50	150			
Magnesium	ND	1.0	0.5000	0	102	50	150			
Manganese	0.0021	0.0020	0.002000	0	106	50	150			
Nickel	ND	0.010	0.005000	0	99.8	50	150			
Sodium	ND	1.0	0.5000	0	110	50	150			
Vanadium	ND	0.050	0.01000	0	104	50	150			
Zinc	0.012	0.010	0.01000	0	118	50	150			

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001875** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001875** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.54	0.020	0.5000	0	107	85	115			
Barium	0.49	0.0020	0.5000	0	98.7	85	115			
Beryllium	0.51	0.0020	0.5000	0	102	85	115			
Cadmium	0.49	0.0020	0.5000	0	97.7	85	115			
Calcium	50	1.0	50.00	0	101	85	115			
Chromium	0.48	0.0060	0.5000	0	96.6	85	115			
Cobalt	0.48	0.0060	0.5000	0	95.4	85	115			
Iron	0.50	0.020	0.5000	0	99.7	85	115			
Magnesium	50	1.0	50.00	0	100	85	115			
Manganese	0.48	0.0020	0.5000	0	96.9	85	115			
Nickel	0.47	0.010	0.5000	0	94.8	85	115			
Sodium	49	1.0	50.00	0	98.1	85	115			
Vanadium	0.51	0.050	0.5000	0	101	85	115			
Zinc	0.49	0.010	0.5000	0	98.7	85	115			

Sample ID: **2201641-013CMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001927** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.0	0.010	2.500	1.428	101	70	130			

Sample ID: **2201641-013CMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001928** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Manganese	4.0	0.010	2.500	1.428	102	70	130	0.787	20	

Sample ID: **2201641-022CMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **SW-2**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001939** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.5	0.10	2.500	0	99.4	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **2201641-022CMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **SW-2**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001940** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.6	0.10	2.500	0	104	70	130	4.53	20	

Sample ID: **2201641-013CMS**	SampType: **MS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001960** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.58	0.020	0.5000	0	116	70	130			
Barium	0.51	0.0020	0.5000	0	102	70	130			
Beryllium	0.48	0.0020	0.5000	0	96.8	70	130			
Cadmium	0.46	0.0020	0.5000	0	92.3	70	130			
Chromium	0.48	0.0060	0.5000	0	96.4	70	130			
Cobalt	0.45	0.0060	0.5000	0	90.8	70	130			
Nickel	0.42	0.010	0.5000	0	84.3	70	130			
Vanadium	0.51	0.050	0.5000	0	102	70	130			
Zinc	0.45	0.010	0.5000	0	89.5	70	130			

Sample ID: **2201641-013CMSD**	SampType: **MSD**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **A85320**	RunNo: **85320**
Prep Date:	Analysis Date: **1/21/2022**	SeqNo: **3001961** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.60	0.020	0.5000	0	119	70	130	2.47	20	
Barium	0.52	0.0020	0.5000	0	103	70	130	1.49	20	
Beryllium	0.50	0.0020	0.5000	0	99.4	70	130	2.62	20	
Cadmium	0.47	0.0020	0.5000	0	93.8	70	130	1.59	20	
Chromium	0.49	0.0060	0.5000	0	97.9	70	130	1.52	20	
Cobalt	0.46	0.0060	0.5000	0	92.9	70	130	2.29	20	
Nickel	0.43	0.010	0.5000	0	86.1	70	130	2.14	20	
Vanadium	0.52	0.050	0.5000	0	104	70	130	2.25	20	
Zinc	0.46	0.010	0.5000	0	91.5	70	130	2.22	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B85260**	RunNo: **85260**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2999714** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0010								
Copper	ND	0.0010								
Lead	ND	0.00050								
Selenium	ND	0.0010								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B85260**	RunNo: **85260**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2999716** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.023	0.0010	0.02500	0	91.4	85	115			
Copper	0.023	0.0010	0.02500	0	90.1	85	115			
Lead	0.011	0.00050	0.01250	0	90.2	85	115			
Selenium	0.022	0.0010	0.02500	0	89.4	85	115			

Sample ID: **2201641-013CMS**	SampType: **MS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **B85260**	RunNo: **85260**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2999824** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.050	0.0010	0.02500	0.02692	92.3	70	130			
Selenium	0.023	0.0010	0.02500	0.0005101	88.8	70	130			

Sample ID: **2201641-013CMSD**	SampType: **MSD**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **MW-02 & 05-02**	Batch ID: **B85260**	RunNo: **85260**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2999825** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.049	0.0010	0.02500	0.02692	86.8	70	130	2.81	20	
Selenium	0.024	0.0010	0.02500	0.0005101	92.5	70	130	4.04	20	

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **C85431**	RunNo: **85431**
Prep Date:	Analysis Date: **1/26/2022**	SeqNo: **3006224** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Copper	ND	0.0010								
Lead	ND	0.00050								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **C85431**	RunNo: **85431**
Prep Date:	Analysis Date: **1/26/2022**	SeqNo: **3006224** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.0010								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **C85431**	RunNo: **85431**
Prep Date:	Analysis Date: **1/26/2022**	SeqNo: **3006226** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.023	0.0010	0.02500	0	92.1	85	115			
Arsenic	0.024	0.0010	0.02500	0	96.7	85	115			
Copper	0.023	0.0010	0.02500	0	91.5	85	115			
Lead	0.012	0.00050	0.01250	0	92.1	85	115			
Selenium	0.025	0.0010	0.02500	0	100	85	115			

Sample ID: **2201641-011CMS**	SampType: **MS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **MW-02 & 05-10**	Batch ID: **C85431**	RunNo: **85431**
Prep Date:	Analysis Date: **1/26/2022**	SeqNo: **3006260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.12	0.0050	0.1250	0	98.2	70	130			
Lead	0.057	0.0025	0.06250	0	91.9	70	130			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **B85673**	RunNo: **85673**
Prep Date:	Analysis Date: **2/8/2022**	SeqNo: **3016430** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.0010								

Sample ID: **LCSLL**	SampType: **LCSLL**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **B85673**	RunNo: **85673**
Prep Date:	Analysis Date: **2/8/2022**	SeqNo: **3016431** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.0010	0.001000	0	76.5	50	150			

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B85673**	RunNo: **85673**
Prep Date:	Analysis Date: **2/8/2022**	SeqNo: **3016440** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **B85673**	RunNo: **85673**
Prep Date:	Analysis Date: **2/8/2022**	SeqNo: **3016440** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	0.024	0.0010	0.02500	0	94.1	85	115			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **A85785**	RunNo: **85785**
Prep Date:	Analysis Date: **2/11/2022**	SeqNo: **3020340** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Copper	ND	0.0010								
Lead	ND	0.00050								
Selenium	ND	0.0010								

Sample ID: **LCSLL**	SampType: **LCSLL**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **A85785**	RunNo: **85785**
Prep Date:	Analysis Date: **2/11/2022**	SeqNo: **3020341** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0011	0.0010	0.001000	0	106	50	150			
Arsenic	0.0010	0.0010	0.001000	0	102	50	150			
Copper	0.0011	0.0010	0.001000	0	112	50	150			
Lead	0.00051	0.00050	0.0005000	0	102	50	150			
Selenium	ND	0.0010	0.001000	0	82.0	50	150			

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **A85785**	RunNo: **85785**
Prep Date:	Analysis Date: **2/11/2022**	SeqNo: **3020342** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.024	0.0010	0.02500	0	95.5	85	115			
Arsenic	0.024	0.0010	0.02500	0	97.8	85	115			
Copper	0.024	0.0010	0.02500	0	97.4	85	115			
Lead	0.012	0.00050	0.01250	0	97.3	85	115			
Selenium	0.024	0.0010	0.02500	0	96.3	85	115			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2998900** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Bromide	ND	0.10								
Phosphorus, Orthophosphate (As P)	ND	0.50								

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2998901** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.53	0.10	0.5000	0	105	90	110			
Chloride	4.9	0.50	5.000	0	98.2	90	110			
Bromide	2.5	0.10	2.500	0	98.1	90	110			
Phosphorus, Orthophosphate (As P)	4.5	0.50	5.000	0	90.1	90	110			

Sample ID: **2201641-002BMS**	SampType: **ms**	TestCode: **EPA Method 300.0: Anions**
Client ID: **MW05001**	Batch ID: **R85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2998914** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.1	0.50	2.500	1.708	94.0	79.7	110			
Bromide	12	0.50	12.50	0	97.2	91.2	106			

Sample ID: **2201641-002BMSD**	SampType: **msd**	TestCode: **EPA Method 300.0: Anions**
Client ID: **MW05001**	Batch ID: **R85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2998917** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.1	0.50	2.500	1.708	96.8	79.7	110	1.71	20	
Bromide	12	0.50	12.50	0	99.5	91.2	106	2.30	20	

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **A85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2998992** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Bromide	ND	0.10								
Phosphorus, Orthophosphate (As P)	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **A85247**	RunNo: **85247**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **2998993** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.52	0.10	0.5000	0	104	90	110			
Bromide	2.5	0.10	2.500	0	100	90	110			
Phosphorus, Orthophosphate (As P)	4.6	0.50	5.000	0	92.8	90	110			

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R85279**	RunNo: **85279**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **3000162** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R85279**	RunNo: **85279**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **3000171** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.3	90	110			
Sulfate	9.4	0.50	10.00	0	93.6	90	110			
Nitrate+Nitrite as N	3.5	0.20	3.500	0	99.4	90	110			

Sample ID: **MB**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **A85279**	RunNo: **85279**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **3000218** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Phosphorus, Orthophosphate (As P)	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **A85279**	RunNo: **85279**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **3000219** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.7	90	110			
Phosphorus, Orthophosphate (As P)	4.6	0.50	5.000	0	91.3	90	110			
Sulfate	9.4	0.50	10.00	0	94.4	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **LCS**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **A85279**	RunNo: **85279**
Prep Date:	Analysis Date: **1/19/2022**	SeqNo: **3000219** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate+Nitrite as N	3.5	0.20	3.500	0	100	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID:	**lcs-1 99.3uS eC**	SampType:	**lcs**			TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**LCSW**	Batch ID:	**R85380**			RunNo:	**85380**				
Prep Date:		Analysis Date:	**1/24/2022**			SeqNo:	**3004238**	Units:	**µmhos/cm**		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity		110	10	99.30	0	106	85	115			

Sample ID:	**2201641-002B dup**	SampType:	**dup**			TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**MW05001**	Batch ID:	**R85380**			RunNo:	**85380**				
Prep Date:		Analysis Date:	**1/24/2022**			SeqNo:	**3004240**	Units:	**µmhos/cm**		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity		4600	10						0.549	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **mb-1 alk**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R85251**	RunNo: **85251**							
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2999092**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID: **lcs-1 alk**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R85251**	RunNo: **85251**							
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2999093**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	75.72	20.00	80.00	0	94.6	90	110			

Sample ID: **mb-2 alk**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R85251**	RunNo: **85251**							
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2999115**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID: **lcs-2 alk**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R85251**	RunNo: **85251**							
Prep Date:	Analysis Date: **1/18/2022**	SeqNo: **2999116**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	76.48	20.00	80.00	0	95.6	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB1**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003729**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.0								

Sample ID: **LCS1**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003730**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.9	1.0	4.850	0	100	90	110			

Sample ID: **2201641-002ams**	SampType: **ms**	TestCode: **SM 5310B: TOC**							
Client ID: **MW05001**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003733**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	11	1.0	4.650	6.833	88.8	85	115			

Sample ID: **2201641-002amsd**	SampType: **msd**	TestCode: **SM 5310B: TOC**							
Client ID: **MW05001**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003734**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	11	1.0	4.650	6.833	93.1	85	115	1.81	15	

Sample ID: **2201641-013ams**	SampType: **ms**	TestCode: **SM 5310B: TOC**							
Client ID: **MW-02 & 05-02**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003750**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	25	1.0	4.650	20.41	98.3	85	115			

Sample ID: **2201641-013amsd**	SampType: **msd**	TestCode: **SM 5310B: TOC**							
Client ID: **MW-02 & 05-02**	Batch ID: **R85373**	RunNo: **85373**							
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003751**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	26	1.0	4.650	20.41	112	85	115	2.61	15	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB2**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**
Client ID: **PBW**	Batch ID: **A85373**	RunNo: **85373**
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003760** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.0								

Sample ID: **LCS2**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **A85373**	RunNo: **85373**
Prep Date:	Analysis Date: **1/24/2022**	SeqNo: **3003761** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.9	1.0	4.850	0	100	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB-65074**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **65074**	RunNo: **85347**
Prep Date: **1/18/2022**	Analysis Date: **1/24/2022**	SeqNo: **3002946** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID: **LCS-65074**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **65074**	RunNo: **85347**
Prep Date: **1/18/2022**	Analysis Date: **1/24/2022**	SeqNo: **3002947** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	998	20.0	1000	0	99.8	80	120			

Sample ID: **2201641-022BDUP**	SampType: **DUP**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **SW-2**	Batch ID: **65074**	RunNo: **85347**
Prep Date: **1/18/2022**	Analysis Date: **1/24/2022**	SeqNo: **3002966** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	48100	200						2.97	10	*D

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **MB-65208** SampType: **MBLK** TestCode: **SM 4500 Norg C: TKN**
Client ID: **PBW** Batch ID: **65208** RunNo: **85453**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007096** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	ND	1.0								

Sample ID: **LCS-65208** SampType: **LCS** TestCode: **SM 4500 Norg C: TKN**
Client ID: **LCSW** Batch ID: **65208** RunNo: **85453**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007097** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	9.9	1.0	10.00	0	99.4	80	120			

Sample ID: **2201641-022BMS** SampType: **MS** TestCode: **SM 4500 Norg C: TKN**
Client ID: **SW-2** Batch ID: **65208** RunNo: **85453**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007105** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	32	2.0	20.00	11.76	102	75	125			D

Sample ID: **2201641-022BMSD** SampType: **MSD** TestCode: **SM 4500 Norg C: TKN**
Client ID: **SW-2** Batch ID: **65208** RunNo: **85453**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007106** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	32	2.0	20.00	11.76	101	75	125	0.873	20	D

Sample ID: **MB-65218** SampType: **MBLK** TestCode: **SM 4500 Norg C: TKN**
Client ID: **PBW** Batch ID: **65218** RunNo: **85460**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	ND	1.0								

Sample ID: **LCS-65218** SampType: **LCS** TestCode: **SM 4500 Norg C: TKN**
Client ID: **LCSW** Batch ID: **65218** RunNo: **85460**
Prep Date: **1/26/2022** Analysis Date: **1/27/2022** SeqNo: **3007494** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	10	1.0	10.00	0	101	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2201641**

26-May-22

Client: Daniel B. Stephens & Assoc.

Project: Holloman AFB PFAS

Sample ID: **2201641-013BMS**	SampType: **MS**	TestCode: **SM 4500 Norg C: TKN**
Client ID: **MW-02 & 05-02**	Batch ID: **65218**	RunNo: **85460**
Prep Date: **1/26/2022**	Analysis Date: **1/27/2022**	SeqNo: **3007505** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	21	2.0	20.00	0	104	75	125			D

Sample ID: **2201641-013BMSD**	SampType: **MSD**	TestCode: **SM 4500 Norg C: TKN**
Client ID: **MW-02 & 05-02**	Batch ID: **65218**	RunNo: **85460**
Prep Date: **1/26/2022**	Analysis Date: **1/27/2022**	SeqNo: **3007506** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Kjeldahl, Total	21	2.0	20.00	0	104	75	125	0	20	D

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: **Daniel B. Stephens & Assoc.** Work Order Number: **2201641** RcptNo: 1

Received By: **Sean Livingston** **1/17/2022 3:27:00 PM** Sean Livingston

Completed By: **Cheyenne Cason** **1/17/2022 3:41:51 PM** Chad

Reviewed By: JGC 1/18/22

labeled unpres + preserved: JGC 1/17/22

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☑ No ☐ NA ☐
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

of preserved bottles checked for pH: 40 (<2 or >12 unless noted)

Adjusted? No

Checked by: CMC/JGC 1/18/22

labeled by: JGC 1/17/22

PH by: JGC 1.17.22

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good	Not Present			
2	0.4	Good	Not Present			
3	1.4	Good	Not Present			
4	0.3	Good	Not Present			

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Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: **Daniel B. Stephens & Assoc.** Work Order Number: **2201641** RcptNo: 1

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
5	1.6	Good	Not Present			
6	1.8	Good	Not Present			
7	1.2	Good	Not Present			

Chain-of-Custody Record

Client: DBS&A

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jbunch@geo-logic.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Holloman AFB PFAS

Project #: DB21.1060.00.02.03

Project Manager: John Bunch

Sampler: J. Fisher

On Ice: ☒ Yes ☐ No

of Coolers: 1

Cooler Temp(including CF): See Checklist (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2201641	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PFAS 537/537.1	TOC 415.1	TKN SM 4500	6010/6020/200.7/200.8 see Metals List	6010/SW8260B/6020/8270 Dissolved Anions 300.0/353.2/SM4500
1/11/22	1100	GW	Equipment Blank	4-250mL Poly	2-Ammonium Acetate Buffer	001											X				
	1120		MW05001	9-Various	Various	002											X	X	X	X	X
	1305		FT31-LM4	9-Various	Various	003											X	X	X	X	X
	1404		~~FT31-LM5~~ MW01004			004											X	X	X	X	X
	1455		FT31-LM5			005											X	X	X	X	X
	1550		FT31-LM1			006											X	X	X	X	X
	1635		FT31-LM2			007											X	X	X	X	X
	1650		Field Blank	4-250mL Poly	2-Ammonium Acetate Buffer	008											X				
1/12/22	0937		Equipment Blank			009											X				
	1010		MW-29-01	9-Various	Various	010											X	X	X	X	X
	1225		MW-02 & 05-10			011											X	X	X	X	X
	1327		S1-MW3			012											X	X	X	X	X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
1/17/21	1527		Sue	COC	1/17/22	15:27
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
Metals List: Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Vanadium, Zinc

GW 1 of 2

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chain-of-Custody Record

Client: DBS&A

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jbunch@geo-logic.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Holloman AFB PFAS

Project #: DB21.1060.00.02.03

Project Manager: John Bunch

Sampler: J. Fisher

On Ice: ☒ Yes ☐ No

of Coolers: 7

Cooler Temp(including CF): See Checklist (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2201641	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PFAS 533+537	TOC 415.1	TKN 351.2 or SM4500	6010/200.7/200.8/6020 List	Dissolved Anions 300.0/SM4500	MS/MSD
1/12/22	1430	GW	MW-02 & 05-02	9-Various	9-Various	013											X	X	X	X	X	X
	1430		MW-02 & 05-02 DUP			014											X	X	X	X	X	
	1545		MW-30 & 33-1			015											X	X	X	X	X	
	1610		Field Blank	4-250mL Poly	a-Ammonia Acetate 2-Bisulfate	016											X					
1/13/22	1010		Equipment Blank			017											X					
	1038		GC-MW04	9-Various	9-Various	018											X	X	X	X	X	
	1130		GC-MW02			019											X	X	X	X	X	
	1217		GC-MW01			020											X	X	X	X	X	
	1310		GC-MW03			021											X	X	X	X	X	
						Ø									X							

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
1/17/22	1527	DBS&A	See Cooler		1/17/22	15:27
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
See Metals List on 1 of 2.

GW 2 of 2

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chain-of-Custody Record

Client: DBS&A

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jbunch@geo-logic.com

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Holloman AFB PFAS

Project #: DB21.1060.00.02.03

Project Manager: John Bunch

Sampler: J. Fisher

On Ice: ☑ Yes ☐ No

of Coolers: 7

Cooler Temp(including CF): See Checklist (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2201641	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PFAS 537.1/537	TOC 415.1	TKN SM4500	6010/6020/200.7/200.8 Metals	Dissolved Anions 300.0/9056A	MS/MSD
1/13/22	1500	SW	SW-2	9-Various	Various	022											X	X	X	X	X	X
	1500		SW-2 Dup			023											X	X	X	X	X	X
	1600	SW	SW-3			024											X	X	X	X	X	X
	1732	SW	SW-1			025											X	X	X	X	X	X

1/13/22

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
1/17/22	1527	DBS&A	See COC		1/17/22	15:27
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: Metals List: Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Vanadium, Zinc

Surface Water 1 of 1

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chain-of-Custody Record

Client: DB Stephens

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jbunch@dbstephens.com

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Holloman AFB PFAS

Project #: DB21, 1060.00.02.03

Project Manager: John Bunch

Sampler: J. Fisher

On Ice: ☑ Yes ☐ No

of Coolers: 7

Cooler Temp(including CF): See Checklist (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2201641	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PFAS LC-MS/MS Vista 5000	PFAS 533 & 537	MS/MSD
1/11/22	1135	Sediment	SED-8	1-500mL Poly	—	026											X		
1/13/22	1630		SED-4	2-250mL Poly	—	027											X		
	1650		SED-5			028											X	X	
	1650		SED-5 DUP			029											X		
	1709		SED-11			030											X		
1/14/22	0804		SED-10			031											X		
	0825		SED-9			032											X		
	0848		SED-1			033											X		
	0900		SED-2			034											X		
	0923	Water	Equipment Rinsate	4-250mL Poly	2-Ammonium Acetate 2-Buffer	035											X		
	0930	Sediment	SED-3	2-250mL Poly	—	036											X		
	0945		SED-6			037											X		

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
1/17/22	1527		Sue Cruz		1/17/22	15:27
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
~~Sed-9~~ SED-9 Dup - 038
CME 1/18/22

Sediment 1 of 1

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Appendix E

Data Quality Assessment Report

DBS&A
Daniel B. Stephens & Associates, Inc.

Appendix E. Data Quality Assessment
Vista Analytical Laboratory
Work Order Nos. No. 2201174-2201176

E-1. Introduction

This data quality assessment was performed to confirm that the data quality objectives (DQOs) for the NMED Phase I PFAS investigation project were met. This report summarizes the results of the review of analytical data for 15 groundwater samples, 3 surface water samples, and 10 sediment samples, as well as the associated duplicate samples, equipment rinsates, and field blanks collected by Daniel B. Stephens & Associates, Inc. (DBS&A) at Holloman Air Force Base (AFB), near Alamogordo, New Mexico, on January 11 through 14, 2022. Also included in the assessment were quality control (QC) samples analyzed by the laboratory.

The samples were collected in accordance with standard operating procedures (SOPs) for sampling with potential impacts of per- and polyfluoroalkyl substances (PFAS). Samples were collected in pre-preserved containers supplied by the laboratory and stored on ice in coolers with appropriate chain of custody documentation. Samples were hand-delivered to Hall Environmental Analytical Laboratory (HEAL) in Albuquerque on January 17, 2022. HEAL subcontracted the PFAS analysis to Vista Analytical Laboratory (Vista) in El Dorado Hills, California, and transferred the samples for PFAS analysis via Federal Express to Vista on January 18, 2022. The samples were received by Vista on January 20, 2022.

The samples submitted to HEAL were managed under HEAL Order No. 2201641. HEAL performed general chemistry analyses (major ions, metals, alkalinity, etc.). Vista managed the samples as Work Order (WO) Nos. 2201174 through 2201176 and analyzed the samples for PFAS using U.S. Environmental Protection Agency (EPA) methods 533 and 537 with isotope dilution/LC-MSMS method compliant with Table B-15 of DoD QSM 5.3 (Aqueous). Vista is certified to perform the requested analyses under DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005, Certificate No. 3091.01. This data quality assessment addresses samples and associated QC samples analyzed for PFAS by Vista under WOs Nos. 2201174 through 2201176. The complete laboratory report is provided in Appendix D.

The analytical data were evaluated in general accordance with *Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15* (Department of Defense, May 2020).

The analytical methods that were used by Vista during this project provide guidance on procedures and method acceptance criteria that, in some areas, differ from that given in the validation guidelines. Where differences exist between the methods and the validation guidelines, the data reviewers followed the acceptance criteria given in the methods. However, where the laboratory data package presented laboratory-derived acceptance criteria, these criteria were used to evaluate the data unless the criteria were considered inadequate.

SDG Nos. 2201174 through 2201176 are summary data packages, which include a case narrative, sample results and summarized results for select QC parameters. The data quality review applied to this laboratory report represented an abbreviated assessment of the quality of the data set. The review is intended to identify and present those problems and quality control deficiencies that could be readily identified from the summary data package.

E-2. Data Quality Assessment

Data quality assessment was based on the following parameters:

- Data package completeness
- Chain of custody variances
- Sample preservation and holding times
- Extracted internal standards (EIS)
- Blank samples
- Laboratory control sample (LCS) and LCS duplicates (LCSDs)
- Field duplicates
- Matrix spike (MS) and MS duplicates (MSDs)
- Overall assessment

The laboratory reported that five samples (MW-02&05-02, MW-02&05-02 DUP, SW-2, SW-2 DUP, SW-3) contained particulates and were centrifuged prior to extraction. This does not affect the data generated from these samples.

The following subsections summarize the findings of the data evaluation performed.

E-2.1 Data Package Completeness

The data package was complete and included a case narrative, an inventory of samples received and analyzed, results sheets for field and laboratory samples analyzed, a list of data qualifiers and abbreviations used, a list of laboratory certifications and accredited test methods, chain-of-custody documents, and laboratory sample log-in checklists. All samples were analyzed as requested and results were presented for all target analytes requested.

E-2.2 Chain-of-Custody Variances

No issues were identified related to the COC. Copies of both the original and transfer COCs are provided in the laboratory report in Appendix D.

E-2.3 Sample Preservation and Holding Times

Sample containers for PFAS analysis were pre-preserved by HEAL (ammonium acetate for method 533 and Trizma buffer for method 537.1). Samples were delivered to HEAL on regular ice, per DBS&A procedure for samples for PFAS analysis. HEAL forwarded the samples to Vista using Blue Ice, which is not recommended for samples to be analyzed for PFAS. Based on the lack of analyte detections in the trip blanks and field blanks, the use of Blue Ice does not appear to have affected sample integrity. Samples were received at Vista in good condition and within the recommended temperature requirements.

The samples were extracted and analyzed within the technical holding times in accordance with Vista's SOPs.

E-2.4 Extracted Internal Standards

A total of 19 EISs were added to all field samples and QC samples by the laboratory. EIS recoveries are used to correct for bias associated with matrix interferences, sample preparation efficiencies, injection volume variances, chromatographic behavior, and mass spectrometry ionization efficiency. One measure of analytical accuracy is the calculated percent recoveries (%R) of each EIS. The EIS recoveries were generally within laboratory established QC limits of 50 to 150 percent, except for the following, which were all biased low:

Sample ID	WO	Date Collected	Surrogate(s)	%R	Associated Analyte(s)
MW05001	2201174	1/11/2022	13C3-HFPO-DA 13C2-4:2 FTS 13C5-PFNA	37.0 40.3 26.9	ND 888 ng/L 881 ng/L
FT31-LM4	2201174	1/11/2022	13C3-PFBA 13C3-HFPO-DA	32.5 31.3	7,000 ng/L ND
FT31-LM5	2201174	1/11/2022	13C3-HFPO-DA	16.3	ND
MW-02&05-10	2201174	1/12/2022	13C3-PFBA	31.0	2,530 ng/L
Method Blank	2201175	—	13C2-PFTeDA	37.4	ND
Matrix Spike	2201175		13C3-PFBA	42.7	1,660 ng/L
MW-02&05-10 DUP	2201175	1/12/2022	13C3-PFBA	21.5	1,670 ng/L
GC-MW01	2201175	1/13/2022	13C3-PFBA	47.8	4.40 ng/L
SW-2	2201175	1/13/2022	13C3-PFBA 13C2-PFDoA 13C2-PFTeDA	28.0 35.5 12.4	5,230 ng/L ND ND
Matrix Spike	2201175	—	13C3-PFDA 13C2-PFDoA 13C2-PFTeDA	39.0 32.9 12.1	5,000 ng/L 20.2 ng/L 42,5 ng/L
MS Dup	2201175	—	13C3-PFDA 13C2-PFDoA 13C2-PFTeDA	18.0 32.8 10.8	5,660 ng/L 20.5 ng/L 41.7 ng/L
SW-2 DUP	2201175	1/13/2022	13C3-PFDA 13C2-PFDoA 13C2-PFTeDA	38.0 37.3 14.1	5,070 ng/L ND ND
SW-3	2201175	1/13/2022	13C3-PFDA 13C2-PFDoA 13C2-PFTeDA	29.0 32.5 15.5	5,050 ng/L ND ND
SED-8	2201176	1/11/2022	13C5-PFNA 13C2-PFDA d3-MeFOSAA 13C2-PFuNA d5-EtFOSAA 13C2-PFDoA 13C2-PFTeDA	19.9 19.5 4.20 11.5 5.30 12.0 2.90	242 ng/g 1,490 ng/g 88.4 ng/g 1,270 ng/g 156 ng/g 1,310 ng/g 421 ng/g
SED-4	2201176	1/13/2022	13C2-PFTeDA	26.0	ND
SED-5	2201176	1/13/2022	13C2-PFTeDA	23.8	ND
MS	2201176	—	13C2-PFDoA 13C2-PFTeDA	49.7 26.0	6.95 ng/g 10.7 ng/g

Sample ID	WO	Date Collected	Surrogate(s)	%R	Associated Analyte(s)
MSD	2201176	—	13C2-PFDoA 13C2-PFTeDA	49.0 22.8	6.07 ng/g 10.3 ng/g
SED-9	2201176	1/14/2022	13C2-PFTeDA	40.0	ND
SED-9 DUP	2201176	1/14/2022	d3-MeFOSAA 13C2-PFuNA d5-EtFOSAA 13C2-PFDoA 13C2-PFTeDA	39.2 44.0 34.1 33.2 31.2	ND ND ND ND ND

ND = Target analyte not detected in sample
ng/L = Nanograms per liter
g/g = Nanograms per gram

E-2.5 Blank Samples

A total of 4 field blanks, 1 for each day of sampling, were prepared in the field during the sampling effort. No trip blanks were submitted with these samples. The laboratory analyzed 2 method blank samples with this sample group. No PFAS were detected in the field blanks or the laboratory method blanks.

A total of 2 field blanks were prepared in the field during the sampling effort: 1 for each day of sampling. No PFAS were detected in either field blank.

The laboratory analyzed 2 method blank samples with this sample group. No PFAS were detected in either laboratory method blank.

A total of 4 equipment rinsate samples were collected for each day of sampling. Target analytes were detected only in the rinsate collected on January 11, 2022. The results are summarized in the following table.

Analyte	Concentration (ng/L)			
	Rinsate 1/11/2022	Rinsate 1/12/2022	Rinsate 1/13/2022	Rinsate 1/14/2022
PFHxA	1.93 J	ND	ND	ND
PFHxS	1.72 J	ND	ND	ND
PFOS	28.8	ND	ND	ND
6:2 FTS	4.01	ND	ND	ND
8:2 FTS	1.43 J	ND	ND	ND

J = Analyte positively identified, but result is considered an estimate
ND = Not detected

Five PFAS listed in this table were detected in an equipment blank collected before the start of sampling at location MW05001. While these compounds were also detected in the sample from well MW05001, the concentrations in the field sample were generally more than 10,000 times that detected in the equipment rinsate. It is unlikely that there was any significant cross contamination of the sample.

E-2.6 LCS and LCS Duplicates

Vista analyzed 1 LCS/LCSD with this sample group. The LCS/LCSD is a sample of analyte-free water to which known quantities of the target analytes are added. The samples are then analyzed and analyte recoveries are measured. The percent recoveries (%Rs) of analytes added to the LCS and LCSD were all within the acceptance limits established for each analyte. The %Rs of surrogates added to these QC samples were also within acceptance limits (50 to 150 percent).

Precision of duplicate results is calculated using the relative percent difference (RPD). The RPDs for each of the target analytes for the LCS/LCSD samples was 30 percent or less, and met the precision objective for aqueous samples.

Vista also analyzed an Ongoing Performance and Recovery (OPR) sample, which is sometimes referred to as an LCS. The %Rs of analytes added to the OPR were all within the acceptance limits established for each analyte. The %Rs of surrogates added to the samples were also within acceptance limits (50 to 150 percent).

E-2.7 Field Duplicates

Duplicate samples were collected at 2 sample locations during the sampling event. The analytical results of the primary and duplicate samples for each of the target analytes detected were compared using the RPD. The maximum RPDs for the four sets of results ranged from 6.7 to 26.2 (Table E-1), and met the precision objective for aqueous samples.

E-2.8 Matrix Spike/Matrix Spike Duplicate Analysis

MS/MSD analysis was performed using additional sample volume collected from well MW-D. Percent recoveries and RPDs met QC objectives for all target analytes, with the following exceptions:

Analyte	MS %R	MSD %R	%R Limits	RPD	RPD Limit	Sample Result (ng/L)
PFBA	143	133	73-129	7.25 [a]	30	346
PFPeA	113 [a]	131	72-129	14.8 [a]	30	1,200
PFHxA	-117 [a]	68.2	72-129	759	30	1,260
PFHpA	188	151	72-130	21.8 [a]	30	561
PFOA	31.2	116 [a]	71-133	115	30	1,800
PFPeS	71.6 [a]	164	71-127	78.4	30	285
PFHxS	281	205	68-131	31.3	30	5,820
PFOS	-35.2	99.8 [a]	65-140	418	30	2,190
6:2 FTS	579	366	64-140	45.1	30	1,610

[a] Result met QC limit

E-3. Overall Assessment

Laboratory data for a total of 15 groundwater samples, 3 surface water samples, and 10 sediment samples from Holloman AFB were evaluated to confirm that the DQOs for the NMED Phase I PFAS investigation project were met. The data quality assessment indicates that overall quality of the laboratory data is acceptable and meets the DQOs for this project.

E-3.1 Precision

Precision is a measure of how closely values from measurements of a primary and duplicate sample agree with each other. Precision for aqueous samples is measured by calculating the

RPD for the following results: (1) primary and duplicate samples, (2) MSs and MSDs, and (3) LCSs and LCSDs. The precision objective for aqueous samples is an RPD of 30 percent or less, where results are reported at greater than 5 times the quantitation limit. For solid samples (soil and sediment), the precision objective is an RDP of 50 percent or less. Field duplicates were collected at a frequency of 14 percent of field samples. MS/MSDs were collected at a frequency of 10 percent of field samples. LCS/LCSD precision was reported by the laboratories for preparatory batches.

- A total of 4 duplicate samples were collected, including 1 for groundwater, 1 for surface water, and 2 for sediment. In each case, numerous PFAS were detected in the primary and duplicate samples, and with a few exceptions, the same PFAS were detected in the associated duplicates. While aqueous samples generally met the precision objective described above, sediment samples often did not. However, the results are considered acceptable and no data were qualified.
- In MS/MSD #1, RPDs for PFBA, PFPeA, PFBS, PFHpA, PFHxS, 6:2 FTS, PFOA, and PFOS did not meet acceptance criteria
- In MS/MSD #2, RPDs for PFBA, PFBS, 4:2 FTS, PFPeS, HFPO-DA, PFHpA, PFHxS, 6:2 FTS, PFNA, and PFOS did not meet acceptance criteria
- In MS/MSD #3, RPDs for PFHxS, 6:2 FTS, and PFOS did not meet acceptance criteria.

With the exceptions described above, the analytical results met the DQO for precision.

E-3.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value. Accuracy in the field is assessed through the use of field reagent blanks as negative controls and through the adherence to all sample handling, preservation, and holding time requirements. The objective for field reagent blanks is that no target compounds are detected above the laboratory method reporting limits (RLs).

Laboratory accuracy is assessed through the analysis of laboratory method blanks as negative controls, LCSs, OPRs, or laboratory fortified blanks (LFBs) as clean matrix positive controls, MS/MSDs as sample matrix positive controls, and recovery of EIS compounds for the isotope dilution method. Method blanks should not contain any target compounds above the reporting limits. For the LCS, OPRs, and extracted internal standards, the accuracy objectives, as measured by %Rs, were the control limits provided in the laboratory SOPs.

- No PFAS were detected in the 2 field blanks collected during the sampling event.
- No PFAS were detected in the 5 method blanks run by the laboratory.
- PFAS were detected in 2 of 4 equipment rinsates collected during the field program:
  - The rinsate sample from January 11, 2022, which was collected prior to sampling well MW05001, was found to contain 5 PFAS (PFHxA [1.93 nanograms per liter (ng/L)], PFHxS [1.72 ng/L], PFOS [28.8 ng/L], 6:2 FTS [4.01 ng/L], and 8:2 FTS [1.43 ng/L]). While these compounds were also detected in the sample from well MW05001, the concentrations in the field sample were generally more than 10,000 times that detected in the equipment rinsate. It is unlikely that there was any significant cross contamination of the sample; however, the results for those 5 PFAS were qualified with a B for all samples from January 11, 2022.
  - The rinsate sample from January 14, 2022, which was collected prior to collecting sediment sample SED-8, was found to contain PFOS (2.06 ng/L). PFOS (109,000 ng/g) was 1 of 19 PFAS detected in the field sample, but given the concentration difference, it is unlikely that there was any significant cross contamination of the sample; however, the results for PFOS were qualified with a B for all samples from January 14, 2022.
- The %R of HFPO-DA (137 percent) was exceeded in a laboratory OPR run in SDG 2201175. HFPO-DA was not detected in the associated sample, but the result was qualified UJ. %R for other LCS and OPRs were within acceptance limits.
- In MS/MSD #1 (SDG 2201175), %R for PFBA, PFPeA, PFBS, PFHxA, PFPeS, 6:2 FTS, and PFOS did not meet acceptance criteria in both the MS and the MSD analysis. In addition, %R in the MSD for PFHpA, PFHxS, and PFOA did not meet acceptance criteria.
- In MS/MSD #2 (SDG 2201175), %R for PFBA, PFMBA, PFPeA, PFBS, PFEESA, NFDHA, PFHxA, PFPeS, PFHpA, PFHxS, PFOA, PFHpS, PFOS, and PFTrDA did not meet acceptance criteria in both the second MS and the MSD in SDG No. 2201175. %R for 4:2 FTS, 6:2 FTS, PFNA, and HFPO-DA did not meet acceptance criteria in the MSD.
- In MS/MSD #3 (SDG 2201176), %R for in both the MS and the MSD for PFHxS, 6:2 FTS, and PFOS did not meet acceptance criteria. In addition, in the MSD, %R for PFTrDA did not meet acceptance criteria.
- Surrogate %R outside control limits were reported for 36 results, representing 6.8 percent of total PFAS results reviewed. Only 17 of the 36 results were associated with detections. Of

the 17 results, 16 were biased low and qualified J- and 1 was biased high and qualified J+. The non-detect results were qualified UJ.

- Holding times were met for PFAS analysis.

The laboratory case narrative indicates that initial calibration and continuing calibration verifications for this work order met the method acceptance criteria.

E-3.3 Sensitivity

The sensitivity of the analytical data is demonstrated by laboratory method RLs, which are generally based on the low point of calibration. For this project, the laboratory achieved RLs of 4 ng/L or less for aqueous samples. Where required, dilution and reanalysis of specific analytes and associated EISs were performed and highlighted by the laboratory with a D qualifier. All results were reported to two significant figures if less than 10 ng/L for aqueous samples of 10 ng/g for solid samples. Results below the RLs, but above the method detection limits (MDLs), were also reported and qualified by the laboratory as estimates.

E-3.4 Comparability

Comparability is the degree to which different methods or data agree or can be represented as similar, and expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and is satisfied by ensuring that the protocols described in the reference methods are followed and that proper sampling techniques are used. Planned analytical data will be comparable when similar sampling and analytical methods are used in future events.

E-3.5 Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is ensured through the design of the sampling program and was satisfied by ensuring that field personnel used proper sampling techniques per field SOPs. Within the laboratory, representativeness is ensured by the use of appropriate reference methods, conformance to the approved analytical procedures described in the laboratory SOPs, and adherence to sample holding times.

E-3.6 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned. Field completeness is a measure of the number of valid samples obtained during the project. A generic field completeness objective is greater than 90 percent, which was achieved for this project.

Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. A generic laboratory completeness objective is greater than 95 percent, which was achieved for this task. All laboratory results are considered usable for all project purposes; no laboratory results were rejected.

References

Department of Defense (DOD). 2020. *Data validation guidelines Module 3: Data validation procedure for per- and polyfluoroalkyl substances analysis by QSM Table B-15*. May 2020.

Hall Environmental Analysis Laboratory (HEAL). 2022. Holloman AFB PFAS, Order No. 2112792. Revised report issued May 26, 2022.

Vista Analytical Laboratory (Vista). 2022. Vista Work Order 2112095. Prepared for Hall Environmental Analysis Laboratory, Project 2112792. January 11, 2022.

Table E-1. PFAS in Duplicate Samples

Analyte	Concentration (ng/L) MW-02&05-02 1/12/2022		RPD	Concentration (ng/L) SW-2 1/13/2022		RPD	Concentration (ng/g) SED-5 1/13/2022		RPD	Concentration (ng/g) SED-9 1/14/2022		RPD
PFBA	1,660	1,670	0.6	5,230	5,070	-3.1	4.58	4.35	-5.2	3.69	7.5	68.1
PFPeA	3,700	3,710	0.3	16,800	18,200	8.0	17.3	15.1	-13.6	30.5	62.8	69.2
PFBS	1,910	2,350	20.7	3,500	3,020	-14.7	2.52	2.85	12.3	1.24	3.51	95.6
4:02 FTS	9.11	<3.82	—	98.9	93.5	-5.6	<2.00	<1.96	—	<1.97	<1.99	—
PFHxA	8,630	9,980	14.5	10,700	10,600	-0.9	23.9	21.7	-9.6	18.6	47.5	87.4
PFPeS	1,580	1,860	16.3	2,610	2,160	-18.9	2.59	2.58	-0.4	1.1	3.94	112.7
HFPO-DA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFHpA	871	921	5.6	1,840	1,800	-2.2	3.96	3.72	-6.2	7.59	24.8	106.3
ADONA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFHxS	12,700	12,600	-0.8	8,220	7,900	-4.0	253	129	-64.9	13	40.1	102.1
6:02 FTS	3,620	2,720	-28.4	3,040	2,880	-5.4	66.5	37.7	-55.3	6.01	13.2	74.9
PFOA	5,010	5,520	9.7	728	640	-12.9	33.8	17.6	-63.0	1.54	5.26	109.4
PFHpS	144	160	10.5	139	116	-18.0	10.5	8.19	-24.7	<1.97	2.15	—
PFNA	46	50.2	8.7	51.6	40.3	-24.6	17.5	16.2	-7.7	<1.97	1.61	—
PFOS	2,620	2,630	0.4	4,360	3,840	-12.7	799	1,080	29.9	48.2	254	136.2
9Cl-PF3ONS	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFDA	<3.85	<3.82	—	4.14	3.57	-14.8	3.04	5.39	55.8	<1.97	0.838	—
8:02 FTS	34	35.2	3.5	17.7	8.64	-68.8	6.56	11.6	55.5	<1.97	0.534	—
MeFOSAA	<3.85	<3.82	—	<3.88	<3.86	—	1.48	1.95	27.4	<1.97	<1.99	—
EtFOSAA	<3.85	<3.82	—	<3.88	<3.86	—	0.583	1.0	52.7	<1.97	<1.99	—
PFUnA	<3.85	<3.82	—	<3.88	<3.86	—	1.27	2.7	72.0	<1.97	<1.99	—
11Cl-PF3OUdS	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFDoA	<3.85	<3.82	—	<3.88	<3.86	—	0.558	0.951	52.1	<1.97	<1.99	—
PFTrDA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFTeDA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFMBA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFMPA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
PFEESA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—
NFDHA	<3.85	<3.82	—	<3.88	<3.86	—	<2.00	<1.96	—	<1.97	<1.99	—

Appendix F

Biological Testing Summaries

DBS&A
Daniel B. Stephens & Associates, Inc.

Preliminary Report on Bird Study at Holloman Lake for PFAS Monitoring

Prepared by Christopher C. Witt and Andrew B. Johnson
Museum of Southwestern Biology
June, 2022

Executive Summary

We surveyed and sampled the birds of Holloman Lake for the purposes of assessing the effects of PFAS on avian ecology and the resulting implications for human health. We found that Holloman Lake has thriving and diverse bird communities during the wintering, migration, and breeding seasons, respectively, and that species regularly utilizing the lake include several species of conservation concern. Hunters regularly take and eat various species of game birds from the lake. We collected 128 birds of 37 species from Holloman Lake and its immediate environs for the purposes of screening for PFAS contamination, and we have thousands of additional avian tissue samples in our archives to serve as control samples. We sent an initial 20 game-bird muscle samples for PFAS assays, and results are currently pending.

Birds of Holloman Lake

Holloman Lake is a desert oasis with a rich avifauna. The lake was constructed by the U.S. Air Force and receives a steady input of water from treated wastewater, supplemented by rainfall. Its history as a wastewater lagoon led both the water and sediment of the lake to be contaminated with several toxic chemicals such as organichlorine pesticides (incl. benzine hexachloride), various inorganic substances, and various PFAS compounds, among others.

In this study we sought to gain insights into possible effects of PFAS or other contaminants on the avifauna, especially in as far as it might affect the integrity of meat from game species, and thereby pose a danger to human health mediated by the consumption of hunted birds.

Overview of the Avifauna

Data from eBird (https://ebird.org/barchart?r=L278720&yr=all&m=) and our own surveys over the course of the year show that at least 248 species of birds regularly occur at Holloman Lake. The eBird data, comprising 922 submitted checklists from various amateur, advanced amateur, and professional observers, primarily represent coverage over the most recent decade; it can be expected that many additional species have occurred here in the past, and that others continue to occur but have not yet been observed or entered into eBird. For example, Common Ground Dove was listed by the U.S. Fish and Wildlife Service as a species of conservation concern that occurred at

Holloman Lake as of the early 1990s, but has likely been locally extirpated, and has not yet been documented on eBird checklists as occurring at the site.

Habitats

Habitats for birds at Holloman Lake include the shallow, freshwater lake, its extensive shoreline (most of which lacks aquatic vegetation), desert scrub and grassland surrounding the lake, freshwater marsh at the head of the lake (north end), and a limited extent of riparian habitat surrounding the marsh. The dominant plants of the lake's shoreline are small trees and shrubs, the vast majority of which are tamarisk and four-winged saltbush, the latter species increasing in frequency with increasing distance from the lakeshore. western glasswort (*Salicornia rubra*), saltgrass (*Distichilis spicata*) and harmel (*Peganum* sp.) were also present in smaller but significant numbers. The inflow areas of the lake have emergent aquatic vegetation, particularly at the north end, which provides habitat for several aquatic bird species to shelter, forage, and nest. The north end of the lake held the only extensive marsh vegetation with cattail (*Typhus* sp.) and clubrush (*Bolboschoenus*) growing in a dense bed surrounded by larger tamarisk. Of the 113 aquatic bird species known from Holloman Lake, 56 species tend to utilize open water habitats of the lake, 38 are associated with the bare shorelines and adjacent shallow water areas, and 19 are associated with more heavily vegetated marsh habitats. Extensive upland habitats surrounding the lake are desert grassland and shrubland; birds that live in those habitats, for example, Horned Larks, also visit the lake to drink, and therefore could be affected by contamination.

Integrity of Avian Communities, Including Species of Conservation Concern

The bird community at Holloman Lake is diverse and is consistent with the functioning of a productive aquatic ecosystem with varied resources and a robust food web. The species that are present at any given season are those expected for the habitats and geographic position of this site. As the largest body of water in the Tularosa Basin, Holloman Lake seems to be exceptional as a stopover site for migrating birds — the day to day variation in numbers and species of birds present is substantial. Therefore, if PFAS is contaminating tissues of birds that use the lake, Holloman Lake could be a source of PFAS contamination that affects bird populations across a broad swath of North America. Among species of conservation concern, there are several that visit the lake at least occasionally, and one species, the snowy plover, that depends on it heavily. Snowy plovers are common around the margins of Lake Holloman, as well as on adjacent Lake Stinky, when it contains water. The species breeds here and we estimate, based on our observations, that there are at least four breeding pairs present in 2022 (and possibly several more).

The breeding bird community is undoubtedly the most sensitive to contamination effects because of the potential for exposure at early life stages. We tallied 43 species for which there is evidence of breeding at or in the vicinity of Holloman Lake. We included species that utilize resources of the lake while breeding, even if nests are not close by (e.g., Peregrine Falcon, which makes foraging forays to the lake regularly at all seasons). There are many more species (e.g. many ducks and grebes) that likely breed at Holloman Lake once in a while, but not regularly. While 43 may seem like a modest number, the lack of wooded habitats precludes many common terrestrial bird species from breeding at the site.

Raptors are very common at Lake Holloman, as the desert oasis effect serves to concentrate prey items. These include several species of conservation concern, most notably peregrine falcon, prairie falcon, bald eagle, and ferruginous hawk. Raptors could be especially vulnerable to bioaccumulation of toxic substances because of their high trophic position.

Game Species and Human Consumption

There are at least 41 game species that have been recorded at Holloman Lake (Table 1). These are species that can be hunted and eaten by any person who purchases a hunting license. The majority of these are obligate aquatic-habitat species that forage in water and would be considered to be highly susceptible to consuming contaminants from water or lake sediment. Some species, such as sandhill crane, regularly stop at Holloman Lake to forage and roost, and are not hunted there, but undoubtedly are part of the same populations that are hunted in other areas of the state, highlighting the possibility that game meat elsewhere could be carrying PFAS contamination that was accumulated during stopover periods. Non-aquatic species include doves and quail, both of which we have observed foraging and nesting in the immediate vicinity of the lake.

Hunting occurs at and in Holloman Lake itself. We met several hunters during the course of this project who are based in Alamogordo and who regularly hunt at Holloman Lake, consume meat from birds hunted at Holloman Lake, and feed the meat to their families and friends, including small children.

Sample Collection Efforts for PFAS Screening

Collecting at Holloman Lake

We visited Holloman Lake on 23 separate days, between December 7, 2021 and June 20, 2022. During our visits, we surveyed birds present, looked for evidence of breeding, gathered observations about avian ecology and natural history, and collected

specimens to be used for PFAS screening of tissues. Sampling during the winter months was focused on collecting ducks, the group of birds most likely to be consumed by humans. Later collecting efforts were focused on nongame species. In total, we collected 128 birds from Holloman Lake, distributed among three distinct seasons (winter, migration, and breeding), representing 37 species (Table 2).

Collecting at Control Sites

Separately, during the same time period, we visited other sites in New Mexico to collect specimens and frozen tissue samples of species that also occur at Holloman Lake. The purpose of this was to establish a bank of control samples that can be used as a baseline with which to compare Holloman Lake samples with respect to PFAS contamination. For this purpose, we can also draw on our extensive collection of ~30,000 avian tissue samples that have been amassed over the last four decades and are stored in the frozen tissue archives of the Museum of Southwestern Biology.

Selection of Samples for Initial PFAS Screening

For the first 20 avian tissue samples to screen for PFAS, we selected samples from representative game species that we know to be hunted at Holloman Lake and eaten by people (Table 3). These include green-winged teal, several other duck species, and American coot. In total, we selected nine control samples and eleven samples that were collected at Holloman Lake and were likely wintering on site. We opted to screen muscle tissue because it is representative of the tissue consumed by people, and therefore immediately relevant to human health. Some of the same individual birds that we sent for screening were also shot by and eaten by hunters, who fileted out the breast meat before donating the rest of the carcass to our scientific efforts.

Table 1. Game species known to occur at Holloman Lake. These are species that can be hunted and eaten by people, providing a potential hazard of PFAS to human health.

Common Name	**Scientific Name**
Fulvous whistling-duck	*Dendrocygna bicolor*
Snow goose	*Anser caerulescens*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Blue-winged teal	*Spatula discors*
Cinnamon teal	*Spatula cyanoptera*
Northern shoveler	*Spatula clypeata*
Gadwall	*Mareca strepera*
Eurasian wigeon	*Mareca penelope*
American wigeon	*Mareca americana*
Mallard	*Anas platyrhynchos*
Mexican duck	*Anas diazi*
Northern pintail	*Anas acuta*
Green-winged teal	*Anas crecca*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Surf scoter	*Melanitta perspicillata*

Common Name	Scientific Name
White-winged scoter	*Melanitta deglandi*
Black scoter	*Melanitta americana*
Long-tailed Duck	*Clangula hyemalis*
Bufflehead	*Bucephala albeola*
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Scaled quail	*Callipepla squamata*
Gambel's quail	*Callipepla gambelii*
Rock pigeon	*Columba livia*
Eurasian collared-dove	*Streptopelia decaocto*
White-winged dove	*Zenaida asiatica*
Mourning dove	*Zenaida macroura*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
American coot	*Fulica americana*
Sandhill crane	*Antigone canadensis*
Wilson's snipe	*Gallinago delicata*

Table 2. Species and numbers of birds that were collected at Holloman Lake during 2021-2022, for PFAS screening. All of these are archived at the Museum of Southwestern Biology in both the dried and frozen collections.

Common Name	Scientific Name	Winter	Spring	Summer	Total number collected
Snow goose	*Anser caerulescens*	1			1
Northern shoveler	*Spatula clypeata*	22			22
Gadwall	*Mareca strepera*	2			2
American wigeon	*Mareca americana*	1			1
Northern pintail	*Anas acuta*	2			2
Green-winged teal	*Anas crecca*	3			3
Redhead	*Aythya americana*	12			12
Bufflehead	*Bucephala albeola*	4			4
Common goldeneye	*Bucephala clangula*	1			1
Common merganser	*Mergus merganser*	3			3
Ruddy duck	*Oxyura jamaicensis*	2			2
Eared grebe	*Podiceps nigricollis*	1			1
Virginia rail	*Rallus limicola*			1	1
American coot	*Fulica americana*	1			1
Black-necked stilt	*Himantopus mexicanus*	1		1	2
American avocet	*Recurvirostra americana*		2		2
Killdeer	*Charadrius vociferus*		1	3	4
Least sandpiper	*Calidris minutilla*	2			2

Common Name	Scientific Name	Winter	Spring	Summer	Total number collected
White-faced ibis	*Plegadis chihi*		5		5
Sharp-shinned hawk	*Accipiter striatus*		1		1
Western wood-pewee	*Contopus sordidulus*		1		1
Say's phoebe	*Sayornis saya*	1			1
Horned lark	*Eremophila alpestris*	11			11
Marsh wren	*Cistothorus palustris*	5			5
Gray catbird	*Dumetella carolinensis*			1	1
Curve-billed thrasher	*Toxostoma curvirostre*			1	1
American pipit	*Anthus rubescens*	4			4
Brewer's sparrow	*Spizella breweri*	2			2
White-crowned sparrow	*Zonotrichia leucophrys*		2		2
Sagebrush sparrow	*Artemisiospiza nevadensis*	1			1
Song sparrow	*Melospiza melodia*	6			6
Yellow-breasted chat	*Icteria virens*		2		2
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*		6	1	7
Brown-headed cowbird	*Molothrus ater*		1		1
Common	*Geothlypis trichas*		3	2	5

Common Name	Scientific Name	Winter	Spring	Summer	Total number collected
yellowthroat					
Yellow-rumped warbler	*Setophaga coronata*	1			1
Wilson's warbler	*Cardellina pusilla*		5		5
	Totals	89	29	10	128

Table 3. Muscle samples selected and shipped for preliminary assay of PFAS contamination. We selected ten samples from Holloman Lake and ten control samples away from Holloman Lake.

Sample No.	Common Name	Scientific Name	Locality	Date
NK283617	Green-winged teal	*Anas crecca*	Bernardo WMA	12-Dec-2021
NK283706	Mallard	*Anas platyrhynchos*	Bernardo	11-Dec-2021
NK283721	Mallard	*Anas platyrhynchos*	Bernardo	5-Dec-2021
NK283676	American coot	*Fulica americana*	Albuquerque	11-Apr-2022
NK283697	American coot	*Fulica americana*	Albuquerque	26-Jan-2022
NK283613	American coot	*Fulica americana*	Sevilleta NWR	23-Jan-2022
NK283614	American coot	*Fulica americana*	Sevilleta NWR	23-Jan-2022
NK283616	American coot	*Fulica americana*	Sevilleta NWR	23-Jan-2022
NK283699	Ruddy duck	*Oxyura jamaicensis*	Claunch	4-Apr-2022
NK283634	Green-winged teal	*Anas crecca*	Holloman Lake	31-Jan-2022
NK283635	Green-winged teal	*Anas crecca*	Holloman Lake	30-Jan-2022
NK283675	Green-winged teal	*Anas crecca*	Holloman Lake	8-Jan-2022
NK283668	Redhead	*Aythya americana*	Holloman Lake	8-Jan-2022
NK283628	Redhead	*Aythya americana*	Holloman Lake	20-Jan-2022
NK283603	American coot	*Fulica americana*	Holloman Lake	10-Dec-2021
NK283637	Common merganser	*Mergus merganser*	Holloman Lake	31-Jan-2022
NK283612	Common merganser	*Mergus merganser*	Holloman Lake	16-Jan-2022
NK283630	Ruddy duck	*Oxyura jamaicensis*	Holloman Lake	15-Jan-2022

Sample No.	Common Name	Scientific Name	Locality	Date
NK283610	Northern shoveler	*Spatula clypeata*	Holloman Lake	16-Jan-2022
NK283666	Northern shoveler	*Spatula clypeata*	Holloman Lake	8-Jan-2022

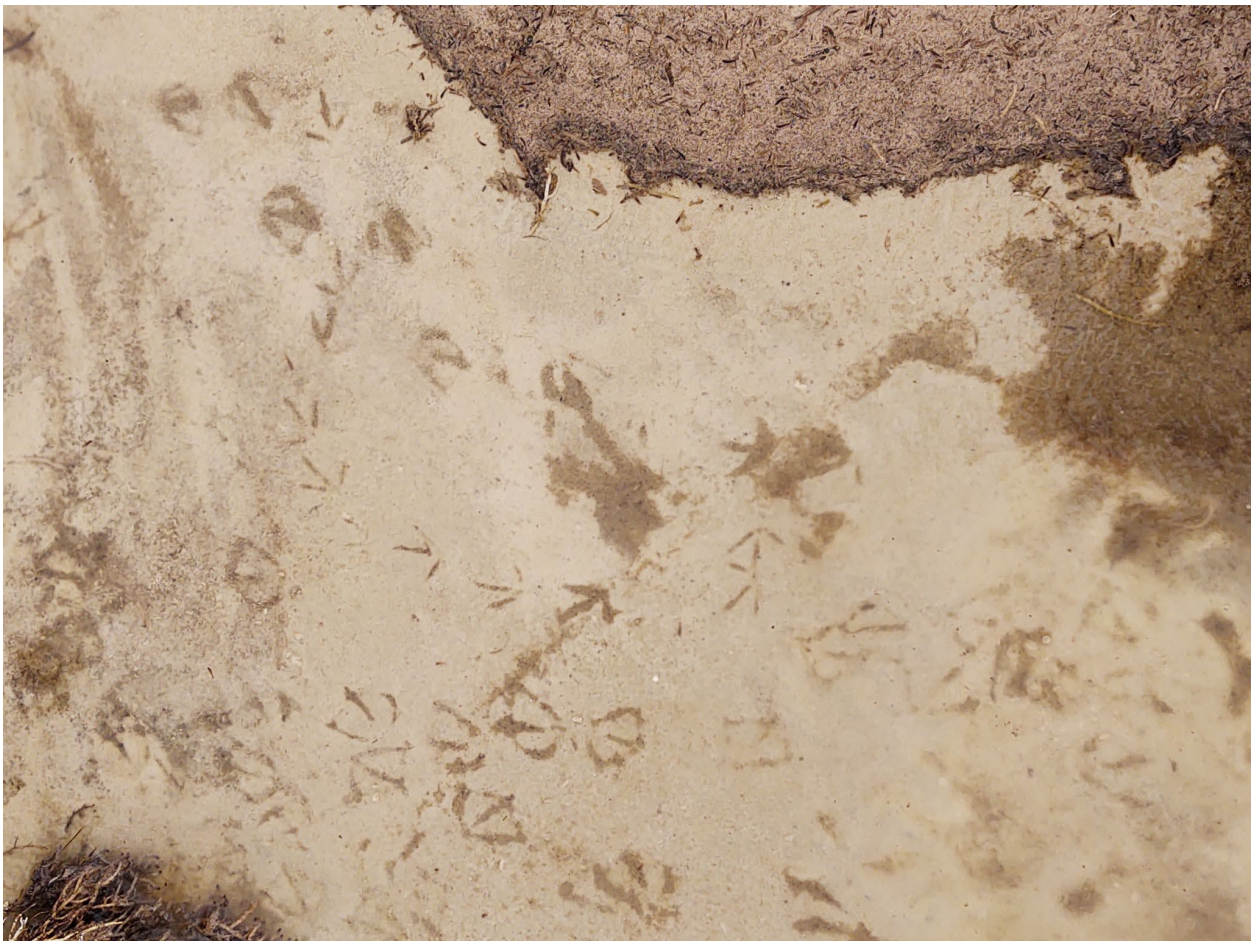

















034









Museum of Southwestern Biology Division of Mammals
Holloman Air Force Base Small Mammal PFAS Sampling Summary

The small mammal community around Lake Holloman (Otero County, Holloman Air Force Base, Lake Holloman, elevation 1,219 meter, 32.812, -106.121) was surveyed using independent traplines of varied trap type (Sherman, Museum Special, Victor Rat, and Macabie gopher traps) designed to sample the various habitat types (lake shoreline dominated by western glasswort, invasive tamarisk dominated canal areas, four-wing saltbush and honey mesquite grass/shrubland, and the cattail (*Typha* sp.), tamarisk dominated wetland inflow to Lake Holloman) and the full small mammal community. Additionally, a creosote/mesquite shrubland at the Oliver Lee State Park site (Otero County, 1.4 km west and 0.5 km south of Oliver Lee State Park, elevation 1,265 meters, 32.748, -105.929) was sampled to serve as a local control site. The Museum of Southwestern Biology (MSB) also archives thousands of additional mammalian tissue samples representing a broad spatial and temporal range which can be leveraged as additional control samples or to address questions regarding the temporal aspects of PFAS in New Mexico.

Three seasonal collecting events were conducted (October 2021, March 2022, and May 2022) and consisted of >3,000 trap nights. A total of 282 small mammal specimens from eleven species were collected during these events (Table 1).

Table 1.

Species	Oct-21	Mar-22	May-22	Total	Locality
White-footed mouse (*Peromyscus leucopus*)	20	32	19	71	Holloman Lake
Cactus mouse (*Peromyscus eremicus*)	3	0	1	4	Holloman Lake
Western harvest mouse (*Reithrodontomys megalotis*)	5	31	32	68	Holloman Lake
Hispid cotton rat (*Sigmodon hispidus*)	1	4	7	12	Holloman Lake
Silky pocket mouse (*Perognathus flavus*)	3	1	0	4	Holloman Lake
House mouse (*Mus musculus*)	4	8	16	28	Holloman Lake
Chihuahuan pocket mouse (*Chaetodipus eremicus*)	3	15	6	24	Holloman Lake
Merriam's kangaroo rat (*Dipodomys merriami*)	5	14	14	33	Holloman Lake
Desert pocket gopher (*Geomys arenarius*)	1	0	0	1	Holloman Lake
Chihuahuan grasshopper mouse (*Onychomys arenicola*)	0	4	1	5	Holloman Lake
TOTAL	45	109	96	250	Holloman Lake
Chihuahuan pocket mouse (*Chaetodipus eremicus*)	11	0	6	17	Control Site
Merriam's kangaroo rat (*Dipodomys merriami*)	7	0	6	13	Control Site
Cactus mouse (*Peromyscus eremicus*)	1	0	0	1	Control Site
Striped skunk (*Mephitis mephitis*)	0	1	0	1	Control Site
TOTAL	19	1	12	32	Control Site

Blood samples, tissue samples (heart, lung, liver, spleen, kidney, muscle, and large intestine), and endo and ecto parasites were collected from each individual animal, using PFAS-free supplies and frozen in liquid nitrogen (-196°C) for archival at the MSB, and subsequent PFAS testing and tissue specific PFAS concentration questions. Species identification, reproductive data, standard measurements, precise locality and collection data, and sample parts/preservation data were collected for each individual and

are recorded on the MSB field datasheets. Object tracking barcodes were assigned for all sample parts for access through the MSB's object tracking system for subsequent PFAS testing.

All specimens are georeferenced to an accuracy of 3 meters, allowing association of PFAS results to not just small mammal species, but the exact location/habitat within the Holloman area.

Appendix G

Biological Laboratory Reports

DBS&A
Daniel B. Stephens & Associates, Inc.

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-88244-1
Laboratory Sample Delivery Group: Frozen Liver
Client Project/Site: Holloman bird/mammal PFAS Project

For:
University of New Mexico
Museum of Southwestern Biology
Division of Mammals
CERIA Bldg 83, Room 204
Albuquerque, New Mexico 87131

Attn: Jean-Luc Cartron

Linda C. Laver

Authorized for release by:
6/22/2022 6:20:43 PM

Linda C. Laver, Senior Project Manager
(916)374-4362
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LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
E	Result exceeded calibration range.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-88244-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-88244-1

Receipt
The samples were received on 5/24/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -47.7º C.

Receipt Exceptions
The requested analysis is not listed on the Chain-of-Custody (COC). Samples were logged in for PFAS based on the quote that was provided prior to receipt of samples.

The Chain-of-Custody has a sample ID listed as MSB340103_liver, but the ID on the container was NK311424_liver. Client confirmed the correct ID to use is NK311424_liver (320-88244-9).

LCMS
Method B/L/T PFAS: The "I" qualifier means the transition mass ratio for the indicated analyte was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some elevated bias. However, analyst judgment was used to positively identify the analyte. NK310910_liver (320-88244-3) and NK310911_liver (320-88244-4)

Method B/L/T PFAS: The concentration of one or more analytes exceeded the instrument calibration range in the following samples. Sample extracts that exhibited potentially saturated peak response were diluted. Historical data indicate that for the isotope dilution method, and in the absence of peak saturation, dilution and re-analysis will not produce significantly different results from those reported above the calibration range. NK310903_liver (320-88244-1), NK310904_liver (320-88244-2), NK310910_liver (320-88244-3), NK310911_liver (320-88244-4), NK310945_liver (320-88244-6), NK310921_liver (320-88244-7), NK310914_liver (320-88244-8) and NK311424_liver (320-88244-9)

Method B/L/T PFAS: Some Isotope Dilution Analyte (IDA) recoveries are above the method recommended limit in the following samples. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries. NK310903_liver (320-88244-1), NK310904_liver (320-88244-2), NK310910_liver (320-88244-3), NK310911_liver (320-88244-4), NK310941_liver (320-88244-5), NK310945_liver (320-88244-6), NK310921_liver (320-88244-7), NK310914_liver (320-88244-8), NK311424_liver (320-88244-9), (LCS 320-596157/2-A), (LCSD 320-596157/3-A) and (MB 320-596157/1-A)

Method B/L/T PFAS: Some Isotope Dilution Analyte (IDA) recoveries are below the method recommended limit in the following samples. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples. NK310903_liver (320-88244-1), NK310911_liver (320-88244-4), NK310941_liver (320-88244-5), NK310945_liver (320-88244-6), NK310921_liver (320-88244-7) and NK311424_liver (320-88244-9)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method SHAKE: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-596157 and preparation batch 320-596388.

Method SHAKE: The following samples were yellow in color following extraction: NK310903_liver (320-88244-1), NK310904_liver (320-88244-2), NK310910_liver (320-88244-3), NK310911_liver (320-88244-4), NK310941_liver (320-88244-5), NK310945_liver (320-88244-6), NK310914_liver (320-88244-8) and NK311424_liver (320-88244-9).

Method SHAKE: Elevated reporting limits are provided for the following samples due to insufficient sample provided for analysis: NK310903_liver (320-88244-1), NK310904_liver (320-88244-2), NK310910_liver (320-88244-3), NK310911_liver (320-88244-4), NK310941_liver (320-88244-5), NK310945_liver (320-88244-6), NK310921_liver (320-88244-7), NK310914_liver (320-88244-8) and NK311424_liver (320-88244-9).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310903_liver — Lab Sample ID: 320-88244-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.2		1.2	0.29	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.40	J	1.2	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	0.65	J	1.2	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.65	J	1.2	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	12		1.2	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	4.3		1.2	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.8		1.2	0.33	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	1.0	J	1.2	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	11		1.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	160		1.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	150	E	1.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	6.8		1.2	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	810	E	3.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	230	E	3.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	1000		3.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
6:2 FTS	0.96	J	1.2	0.52	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	3.4		1.2	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.12	J	1.2	0.12	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310904_liver — Lab Sample ID: 320-88244-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.0	J	3.6	0.84	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.92	J	3.6	0.37	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	18		3.6	0.53	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	37		3.6	0.53	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	18		3.6	0.53	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	7.1		3.6	0.66	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	650	E	8.9	0.73	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	200		8.9	0.73	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	850		8.9	0.73	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310910_liver — Lab Sample ID: 320-88244-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	J	2.3	0.54	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	8.3		2.3	0.40	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	2.6		2.3	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.92	J	2.3	0.62	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	13		2.3	0.34	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	27		2.3	0.34	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	13		2.3	0.34	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	15		2.3	0.42	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	0.35	J	2.3	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.25	J I	2.3	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	630	E	5.7	0.46	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	330	E	5.7	0.46	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	960		5.7	0.46	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310911_liver — Lab Sample ID: 320-88244-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	5.3		2.6	0.61	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	4.3		2.6	0.45	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	3.0		2.6	0.26	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.95	J	2.6	0.70	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	3.7		2.6	0.38	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	3.7		2.6	0.38	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	8.8		2.6	0.47	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	0.33	J	2.6	0.26	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	1100	E	6.4	0.52	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	630	E	6.4	0.52	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	1700		6.4	0.52	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310941_liver — Lab Sample ID: 320-88244-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.9		1.7	0.39	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.25	J	1.7	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	12	I	4.2	0.34	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	4.9		4.2	0.34	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	16		4.2	0.34	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310945_liver — Lab Sample ID: 320-88244-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.5		1.1	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.36	J	1.1	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	0.52	J	1.1	0.31	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.2		1.1	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	1.5		1.1	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.63	J	1.1	0.31	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.75	J	1.1	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	5.6		1.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	64		1.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	59		1.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	5.1		1.1	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	810	E	2.8	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	230	E	2.8	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	1000		2.8	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	0.69	J	1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310921_liver — Lab Sample ID: 320-88244-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	3.6	J	4.5	1.1	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.5	J	4.5	0.53	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	120		4.5	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	4.5		4.5	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	120		4.5	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	250		4.5	0.80	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	18		4.5	0.47	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: NK310921_liver (Continued) — Lab Sample ID: 320-88244-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	5.4		4.5	1.2	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	1.9	J	4.5	0.82	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	55		4.5	0.67	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	610		4.5	0.67	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	560	E	4.5	0.67	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	150		4.5	0.84	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	10000	E	11	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	5900	E	11	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	16000		11	0.92	ug/Kg	1		B/L/T PFAS	Total/NA
6:2 FTS	160		4.5	1.9	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	13		4.5	0.45	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.53	J	4.5	0.46	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310914_liver — Lab Sample ID: 320-88244-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.9		1.1	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.38	J	1.1	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	0.43	J	1.1	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.43	J	1.1	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	14		1.1	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	4.0		1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.1		1.1	0.29	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	79		1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	160		1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	79		1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	70		1.1	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	4200	E	2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	1000	E	2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	5200		2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	1.8		1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK311424_liver — Lab Sample ID: 320-88244-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.1	J	1.5	0.36	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.95	J	1.5	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	3.6		1.5	0.42	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	34		1.5	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	1500	E	1.5	0.31	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	140		1.5	0.31	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	1600		1.5	0.31	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	620	E	1.5	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	46		1.5	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.6		1.5	0.42	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.6		1.5	0.26	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	48		1.5	0.28	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	2600	E	1.5	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	11000		1.5	0.23	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK311424_liver (Continued)

Lab Sample ID: 320-88244-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorohexanesulfonic acid	8000	E	1.5	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	1700	E	1.5	0.28	ug/Kg	1		B/L/T PFAS	Total/NA
6:2 FTS	1000	E	1.5	0.65	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	77		1.5	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.21	J	1.5	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - DL	24000	E	77	6.2	ug/Kg	20		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - DL	19000	E	77	6.2	ug/Kg	20		B/L/T PFAS	Total/NA
Total PFOS - DL	43000		77	6.2	ug/Kg	20		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310903_liver

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-1

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.2**		1.2	0.29	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluoropentanoic acid (PFPeA)	**0.40**	**J**	1.2	0.21	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluorohexanoic acid (PFHxA)	ND		1.2	0.33	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluoroheptanoic acid (PFHpA)	ND		1.2	0.14	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
L-Perfluorooctanoic acid	**0.65**	**J**	1.2	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Br-Perfluorooctanoic acid	ND		1.2	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Total PFOA	**0.65**	**J**	1.2	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluorononanoic acid (PFNA)	**12**		1.2	0.21	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluorodecanoic acid (PFDA)	**4.3**		1.2	0.13	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluoroundecanoic acid (PFUnA)	**1.8**		1.2	0.33	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.2	0.21	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluoropentanesulfonic acid (PFPeS)	**1.0**	**J**	1.2	0.22	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Br-Perfluorohexanesulfonic acid	**11**		1.2	0.18	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Total PFHxS	**160**		1.2	0.18	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
L-Perfluorohexanesulfonic acid	**150**	**E**	1.2	0.18	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Perfluoroheptanesulfonic acid (PFHpS)	**6.8**		1.2	0.23	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
L-Perfluorooctanesulfonic acid	**810**	**E**	3.0	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Br-Perfluorooctanesulfonic acid	**230**	**E**	3.0	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
Total PFOS	**1000**		3.0	0.25	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
4:2 FTS	ND		1.2	0.32	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
6:2 FTS	**0.96**	**J**	1.2	0.52	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
8:2 FTS	**3.4**		1.2	0.12	ug/Kg		06/16/22 19:00	06/18/22 19:00	1
10:2 FTS	**0.12**	**J**	1.2	0.12	ug/Kg		06/16/22 19:00	06/18/22 19:00	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*20*	*5-	*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C5 PFPeA	*99*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C2 PFHxA	*107*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C4 PFHpA	*108*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C4 PFOA	*106*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C5 PFNA	*109*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C2 PFDA	*110*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C2 PFUnA	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C3 PFBS	*102*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
18O2 PFHxS	*108*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C4 PFOS	*108*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
M2-4:2 FTS	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
M2-6:2 FTS	*126*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
M2-8:2 FTS	*121*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*
13C2 10:2 FTS	*152*	*5+	*25 - 150*	*06/16/22 19:00*	*06/18/22 19:00*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310904_liver

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-2

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.0**	**J**	3.6	0.84	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluoropentanoic acid (PFPeA)	ND		3.6	0.63	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluorohexanoic acid (PFHxA)	ND		3.6	0.98	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluoroheptanoic acid (PFHpA)	ND		3.6	0.41	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
L-Perfluorooctanoic acid	ND		3.6	0.72	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Br-Perfluorooctanoic acid	ND		3.6	0.72	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Total PFOA	ND		3.6	0.72	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluorononanoic acid (PFNA)	ND		3.6	0.63	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluorodecanoic acid (PFDA)	**0.92**	**J**	3.6	0.37	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluoroundecanoic acid (PFUnA)	ND		3.6	0.97	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		3.6	0.61	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluoropentanesulfonic acid (PFPeS)	ND		3.6	0.65	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Br-Perfluorohexanesulfonic acid	**18**		3.6	0.53	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Total PFHxS	**37**		3.6	0.53	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
L-Perfluorohexanesulfonic acid	**18**		3.6	0.53	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Perfluoroheptanesulfonic acid (PFHpS)	**7.1**		3.6	0.66	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
L-Perfluorooctanesulfonic acid	**650**	**E**	8.9	0.73	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Br-Perfluorooctanesulfonic acid	**200**		8.9	0.73	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
Total PFOS	**850**		8.9	0.73	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
4:2 FTS	ND		3.6	0.95	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
6:2 FTS	ND		3.6	1.5	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
8:2 FTS	ND		3.6	0.36	ug/Kg		06/16/22 19:00	06/18/22 19:23	1
10:2 FTS	ND		3.6	0.36	ug/Kg		06/16/22 19:00	06/18/22 19:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*37*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C5 PFPeA	*110*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C2 PFHxA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C4 PFHpA	*121*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C4 PFOA	*121*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C5 PFNA	*128*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C2 PFDA	*127*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C2 PFUnA	*140*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C3 PFBS	*129*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
18O2 PFHxS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C4 PFOS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
M2-4:2 FTS	*143*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
M2-6:2 FTS	*157*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
M2-8:2 FTS	*141*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*
13C2 10:2 FTS	*200*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 19:23*	*1*

Client Sample ID: NK310910_liver

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-3

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**J**	2.3	0.54	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluoropentanoic acid (PFPeA)	ND		2.3	0.40	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluorohexanoic acid (PFHxA)	ND		2.3	0.62	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.3	0.26	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
L-Perfluorooctanoic acid	ND		2.3	0.46	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Br-Perfluorooctanoic acid	ND		2.3	0.46	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Total PFOA	ND		2.3	0.46	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluorononanoic acid (PFNA)	**8.3**		2.3	0.40	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluorodecanoic acid (PFDA)	**2.6**		2.3	0.23	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluoroundecanoic acid (PFUnA)	**0.92**	**J**	2.3	0.62	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.3	0.39	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.3	0.41	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Br-Perfluorohexanesulfonic acid	**13**		2.3	0.34	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Total PFHxS	**27**		2.3	0.34	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
L-Perfluorohexanesulfonic acid	**13**		2.3	0.34	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
Perfluoroheptanesulfonic acid (PFHpS)	**15**		2.3	0.42	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
4:2 FTS	ND		2.3	0.60	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
6:2 FTS	ND		2.3	0.96	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
8:2 FTS	**0.35**	**J**	2.3	0.23	ug/Kg		06/16/22 19:00	06/18/22 19:45	1
10:2 FTS	**0.25**	**J I**	2.3	0.23	ug/Kg		06/16/22 19:00	06/18/22 19:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*36*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C5 PFPeA	*109*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C2 PFHxA	*113*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C4 PFHpA	*117*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C4 PFOA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C5 PFNA	*120*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C2 PFDA	*118*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C2 PFUnA	*128*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C3 PFBS	*118*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
18O2 PFHxS	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C4 PFOS	*121*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
M2-4:2 FTS	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
M2-6:2 FTS	*145*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
M2-8:2 FTS	*130*		*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*
13C2 10:2 FTS	*163*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 19:45*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**630**	**E**	5.7	0.46	ug/Kg		06/16/22 19:00	06/21/22 22:33	1
Br-Perfluorooctanesulfonic acid	**330**	**E**	5.7	0.46	ug/Kg		06/16/22 19:00	06/21/22 22:33	1
Total PFOS	**960**		5.7	0.46	ug/Kg		06/16/22 19:00	06/21/22 22:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*113*		*25 - 150*	*06/16/22 19:00*	*06/21/22 22:33*	*1*

Client Sample ID: NK310911_liver

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-4

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**5.3**		2.6	0.61	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluoropentanoic acid (PFPeA)	ND		2.6	0.45	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluorohexanoic acid (PFHxA)	ND		2.6	0.70	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluoroheptanoic acid (PFHpA)	ND		2.6	0.30	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
L-Perfluorooctanoic acid	ND		2.6	0.52	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Br-Perfluorooctanoic acid	ND		2.6	0.52	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Total PFOA	ND		2.6	0.52	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluorononanoic acid (PFNA)	**4.3**		2.6	0.45	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluorodecanoic acid (PFDA)	**3.0**		2.6	0.26	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluoroundecanoic acid (PFUnA)	**0.95**	**J**	2.6	0.70	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.6	0.44	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.6	0.46	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Br-Perfluorohexanesulfonic acid	ND		2.6	0.38	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Total PFHxS	**3.7**		2.6	0.38	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
L-Perfluorohexanesulfonic acid	**3.7**		2.6	0.38	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
Perfluoroheptanesulfonic acid (PFHpS)	**8.8**		2.6	0.47	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
4:2 FTS	ND		2.6	0.68	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
6:2 FTS	ND		2.6	1.1	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
8:2 FTS	**0.33**	**J**	2.6	0.26	ug/Kg		06/16/22 19:00	06/18/22 20:08	1
10:2 FTS	ND		2.6	0.26	ug/Kg		06/16/22 19:00	06/18/22 20:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*24*	**5-*	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C5 PFPeA	*105*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C2 PFHxA	*110*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C4 PFHpA	*109*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C4 PFOA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C5 PFNA	*97*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C2 PFDA	*121*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C2 PFUnA	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C3 PFBS	*116*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
18O2 PFHxS	*99*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C4 PFOS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
M2-4:2 FTS	*137*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
M2-6:2 FTS	*135*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
M2-8:2 FTS	*139*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*
13C2 10:2 FTS	*181*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:08*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**1100**	**E**	6.4	0.52	ug/Kg		06/16/22 19:00	06/21/22 22:46	1
Br-Perfluorooctanesulfonic acid	**630**	**E**	6.4	0.52	ug/Kg		06/16/22 19:00	06/21/22 22:46	1
Total PFOS	**1700**		6.4	0.52	ug/Kg		06/16/22 19:00	06/21/22 22:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*110*		*25 - 150*	*06/16/22 19:00*	*06/21/22 22:46*	*1*

Client Sample ID: NK310941_liver

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-5

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.9**		1.7	0.39	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.29	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.46	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.19	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
L-Perfluorooctanoic acid	ND		1.7	0.34	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Br-Perfluorooctanoic acid	ND		1.7	0.34	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Total PFOA	ND		1.7	0.34	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.29	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluorodecanoic acid (PFDA)	**0.25**	**J**	1.7	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.45	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.28	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7	0.30	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Br-Perfluorohexanesulfonic acid	ND		1.7	0.25	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Total PFHxS	ND		1.7	0.25	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
L-Perfluorohexanesulfonic acid	ND		1.7	0.25	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.7	0.31	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
4:2 FTS	ND		1.7	0.44	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
6:2 FTS	ND		1.7	0.71	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
8:2 FTS	ND		1.7	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:31	1
10:2 FTS	ND		1.7	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*20*	**5-*	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C5 PFPeA	*99*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C2 PFHxA	*109*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C4 PFOA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C5 PFNA	*103*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C2 PFDA	*117*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C2 PFUnA	*130*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C3 PFBS	*111*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
18O2 PFHxS	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C4 PFOS	*120*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
M2-4:2 FTS	*137*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
M2-6:2 FTS	*128*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
M2-8:2 FTS	*133*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*
13C2 10:2 FTS	*171*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:31*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**12**	**I**	4.2	0.34	ug/Kg		06/16/22 19:00	06/21/22 22:59	1
Br-Perfluorooctanesulfonic acid	**4.9**		4.2	0.34	ug/Kg		06/16/22 19:00	06/21/22 22:59	1
Total PFOS	**16**		4.2	0.34	ug/Kg		06/16/22 19:00	06/21/22 22:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*125*		*25 - 150*	*06/16/22 19:00*	*06/21/22 22:59*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310945_liver
Date Collected: 05/06/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-6
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.5**		1.1	0.27	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluoropentanoic acid (PFPeA)	**0.36**	**J**	1.1	0.20	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluorohexanoic acid (PFHxA)	**0.52**	**J**	1.1	0.31	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluoroheptanoic acid (PFHpA)	ND		1.1	0.13	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
L-Perfluorooctanoic acid	ND		1.1	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Br-Perfluorooctanoic acid	ND		1.1	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Total PFOA	ND		1.1	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluorononanoic acid (PFNA)	**1.2**		1.1	0.20	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluorodecanoic acid (PFDA)	**1.5**		1.1	0.12	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluoroundecanoic acid (PFUnA)	**0.63**	**J**	1.1	0.31	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.19	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluoropentanesulfonic acid (PFPeS)	**0.75**	**J**	1.1	0.20	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Br-Perfluorohexanesulfonic acid	**5.6**		1.1	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Total PFHxS	**64**		1.1	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
L-Perfluorohexanesulfonic acid	**59**		1.1	0.17	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Perfluoroheptanesulfonic acid (PFHpS)	**5.1**		1.1	0.21	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
L-Perfluorooctanesulfonic acid	**810**	**E**	2.8	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Br-Perfluorooctanesulfonic acid	**230**	**E**	2.8	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
Total PFOS	**1000**		2.8	0.23	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
4:2 FTS	ND		1.1	0.30	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
6:2 FTS	ND		1.1	0.48	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
8:2 FTS	**0.69**	**J**	1.1	0.11	ug/Kg		06/16/22 19:00	06/18/22 20:53	1
10:2 FTS	ND		1.1	0.11	ug/Kg		06/16/22 19:00	06/18/22 20:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*20*	*5-	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C5 PFPeA	*99*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C2 PFHxA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C4 PFHpA	*111*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C4 PFOA	*116*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C5 PFNA	*116*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C2 PFDA	*116*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C2 PFUnA	*127*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C3 PFBS	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
18O2 PFHxS	*119*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C4 PFOS	*117*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
M2-4:2 FTS	*145*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
M2-6:2 FTS	*141*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
M2-8:2 FTS	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*
13C2 10:2 FTS	*173*	*5+	*25 - 150*	*06/16/22 19:00*	*06/18/22 20:53*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310921_liver
Date Collected: 05/05/22 10:30
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-7
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**3.6**	**J**	4.5	1.1	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluoropentanoic acid (PFPeA)	ND		4.5	0.80	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluorohexanoic acid (PFHxA)	ND		4.5	1.2	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluoroheptanoic acid (PFHpA)	**1.5**	**J**	4.5	0.53	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
L-Perfluorooctanoic acid	**120**		4.5	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Br-Perfluorooctanoic acid	**4.5**		4.5	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Total PFOA	**120**		4.5	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluorononanoic acid (PFNA)	**250**		4.5	0.80	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluorodecanoic acid (PFDA)	**18**		4.5	0.47	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluoroundecanoic acid (PFUnA)	**5.4**		4.5	1.2	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluorobutanesulfonic acid (PFBS)	ND		4.5	0.77	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluoropentanesulfonic acid (PFPeS)	**1.9**	**J**	4.5	0.82	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Br-Perfluorohexanesulfonic acid	**55**		4.5	0.67	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Total PFHxS	**610**		4.5	0.67	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
L-Perfluorohexanesulfonic acid	**560**	**E**	4.5	0.67	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Perfluoroheptanesulfonic acid (PFHpS)	**150**		4.5	0.84	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
L-Perfluorooctanesulfonic acid	**10000**	**E**	11	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Br-Perfluorooctanesulfonic acid	**5900**	**E**	11	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
Total PFOS	**16000**		11	0.92	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
4:2 FTS	ND		4.5	1.2	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
6:2 FTS	**160**		4.5	1.9	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
8:2 FTS	**13**		4.5	0.45	ug/Kg		06/16/22 19:00	06/18/22 21:16	1
10:2 FTS	**0.53**	**J**	4.5	0.46	ug/Kg		06/16/22 19:00	06/18/22 21:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*22*	**5-*	*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C5 PFPeA	*82*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C2 PFHxA	*108*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C4 PFHpA	*108*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C4 PFOA	*112*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C5 PFNA	*111*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C2 PFDA	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C2 PFUnA	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C3 PFBS	*107*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
18O2 PFHxS	*114*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C4 PFOS	*102*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
M2-4:2 FTS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
M2-6:2 FTS	*140*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
M2-8:2 FTS	*126*		*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*
13C2 10:2 FTS	*170*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 21:16*	*1*

Client Sample ID: NK310914_liver

Date Collected: 05/05/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-8

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.9**		1.1	0.25	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluoropentanoic acid (PFPeA)	**0.38**	**J**	1.1	0.19	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluorohexanoic acid (PFHxA)	ND		1.1	0.29	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluoroheptanoic acid (PFHpA)	ND		1.1	0.12	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
L-Perfluorooctanoic acid	**0.43**	**J**	1.1	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Br-Perfluorooctanoic acid	ND		1.1	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Total PFOA	**0.43**	**J**	1.1	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluorononanoic acid (PFNA)	**14**		1.1	0.19	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluorodecanoic acid (PFDA)	**4.0**		1.1	0.11	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluoroundecanoic acid (PFUnA)	**3.1**		1.1	0.29	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.18	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.1	0.19	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Br-Perfluorohexanesulfonic acid	**79**		1.1	0.16	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Total PFHxS	**160**		1.1	0.16	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
L-Perfluorohexanesulfonic acid	**79**		1.1	0.16	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Perfluoroheptanesulfonic acid (PFHpS)	**70**		1.1	0.20	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
L-Perfluorooctanesulfonic acid	**4200**	**E**	2.7	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Br-Perfluorooctanesulfonic acid	**1000**	**E**	2.7	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
Total PFOS	**5200**		2.7	0.22	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
4:2 FTS	ND		1.1	0.29	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
6:2 FTS	ND		1.1	0.46	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
8:2 FTS	**1.8**		1.1	0.11	ug/Kg		06/16/22 19:00	06/18/22 22:24	1
10:2 FTS	ND		1.1	0.11	ug/Kg		06/16/22 19:00	06/18/22 22:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*25*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C5 PFPeA	*98*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C2 PFHxA	*118*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C4 PFHpA	*117*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C4 PFOA	*124*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C5 PFNA	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C2 PFDA	*129*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C2 PFUnA	*141*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C3 PFBS	*120*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
18O2 PFHxS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C4 PFOS	*100*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
M2-4:2 FTS	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
M2-6:2 FTS	*129*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
M2-8:2 FTS	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*
13C2 10:2 FTS	*187*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 22:24*	*1*

Client Sample ID: NK311424_liver

Date Collected: 10/03/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-9

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.1	J	1.5	0.36	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluoropentanoic acid (PFPeA)	0.95	J	1.5	0.27	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluorohexanoic acid (PFHxA)	3.6		1.5	0.42	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluoroheptanoic acid (PFHpA)	34		1.5	0.18	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
L-Perfluorooctanoic acid	1500	E	1.5	0.31	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Br-Perfluorooctanoic acid	140		1.5	0.31	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Total PFOA	1600		1.5	0.31	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluorononanoic acid (PFNA)	620	E	1.5	0.27	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluorodecanoic acid (PFDA)	46		1.5	0.16	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluoroundecanoic acid (PFUnA)	3.6		1.5	0.42	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluorobutanesulfonic acid (PFBS)	1.6		1.5	0.26	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluoropentanesulfonic acid (PFPeS)	48		1.5	0.28	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Br-Perfluorohexanesulfonic acid	2600	E	1.5	0.23	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Total PFHxS	11000		1.5	0.23	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
L-Perfluorohexanesulfonic acid	8000	E	1.5	0.23	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
Perfluoroheptanesulfonic acid (PFHpS)	1700	E	1.5	0.28	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
4:2 FTS	ND		1.5	0.41	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
6:2 FTS	1000	E	1.5	0.65	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
8:2 FTS	77		1.5	0.15	ug/Kg		06/17/22 15:28	06/19/22 18:53	1
10:2 FTS	0.21	J	1.5	0.16	ug/Kg		06/17/22 15:28	06/19/22 18:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*24*	*5-	*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C5 PFPeA	*96*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C2 PFHxA	*126*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C4 PFHpA	*99*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C4 PFOA	*83*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C5 PFNA	*73*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C2 PFDA	*94*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C2 PFUnA	*97*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C3 PFBS	*91*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
18O2 PFHxS	*56*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C4 PFOS	*30*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
M2-4:2 FTS	*161*	*5+	*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
M2-6:2 FTS	*128*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
M2-8:2 FTS	*103*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*
13C2 10:2 FTS	*123*		*25 - 150*	*06/17/22 15:28*	*06/19/22 18:53*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	24000	E	77	6.2	ug/Kg		06/17/22 15:28	06/22/22 02:25	20
Br-Perfluorooctanesulfonic acid	19000	E	77	6.2	ug/Kg		06/17/22 15:28	06/22/22 02:25	20
Total PFOS	43000		77	6.2	ug/Kg		06/17/22 15:28	06/22/22 02:25	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*56*		*25 - 150*	*06/17/22 15:28*	*06/22/22 02:25*	*20*

Isotope Dilution Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Matrix: Tissue

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)
320-88244-1	NK310903_liver	20 *5-	99	107	108	106	109	110	122
320-88244-2	NK310904_liver	37	110	114	121	121	128	127	140
320-88244-3	NK310910_liver	36	109	113	117	114	120	118	128
320-88244-3 - RA	NK310910_liver								
320-88244-4	NK310911_liver	24 *5-	105	110	109	114	97	121	136
320-88244-4 - RA	NK310911_liver								
320-88244-5	NK310941_liver	20 *5-	99	109	113	114	103	117	130
320-88244-5 - RA	NK310941_liver								
320-88244-6	NK310945_liver	20 *5-	99	114	111	116	116	116	127
320-88244-7	NK310921_liver	22 *5-	82	108	108	112	111	114	122
320-88244-8	NK310914_liver	25	98	118	117	124	122	129	141
320-88244-9	NK311424_liver	24 *5-	96	126	99	83	73	94	97
320-88244-9 - DL	NK311424_liver								
LCS 320-596157/2-A	Lab Control Sample	41	104	115	114	115	120	119	126
LCS 320-596388/2-A	Lab Control Sample	42	83	115	104	94	100	93	97
LCSD 320-596157/3-A	Lab Control Sample Dup	41	102	112	114	112	119	121	138
LCSD 320-596388/3-A	Lab Control Sample Dup	38	85	113	101	93	100	93	95
MB 320-596157/1-A	Method Blank	48	107	116	119	115	125	125	136
MB 320-596388/1-A	Method Blank	46	89	118	103	93	100	94	98

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	M102FTS (25-150)
320-88244-1	NK310903_liver	102	108	108	136	126	121	152 *5+
320-88244-2	NK310904_liver	129	125	125	143	157 *5+	141	200 *5+
320-88244-3	NK310910_liver	118	122	121	122	145	130	163 *5+
320-88244-3 - RA	NK310910_liver			113				
320-88244-4	NK310911_liver	116	99	125	137	135	139	181 *5+
320-88244-4 - RA	NK310911_liver			110				
320-88244-5	NK310941_liver	111	114	120	137	128	133	171 *5+
320-88244-5 - RA	NK310941_liver			125				
320-88244-6	NK310945_liver	114	119	117	145	141	136	173 *5+
320-88244-7	NK310921_liver	107	114	102	125	140	126	170 *5+
320-88244-8	NK310914_liver	120	125	100	136	129	136	187 *5+
320-88244-9	NK311424_liver	91	56	30	161 *5+	128	103	123
320-88244-9 - DL	NK311424_liver			56				
LCS 320-596157/2-A	Lab Control Sample	117	122	121	124	134	126	184 *5+
LCS 320-596388/2-A	Lab Control Sample	82	83	83	127	127	110	127
LCSD 320-596157/3-A	Lab Control Sample Dup	116	122	119	116	136	128	174 *5+
LCSD 320-596388/3-A	Lab Control Sample Dup	81	81	81	129	124	106	117
MB 320-596157/1-A	Method Blank	122	125	120	124	130	124	190 *5+
MB 320-596388/1-A	Method Blank	80	84	83	129	131	106	117

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA

Isotope Dilution Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

PFUnA = 13C2 PFUnA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
M102FTS = 13C2 10:2 FTS

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Lab Sample ID: MB 320-596157/1-A
Matrix: Tissue
Analysis Batch: 596947

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596157

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.24	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.27	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0	0.12	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
L-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Br-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Total PFOA	ND		1.0	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluorononanoic acid (PFNA)	ND		1.0	0.18	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluorodecanoic acid (PFDA)	ND		1.0	0.10	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0	0.27	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0	0.18	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Br-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Total PFHxS	ND		1.0	0.15	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
L-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0	0.19	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
L-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Br-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
Total PFOS	ND		2.5	0.20	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
6:2 FTS	ND		1.0	0.42	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
8:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:00	06/18/22 17:52	1
10:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:00	06/18/22 17:52	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*48*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C5 PFPeA	*107*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C2 PFHxA	*116*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C4 PFHpA	*119*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C4 PFOA	*115*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C5 PFNA	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C2 PFDA	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C2 PFUnA	*136*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C3 PFBS	*122*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
18O2 PFHxS	*125*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C4 PFOS	*120*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
M2-4:2 FTS	*124*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
M2-6:2 FTS	*130*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
M2-8:2 FTS	*124*		*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*
13C2 10:2 FTS	*190*	**5+*	*25 - 150*	*06/16/22 19:00*	*06/18/22 17:52*	*1*

Lab Sample ID: LCS 320-596157/2-A
Matrix: Tissue
Analysis Batch: 596947

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596157

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10.0	10.8		ug/Kg		108	76 - 136

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCS 320-596157/2-A
Matrix: Tissue
Analysis Batch: 596947

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596157

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoropentanoic acid (PFPeA)	10.0	9.97		ug/Kg		100	69 - 129
Perfluorohexanoic acid (PFHxA)	10.0	9.03		ug/Kg		90	71 - 131
Perfluoroheptanoic acid (PFHpA)	10.0	10.1		ug/Kg		101	71 - 131
L-Perfluorooctanoic acid	10.0	9.76		ug/Kg		98	72 - 132
Total PFOA	10.0	9.76		ug/Kg		98	
Perfluorononanoic acid (PFNA)	10.0	9.48		ug/Kg		95	73 - 133
Perfluorodecanoic acid (PFDA)	10.0	10.2		ug/Kg		102	72 - 132
Perfluoroundecanoic acid (PFUnA)	10.0	10.3		ug/Kg		103	66 - 126
Perfluorobutanesulfonic acid (PFBS)	8.88	8.90		ug/Kg		100	69 - 129
Perfluoropentanesulfonic acid (PFPeS)	9.38	9.54		ug/Kg		102	66 - 126
Total PFHxS	9.12	8.97		ug/Kg		98	
L-Perfluorohexanesulfonic acid	9.12	8.97		ug/Kg		98	62 - 122
Perfluoroheptanesulfonic acid (PFHpS)	9.54	9.72		ug/Kg		102	76 - 136
L-Perfluorooctanesulfonic acid	9.30	9.01		ug/Kg		97	68 - 141
Total PFOS	9.30	9.01		ug/Kg		97	
4:2 FTS	9.38	9.35		ug/Kg		100	68 - 143
6:2 FTS	9.52	9.06		ug/Kg		95	73 - 139
8:2 FTS	9.60	9.55		ug/Kg		99	75 - 135
10:2 FTS	9.66	9.33		ug/Kg		97	69 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*41*		*25 - 150*
13C5 PFPeA	*104*		*25 - 150*
13C2 PFHxA	*115*		*25 - 150*
13C4 PFHpA	*114*		*25 - 150*
13C4 PFOA	*115*		*25 - 150*
13C5 PFNA	*120*		*25 - 150*
13C2 PFDA	*119*		*25 - 150*
13C2 PFUnA	*126*		*25 - 150*
13C3 PFBS	*117*		*25 - 150*
18O2 PFHxS	*122*		*25 - 150*
13C4 PFOS	*121*		*25 - 150*
M2-4:2 FTS	*124*		*25 - 150*
M2-6:2 FTS	*134*		*25 - 150*
M2-8:2 FTS	*126*		*25 - 150*
13C2 10:2 FTS	*184*	**5+*	*25 - 150*

Lab Sample ID: LCSD 320-596157/3-A
Matrix: Tissue
Analysis Batch: 596947

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596157

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	10.0	11.0		ug/Kg		110	76 - 136	2	30
Perfluoropentanoic acid (PFPeA)	10.0	9.95		ug/Kg		99	69 - 129	0	30
Perfluorohexanoic acid (PFHxA)	10.0	9.31		ug/Kg		93	71 - 131	3	30
Perfluoroheptanoic acid (PFHpA)	10.0	10.3		ug/Kg		103	71 - 131	2	30

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCSD 320-596157/3-A
Matrix: Tissue
Analysis Batch: 596947

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596157

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
L-Perfluorooctanoic acid			10.0	10.1		ug/Kg		101	72 - 132	4	30
Total PFOA			10.0	10.1		ug/Kg		101		4	
Perfluorononanoic acid (PFNA)			10.0	9.97		ug/Kg		100	73 - 133	5	30
Perfluorodecanoic acid (PFDA)			10.0	10.4		ug/Kg		104	72 - 132	2	30
Perfluoroundecanoic acid (PFUnA)			10.0	10.0		ug/Kg		100	66 - 126	3	30
Perfluorobutanesulfonic acid (PFBS)			8.88	9.02		ug/Kg		102	69 - 129	1	30
Perfluoropentanesulfonic acid (PFPeS)			9.38	9.73		ug/Kg		104	66 - 126	2	30
Total PFHxS			9.12	9.09		ug/Kg		100		1	
L-Perfluorohexanesulfonic acid			9.12	9.09		ug/Kg		100	62 - 122	1	30
Perfluoroheptanesulfonic acid (PFHpS)			9.54	10.4		ug/Kg		109	76 - 136	7	30
L-Perfluorooctanesulfonic acid			9.30	9.48		ug/Kg		102	68 - 141	5	30
Total PFOS			9.30	9.48		ug/Kg		102		5	
4:2 FTS			9.38	11.2		ug/Kg		119	68 - 143	18	30
6:2 FTS			9.52	9.37		ug/Kg		98	73 - 139	3	30
8:2 FTS			9.60	9.97		ug/Kg		104	75 - 135	4	30
10:2 FTS			9.66	10.2		ug/Kg		105	69 - 145	9	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*41*		*25 - 150*
13C5 PFPeA	*102*		*25 - 150*
13C2 PFHxA	*112*		*25 - 150*
13C4 PFHpA	*114*		*25 - 150*
13C4 PFOA	*112*		*25 - 150*
13C5 PFNA	*119*		*25 - 150*
13C2 PFDA	*121*		*25 - 150*
13C2 PFUnA	*138*		*25 - 150*
13C3 PFBS	*116*		*25 - 150*
18O2 PFHxS	*122*		*25 - 150*
13C4 PFOS	*119*		*25 - 150*
M2-4:2 FTS	*116*		*25 - 150*
M2-6:2 FTS	*136*		*25 - 150*
M2-8:2 FTS	*128*		*25 - 150*
13C2 10:2 FTS	*174*	*5+	*25 - 150*

Lab Sample ID: MB 320-596388/1-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596388

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.24	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.27	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0	0.12	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
L-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Br-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Total PFOA	ND		1.0	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: MB 320-596388/1-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596388

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		1.0	0.18	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluorodecanoic acid (PFDA)	ND		1.0	0.10	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0	0.27	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0	0.18	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Br-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Total PFHxS	ND		1.0	0.15	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
L-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0	0.19	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
L-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Br-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
Total PFOS	ND		2.5	0.20	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
6:2 FTS	ND		1.0	0.42	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
8:2 FTS	ND		1.0	0.10	ug/Kg		06/17/22 15:28	06/19/22 17:45	1
10:2 FTS	ND		1.0	0.10	ug/Kg		06/17/22 15:28	06/19/22 17:45	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*46*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C5 PFPeA	*89*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C2 PFHxA	*118*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C4 PFHpA	*103*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C4 PFOA	*93*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C5 PFNA	*100*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C2 PFDA	*94*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C2 PFUnA	*98*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C3 PFBS	*80*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
18O2 PFHxS	*84*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C4 PFOS	*83*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
M2-4:2 FTS	*129*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
M2-6:2 FTS	*131*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
M2-8:2 FTS	*106*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*
13C2 10:2 FTS	*117*		*25 - 150*	*06/17/22 15:28*	*06/19/22 17:45*	*1*

Lab Sample ID: LCS 320-596388/2-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596388

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10.0	9.81		ug/Kg		98	76 - 136
Perfluoropentanoic acid (PFPeA)	10.0	9.73		ug/Kg		97	69 - 129
Perfluorohexanoic acid (PFHxA)	10.0	8.49		ug/Kg		85	71 - 131
Perfluoroheptanoic acid (PFHpA)	10.0	9.76		ug/Kg		98	71 - 131
L-Perfluorooctanoic acid	10.0	10.1		ug/Kg		101	72 - 132
Total PFOA	10.0	10.1		ug/Kg		101	
Perfluorononanoic acid (PFNA)	10.0	10.0		ug/Kg		100	73 - 133
Perfluorodecanoic acid (PFDA)	10.0	9.77		ug/Kg		98	72 - 132

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCS 320-596388/2-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596388

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroundecanoic acid (PFUnA)	10.0	9.15		ug/Kg		92	66 - 126
Perfluorobutanesulfonic acid (PFBS)	8.88	10.5		ug/Kg		119	69 - 129
Perfluoropentanesulfonic acid (PFPeS)	9.38	10.1		ug/Kg		108	66 - 126
Total PFHxS	9.12	9.72		ug/Kg		107	
L-Perfluorohexanesulfonic acid	9.12	9.72		ug/Kg		107	62 - 122
Perfluoroheptanesulfonic acid (PFHpS)	9.54	9.29		ug/Kg		97	76 - 136
L-Perfluorooctanesulfonic acid	9.30	8.90		ug/Kg		96	68 - 141
Total PFOS	9.30	8.90		ug/Kg		96	
4:2 FTS	9.38	9.46		ug/Kg		101	68 - 143
6:2 FTS	9.52	9.74		ug/Kg		102	73 - 139
8:2 FTS	9.60	9.74		ug/Kg		101	75 - 135
10:2 FTS	9.66	9.39		ug/Kg		97	69 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*42*		*25 - 150*
13C5 PFPeA	*83*		*25 - 150*
13C2 PFHxA	*115*		*25 - 150*
13C4 PFHpA	*104*		*25 - 150*
13C4 PFOA	*94*		*25 - 150*
13C5 PFNA	*100*		*25 - 150*
13C2 PFDA	*93*		*25 - 150*
13C2 PFUnA	*97*		*25 - 150*
13C3 PFBS	*82*		*25 - 150*
18O2 PFHxS	*83*		*25 - 150*
13C4 PFOS	*83*		*25 - 150*
M2-4:2 FTS	*127*		*25 - 150*
M2-6:2 FTS	*127*		*25 - 150*
M2-8:2 FTS	*110*		*25 - 150*
13C2 10:2 FTS	*127*		*25 - 150*

Lab Sample ID: LCSD 320-596388/3-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596388

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	10.0	10.5		ug/Kg		105	76 - 136	7	30
Perfluoropentanoic acid (PFPeA)	10.0	9.62		ug/Kg		96	69 - 129	1	30
Perfluorohexanoic acid (PFHxA)	10.0	8.59		ug/Kg		86	71 - 131	1	30
Perfluoroheptanoic acid (PFHpA)	10.0	9.98		ug/Kg		100	71 - 131	2	30
L-Perfluorooctanoic acid	10.0	10.3		ug/Kg		103	72 - 132	2	30
Total PFOA	10.0	10.3		ug/Kg		103		2	
Perfluorononanoic acid (PFNA)	10.0	10.1		ug/Kg		101	73 - 133	1	30
Perfluorodecanoic acid (PFDA)	10.0	9.73		ug/Kg		97	72 - 132	0	30
Perfluoroundecanoic acid (PFUnA)	10.0	9.36		ug/Kg		94	66 - 126	2	30

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCSD 320-596388/3-A
Matrix: Tissue
Analysis Batch: 596860

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596388

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)			8.88	10.1		ug/Kg		114	69 - 129	4	30
Perfluoropentanesulfonic acid (PFPeS)			9.38	9.98		ug/Kg		106	66 - 126	1	30
Total PFHxS			9.12	9.91		ug/Kg		109		2	
L-Perfluorohexanesulfonic acid			9.12	9.91		ug/Kg		109	62 - 122	2	30
Perfluoroheptanesulfonic acid (PFHpS)			9.54	9.59		ug/Kg		100	76 - 136	3	30
L-Perfluorooctanesulfonic acid			9.30	9.11		ug/Kg		98	68 - 141	2	30
Total PFOS			9.30	9.11		ug/Kg		98		2	
4:2 FTS			9.38	9.89		ug/Kg		105	68 - 143	4	30
6:2 FTS			9.52	10.8		ug/Kg		114	73 - 139	11	30
8:2 FTS			9.60	10.5		ug/Kg		109	75 - 135	7	30
10:2 FTS			9.66	10.1		ug/Kg		104	69 - 145	7	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*38*		*25 - 150*
13C5 PFPeA	*85*		*25 - 150*
13C2 PFHxA	*113*		*25 - 150*
13C4 PFHpA	*101*		*25 - 150*
13C4 PFOA	*93*		*25 - 150*
13C5 PFNA	*100*		*25 - 150*
13C2 PFDA	*93*		*25 - 150*
13C2 PFUnA	*95*		*25 - 150*
13C3 PFBS	*81*		*25 - 150*
18O2 PFHxS	*81*		*25 - 150*
13C4 PFOS	*81*		*25 - 150*
M2-4:2 FTS	*129*		*25 - 150*
M2-6:2 FTS	*124*		*25 - 150*
M2-8:2 FTS	*106*		*25 - 150*
13C2 10:2 FTS	*117*		*25 - 150*

LCMS

Prep Batch: 596157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88244-1	NK310903_liver	Total/NA	Tissue	SHAKE	
320-88244-2	NK310904_liver	Total/NA	Tissue	SHAKE	
320-88244-3	NK310910_liver	Total/NA	Tissue	SHAKE	
320-88244-3 - RA	NK310910_liver	Total/NA	Tissue	SHAKE	
320-88244-4	NK310911_liver	Total/NA	Tissue	SHAKE	
320-88244-4 - RA	NK310911_liver	Total/NA	Tissue	SHAKE	
320-88244-5	NK310941_liver	Total/NA	Tissue	SHAKE	
320-88244-5 - RA	NK310941_liver	Total/NA	Tissue	SHAKE	
320-88244-6	NK310945_liver	Total/NA	Tissue	SHAKE	
320-88244-7	NK310921_liver	Total/NA	Tissue	SHAKE	
320-88244-8	NK310914_liver	Total/NA	Tissue	SHAKE	
MB 320-596157/1-A	Method Blank	Total/NA	Tissue	SHAKE	
LCS 320-596157/2-A	Lab Control Sample	Total/NA	Tissue	SHAKE	
LCSD 320-596157/3-A	Lab Control Sample Dup	Total/NA	Tissue	SHAKE	

Prep Batch: 596388

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88244-9	NK311424_liver	Total/NA	Tissue	SHAKE	
320-88244-9 - DL	NK311424_liver	Total/NA	Tissue	SHAKE	
MB 320-596388/1-A	Method Blank	Total/NA	Tissue	SHAKE	
LCS 320-596388/2-A	Lab Control Sample	Total/NA	Tissue	SHAKE	
LCSD 320-596388/3-A	Lab Control Sample Dup	Total/NA	Tissue	SHAKE	

Analysis Batch: 596860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88244-9	NK311424_liver	Total/NA	Tissue	B/L/T PFAS	596388
MB 320-596388/1-A	Method Blank	Total/NA	Tissue	B/L/T PFAS	596388
LCS 320-596388/2-A	Lab Control Sample	Total/NA	Tissue	B/L/T PFAS	596388
LCSD 320-596388/3-A	Lab Control Sample Dup	Total/NA	Tissue	B/L/T PFAS	596388

Analysis Batch: 596947

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88244-1	NK310903_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-2	NK310904_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-3	NK310910_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-4	NK310911_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-5	NK310941_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-6	NK310945_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-7	NK310921_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-8	NK310914_liver	Total/NA	Tissue	B/L/T PFAS	596157
MB 320-596157/1-A	Method Blank	Total/NA	Tissue	B/L/T PFAS	596157
LCS 320-596157/2-A	Lab Control Sample	Total/NA	Tissue	B/L/T PFAS	596157
LCSD 320-596157/3-A	Lab Control Sample Dup	Total/NA	Tissue	B/L/T PFAS	596157

Analysis Batch: 597578

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88244-3 - RA	NK310910_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-4 - RA	NK310911_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-5 - RA	NK310941_liver	Total/NA	Tissue	B/L/T PFAS	596157
320-88244-9 - DL	NK311424_liver	Total/NA	Tissue	B/L/T PFAS	596388

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310903_liver
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-1
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.82 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 19:00	AF	TAL SAC

Client Sample ID: NK310904_liver
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-2
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.28 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 19:23	AF	TAL SAC

Client Sample ID: NK310910_liver
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-3
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.44 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 19:45	AF	TAL SAC
Total/NA	Prep	SHAKE	RA		0.44 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 22:33	MEO	TAL SAC

Client Sample ID: NK310911_liver
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-4
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.39 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 20:08	AF	TAL SAC
Total/NA	Prep	SHAKE	RA		0.39 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 22:46	MEO	TAL SAC

Client Sample ID: NK310941_liver
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-5
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.60 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 20:31	AF	TAL SAC
Total/NA	Prep	SHAKE	RA		0.60 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 22:59	MEO	TAL SAC

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Client Sample ID: NK310945_liver
Date Collected: 05/06/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-6
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.89 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 20:53	AF	TAL SAC

Client Sample ID: NK310921_liver
Date Collected: 05/05/22 10:30
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-7
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.22 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 21:16	AF	TAL SAC

Client Sample ID: NK310914_liver
Date Collected: 05/05/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-8
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.93 g	10.0 mL	596157	06/16/22 19:00	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596947	06/18/22 22:24	AF	TAL SAC

Client Sample ID: NK311424_liver
Date Collected: 10/03/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88244-9
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.65 g	10.0 mL	596388	06/17/22 15:28	AP	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596860	06/19/22 18:53	D1R	TAL SAC
Total/NA	Prep	SHAKE	DL		0.65 g	10.0 mL	596388	06/17/22 15:28	AP	TAL SAC
Total/NA	Analysis	B/L/T PFAS	DL	20			597578	06/22/22 02:25	MEO	TAL SAC

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Laboratory: Eurofins Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-22
Arkansas DEQ	State	88-0691	06-17-22 *
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-22
Florida	NELAP	E87570	06-30-22
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-22
Louisiana	NELAP	01944	06-30-22
Louisiana (All)	NELAP	01944	06-30-22
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	08-31-22
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-22
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-22
Wisconsin	State	998204680	08-31-22
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Method	Method Description	Protocol	Laboratory
B/L/T PFAS	Branched, Linear and Total PFAS	EPA	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88244-1
SDG: Frozen Liver

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-88244-1	NK310903_liver	Tissue	05/05/22 11:00	05/24/22 10:00
320-88244-2	NK310904_liver	Tissue	05/05/22 11:00	05/24/22 10:00
320-88244-3	NK310910_liver	Tissue	05/05/22 11:00	05/24/22 10:00
320-88244-4	NK310911_liver	Tissue	05/05/22 11:00	05/24/22 10:00
320-88244-5	NK310941_liver	Tissue	05/05/22 11:00	05/24/22 10:00
320-88244-6	NK310945_liver	Tissue	05/06/22 10:00	05/24/22 10:00
320-88244-7	NK310921_liver	Tissue	05/05/22 10:30	05/24/22 10:00
320-88244-8	NK310914_liver	Tissue	05/05/22 10:00	05/24/22 10:00
320-88244-9	NK311424_liver	Tissue	10/03/21 10:00	05/24/22 10:00

Eurofins Environment Testing Northern California
880 Riverside Parkway
West Sacramento, CA 95605
Phone 916.373.5600

Chain of Custody Record

eurofins | Environment Testing America

Client Contact	Report To:	Site Contact:	20-May-22	COC No
Museum of Southwestern Biology, University of New Mexico	Tel/Fax:	Lab Contact:	Carrier:	of COCs
CERIA 83, rm 204, 1 University of New Mexico	Analysis Turnaround Time			Job No.
Albuquerque, New Mexico 87131	Calendar (C) or Work Days (W) C			
505 277-9262	TAT if different from Below			
FAX	[x] 2 weeks			SDG No
Holloman bird/mammal PFAS Project	[ ] 1 week			
Site:	[ ] 2 days			
P O #	[ ] 1 day			

320-88244 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Sample Specific Notes
NK310903_liver	5/5/22	11:00				n	frozen liver
NK310904_liver	5/5/22	11:00				n	frozen liver
NK310910_liver	5/5/22	11:00				n	frozen liver
NK310911_liver	5/5/22	11:00				n	frozen liver
NK310941_liver	5/5/22	11:00				n	frozen liver
NK310945_liver	5/6/22	10:00				n	frozen liver
NK310921_liver	5/5/22	10:30				n	frozen liver
NK310914_liver	5/5/22	10:00				n	frozen liver
MSB340103_liver	10/3/21	10:00				n	frozen liver
						n	
						n	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] *Non-Hazard* [ ] *Flammable* [ ] *Skin Irritant* *Poison B* *Unknown* [ ]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] *Return To Client* [x] *Disposal By Lab* [ ] *Archive For* _____ *Months*

Special Instructions/QC Requirements & Comments:

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
	Museum of Southwestern Biology, University of New Mexico	5/23/22			
Relinquished by	Company MSB UNM	Date/Time 5/23/22	Received by	Company	Date/Time 5/24/22 1000
Relinquished by	Company	Date/Time	Received by	Company	Date/Time

Login Sample Receipt Checklist

Client: University of New Mexico

Job Number: 320-88244-1
SDG Number: Frozen Liver

Login Number: 88244
List Number: 1
Creator: Her, David A

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1685757
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Requested analyses are not listed on COC
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-88247-1
Laboratory Sample Delivery Group: Frozen muscle
Client Project/Site: Holloman bird/mammal PFAS Project

For:
University of New Mexico
Museum of Southwestern Biology
Division of Mammals
CERIA Bldg 83, Room 204
Albuquerque, New Mexico 87131

Attn: Jean-Luc Cartron

Linda C. Laver

Authorized for release by:
6/22/2022 6:23:56 PM

Linda C. Laver, Senior Project Manager
(916)374-4362
Linda.Laver@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
E	Result exceeded calibration range.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-88247-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-88247-1

Receipt
The samples were received on 5/24/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -47.7º C.

Receipt Exceptions
The requested analysis is not listed on the Chain-of-Custody (COC). Samples were logged in for PFAS based on the quote that was provided prior to receipt of samples.

LCMS
Method B/L/T PFAS: The "I" qualifier means the transition mass ratio for the indicated analyte was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some elevated bias. However, analyst judgment was used to positively identify the analyte. NK283721 (320-88247-3), NK283613 (320-88247-6) and NK283616 (320-88247-8)

Method B/L/T PFAS: The concentration of one or more analytes exceeded the instrument calibration range in the following samples. Sample extracts that exhibited potentially saturated peak response were diluted. Historical data indicate that for the isotope dilution method, and in the absence of peak saturation, dilution and re-analysis will not produce significantly different results from those reported above the calibration range. NK283634 (320-88247-10), NK283635 (320-88247-11), NK283675 (320-88247-12), NK283668 (320-88247-13), NK283628 (320-88247-14), NK283603 (320-88247-15), NK283630 (320-88247-18), NK283610 (320-88247-19) and NK283666 (320-88247-20)

Method B/L/T PFAS: Some Isotope Dilution Analyte (IDA) recoveries are above the method recommended limit for the following samples. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries. NK283617 (320-88247-1), NK283706 (320-88247-2), NK283721 (320-88247-3), NK283676 (320-88247-4), NK283697 (320-88247-5), NK283613 (320-88247-6), NK283614 (320-88247-7), NK283616 (320-88247-8), NK283699 (320-88247-9), NK283634 (320-88247-10), NK283635 (320-88247-11), NK283675 (320-88247-12), NK283668 (320-88247-13), NK283628 (320-88247-14), NK283603 (320-88247-15), NK283637 (320-88247-16), NK283612 (320-88247-17), NK283630 (320-88247-18), NK283610 (320-88247-19), NK283666 (320-88247-20), (LCS 320-596158/2-A), (LCSD 320-596158/3-A) and (MB 320-596158/1-A)

Method B/L/T PFAS: Some Isotope Dilution Analyte (IDA) recoveries are below the method recommended limit in the following samples. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples. NK283706 (320-88247-2), NK283721 (320-88247-3), NK283676 (320-88247-4), NK283697 (320-88247-5), NK283613 (320-88247-6), NK283616 (320-88247-8), NK283699 (320-88247-9), NK283634 (320-88247-10), NK283635 (320-88247-11), NK283675 (320-88247-12), NK283668 (320-88247-13), NK283628 (320-88247-14), NK283603 (320-88247-15), NK283637 (320-88247-16), NK283612 (320-88247-17), NK283630 (320-88247-18), NK283610 (320-88247-19), NK283666 (320-88247-20) and (LCS 320-596158/2-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method SHAKE: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-596158.

Method SHAKE: The following samples were yellow in color following extraction: NK283676 (320-88247-4), NK283697 (320-88247-5), NK283668 (320-88247-13), NK283628 (320-88247-14), NK283603 (320-88247-15), NK283637 (320-88247-16), NK283630 (320-88247-18), NK283610 (320-88247-19) and NK283666 (320-88247-20).

Method SHAKE: Elevated reporting limits are provided for the following samples due to insufficient sample provided for analysis: NK283617 (320-88247-1), NK283706 (320-88247-2), NK283721 (320-88247-3), NK283676 (320-88247-4), NK283697 (320-88247-5), NK283613 (320-88247-6), NK283614 (320-88247-7), NK283616 (320-88247-8), NK283699 (320-88247-9), NK283634 (320-88247-10), NK283635 (320-88247-11), NK283675 (320-88247-12), NK283668 (320-88247-13), NK283628 (320-88247-14), NK283603 (320-88247-15), NK283637 (320-88247-16), NK283612 (320-88247-17), NK283630 (320-88247-18), NK283610 (320-88247-19) and

Job ID: 320-88247-1 (Continued)

Laboratory: Eurofins Sacramento (Continued)

NK283666 (320-88247-20).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283617 — Lab Sample ID: 320-88247-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanesulfonic acid - RA	1.0	J	3.9	0.32	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	1.0	J	3.9	0.32	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283706 — Lab Sample ID: 320-88247-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	1.7	J	3.4	0.60	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.37	J	3.4	0.36	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	4.2	J	8.6	0.70	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.87	J	8.6	0.70	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	5.1	J	8.6	0.70	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283721 — Lab Sample ID: 320-88247-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.64	J	1.1	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	2.2	J I	2.9	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.36	J	2.9	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	2.6	J	2.9	0.23	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283676 — Lab Sample ID: 320-88247-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanoic acid	0.21	J	0.98	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.21	J	0.98	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.17	J	0.98	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	0.25	J	0.98	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	0.25	J	0.98	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	0.80	J	2.5	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.49	J	2.5	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	1.3	J	2.5	0.20	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283697 — Lab Sample ID: 320-88247-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.14	J	1.2	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	0.77	J	3.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	0.77	J	3.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283613 — Lab Sample ID: 320-88247-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.21	J	1.1	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.29	J	1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	3.7	I	2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.22	J	2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	3.9		2.7	0.22	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283614 — Lab Sample ID: 320-88247-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanoic acid	0.28	J	0.92	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.28	J	0.92	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.28	J	0.92	0.16	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: NK283614 (Continued) — Lab Sample ID: 320-88247-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.41	J	0.92	0.094	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	3.3		2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.20	J	2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	3.5		2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283616 — Lab Sample ID: 320-88247-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanoic acid	0.20	J	0.94	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.20	J	0.94	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.28	J	0.94	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.27	J	0.94	0.097	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	5.0	I	2.4	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.36	J	2.4	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	5.3		2.4	0.19	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283699 — Lab Sample ID: 320-88247-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanoic acid	0.24	J	1.0	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	0.24	J	1.0	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.1		1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RA	0.40	J	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RA	0.21	J	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS - RA	0.61	J	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283634 — Lab Sample ID: 320-88247-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.15	J	1.0	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	9.4		1.0	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.20	J	1.0	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	9.6		1.0	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	73		1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	7.7		1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.79	J	1.0	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	4.6		1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	26		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	640		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	620	E	1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	64		1.0	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	2000	E	2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	570	E	2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	2600		2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	4.2		1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.18	J	1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283635 — Lab Sample ID: 320-88247-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.24	J	0.90	0.21	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK283635 (Continued)

Lab Sample ID: 320-88247-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.19	J	0.90	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	12		0.90	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.40	J	0.90	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	13		0.90	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	21		0.90	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	2.8		0.90	0.093	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.42	J	0.90	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	5.7		0.90	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	26		0.90	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	320		0.90	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	290	E	0.90	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	15		0.90	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	630	E	2.3	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	170	E	2.3	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	810		2.3	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	0.98		0.90	0.090	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283675

Lab Sample ID: 320-88247-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.29	J	1.1	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.13	J	1.1	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	5.6		1.1	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	5.6		1.1	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	21		1.1	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	3.8		1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.61	J	1.1	0.29	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	3.5		1.1	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	22		1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	280		1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	250	E	1.1	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	16		1.1	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	880	E	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	280	E	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	1200		2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	1.9		1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
10:2 FTS	0.12	J	1.1	0.11	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283668

Lab Sample ID: 320-88247-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.84	J	0.86	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.26	J	0.86	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	0.43	J	0.86	0.24	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.36	J	0.86	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	40		0.86	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.81	J	0.86	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	41		0.86	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	56		0.86	0.15	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK283668 (Continued)

Lab Sample ID: 320-88247-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	5.8		0.86	0.089	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.53	J	0.86	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.25	J	0.86	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	6.2		0.86	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	44		0.86	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	1100		0.86	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	1100	E	0.86	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	54		0.86	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	1500	E	2.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	480	E	2.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	1900		2.2	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	2.6		0.86	0.086	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283628

Lab Sample ID: 320-88247-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.2		1.0	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.34	J	1.0	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	19		1.0	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.81	J	1.0	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	20		1.0	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	15		1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	1.8		1.0	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.23	J	1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	7.3		1.0	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	24		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	210		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	190	E	1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	10		1.0	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	470	E	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	140	E	2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	610		2.6	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	0.75	J	1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283603

Lab Sample ID: 320-88247-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.45	J	1.0	0.24	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.18	J	1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.15	J	1.0	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	4.1		1.0	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	4.1		1.0	0.20	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	5.8		1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	1.7		1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.34	J	1.0	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.74	J	1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	11		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	330		1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK283603 (Continued) — Lab Sample ID: 320-88247-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorohexanesulfonic acid	320	E	1.0	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	15		1.0	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	740	E	2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	230	E	2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	960		2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	2.7		1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283637 — Lab Sample ID: 320-88247-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	2.5		0.84	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	11		0.84	0.087	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.9		0.84	0.23	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	48		2.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	3.2		2.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	51		2.1	0.17	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283612 — Lab Sample ID: 320-88247-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.78	J	1.0	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.94	J	1.0	0.10	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.41	J	1.0	0.27	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	15		2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	2.5		2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	17		2.5	0.21	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283630 — Lab Sample ID: 320-88247-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.2		0.82	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.16	J	0.82	0.095	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	46		0.82	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.59	J	0.82	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	46		0.82	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	58		0.82	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	6.4		0.82	0.084	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.62	J	0.82	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	5.8		0.82	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	67		0.82	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	1600		0.82	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	1500	E	0.82	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	61		0.82	0.15	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	1700	E	2.0	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	540	E	2.0	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	2300		2.0	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	2.7		0.82	0.082	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283610 — Lab Sample ID: 320-88247-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.1		0.78	0.18	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.16	J	0.78	0.091	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	15		0.78	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.32	J	0.78	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	15		0.78	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	29		0.78	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	3.1		0.78	0.080	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.31	J	0.78	0.21	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.14	J	0.78	0.13	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	4.5		0.78	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	29		0.78	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	400		0.78	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	370	E	0.78	0.12	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	21		0.78	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	830	E	2.0	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	230	E	2.0	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	1100		2.0	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	1.1		0.78	0.078	ug/Kg	1		B/L/T PFAS	Total/NA

Client Sample ID: NK283666 — Lab Sample ID: 320-88247-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.0		0.93	0.22	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.29	J	0.93	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	0.34	J	0.93	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.41	J	0.93	0.11	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	51		0.93	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	1.2		0.93	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOA	52		0.93	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	59		0.93	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	5.7		0.93	0.095	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.47	J	0.93	0.25	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.32	J	0.93	0.16	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	10		0.93	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorohexanesulfonic acid	74		0.93	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFHxS	1400		0.93	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorohexanesulfonic acid	1300	E	0.93	0.14	ug/Kg	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	61		0.93	0.17	ug/Kg	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	1600	E	2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	490	E	2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
Total PFOS	2100		2.3	0.19	ug/Kg	1		B/L/T PFAS	Total/NA
8:2 FTS	2.4		0.93	0.093	ug/Kg	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK283617

Date Collected: 12/12/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-1

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.6	0.37	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluoropentanoic acid (PFPeA)	ND		1.6	0.27	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluorohexanoic acid (PFHxA)	ND		1.6	0.43	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluoroheptanoic acid (PFHpA)	ND		1.6	0.18	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
L-Perfluorooctanoic acid	ND		1.6	0.32	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Br-Perfluorooctanoic acid	ND		1.6	0.32	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Total PFOA	ND		1.6	0.32	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluorononanoic acid (PFNA)	ND		1.6	0.27	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluorodecanoic acid (PFDA)	ND		1.6	0.16	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluoroundecanoic acid (PFUnA)	ND		1.6	0.43	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.6	0.27	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.6	0.28	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Br-Perfluorohexanesulfonic acid	ND		1.6	0.23	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Total PFHxS	ND		1.6	0.23	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
L-Perfluorohexanesulfonic acid	ND		1.6	0.23	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.6	0.29	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
4:2 FTS	ND		1.6	0.42	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
6:2 FTS	ND		1.6	0.66	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
8:2 FTS	ND		1.6	0.16	ug/Kg		06/16/22 19:03	06/18/22 06:57	1
10:2 FTS	ND		1.6	0.16	ug/Kg		06/16/22 19:03	06/18/22 06:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*37*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C5 PFPeA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C2 PFHxA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C4 PFHpA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C4 PFOA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C5 PFNA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C2 PFDA	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C2 PFUnA	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C3 PFBS	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
18O2 PFHxS	*129*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C4 PFOS	*132*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
M2-4:2 FTS	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
M2-6:2 FTS	*143*		*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
M2-8:2 FTS	*152*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*
13C2 10:2 FTS	*169*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 06:57*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**1.0**	**J**	3.9	0.32	ug/Kg		06/16/22 19:03	06/21/22 23:12	1
Br-Perfluorooctanesulfonic acid	ND		3.9	0.32	ug/Kg		06/16/22 19:03	06/21/22 23:12	1
Total PFOS	**1.0**	**J**	3.9	0.32	ug/Kg		06/16/22 19:03	06/21/22 23:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*123*		*25 - 150*	*06/16/22 19:03*	*06/21/22 23:12*	*1*

Client Sample ID: NK283706

Date Collected: 12/11/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-2

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		3.4	0.81	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluoropentanoic acid (PFPeA)	ND		3.4	0.60	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluorohexanoic acid (PFHxA)	ND		3.4	0.94	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluoroheptanoic acid (PFHpA)	ND		3.4	0.40	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
L-Perfluorooctanoic acid	ND		3.4	0.70	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Br-Perfluorooctanoic acid	ND		3.4	0.70	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Total PFOA	ND		3.4	0.70	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluorononanoic acid (PFNA)	**1.7**	**J**	3.4	0.60	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluorodecanoic acid (PFDA)	**0.37**	**J**	3.4	0.36	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluoroundecanoic acid (PFUnA)	ND		3.4	0.94	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		3.4	0.59	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluoropentanesulfonic acid (PFPeS)	ND		3.4	0.62	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Br-Perfluorohexanesulfonic acid	ND		3.4	0.51	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Total PFHxS	ND		3.4	0.51	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
L-Perfluorohexanesulfonic acid	ND		3.4	0.51	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		3.4	0.64	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
4:2 FTS	ND		3.4	0.92	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
6:2 FTS	ND		3.4	1.5	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
8:2 FTS	ND		3.4	0.34	ug/Kg		06/16/22 19:03	06/18/22 07:19	1
10:2 FTS	ND		3.4	0.35	ug/Kg		06/16/22 19:03	06/18/22 07:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*9*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C5 PFPeA	*48*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C2 PFHxA	*110*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C4 PFHpA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C4 PFOA	*120*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C5 PFNA	*127*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C2 PFDA	*139*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C2 PFUnA	*146*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C3 PFBS	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
18O2 PFHxS	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C4 PFOS	*124*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
M2-4:2 FTS	*164*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
M2-6:2 FTS	*181*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
M2-8:2 FTS	*196*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*
13C2 10:2 FTS	*160*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:19*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**4.2**	**J**	8.6	0.70	ug/Kg		06/16/22 19:03	06/21/22 23:25	1
Br-Perfluorooctanesulfonic acid	**0.87**	**J**	8.6	0.70	ug/Kg		06/16/22 19:03	06/21/22 23:25	1
Total PFOS	**5.1**	**J**	8.6	0.70	ug/Kg		06/16/22 19:03	06/21/22 23:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*06/16/22 19:03*	*06/21/22 23:25*	*1*

Client Sample ID: NK283721

Date Collected: 12/05/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-3

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.1	0.27	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluoropentanoic acid (PFPeA)	ND		1.1	0.20	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluorohexanoic acid (PFHxA)	ND		1.1	0.31	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluoroheptanoic acid (PFHpA)	ND		1.1	0.13	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
L-Perfluorooctanoic acid	ND		1.1	0.23	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Br-Perfluorooctanoic acid	ND		1.1	0.23	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Total PFOA	ND		1.1	0.23	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluorononanoic acid (PFNA)	**0.64**	**J**	1.1	0.20	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluorodecanoic acid (PFDA)	ND		1.1	0.12	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluoroundecanoic acid (PFUnA)	ND		1.1	0.31	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.20	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.1	0.21	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Br-Perfluorohexanesulfonic acid	ND		1.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Total PFHxS	ND		1.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
L-Perfluorohexanesulfonic acid	ND		1.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.1	0.21	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
4:2 FTS	ND		1.1	0.31	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
6:2 FTS	ND		1.1	0.49	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
8:2 FTS	ND		1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 07:42	1
10:2 FTS	ND		1.1	0.12	ug/Kg		06/16/22 19:03	06/18/22 07:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*17*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C5 PFPeA	*92*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C2 PFHxA	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C4 PFHpA	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C4 PFOA	*127*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C5 PFNA	*129*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C2 PFDA	*150*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C2 PFUnA	*155*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C3 PFBS	*124*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
18O2 PFHxS	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C4 PFOS	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
M2-4:2 FTS	*169*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
M2-6:2 FTS	*186*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
M2-8:2 FTS	*215*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*
13C2 10:2 FTS	*204*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 07:42*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**2.2**	**J I**	2.9	0.23	ug/Kg		06/16/22 19:03	06/21/22 23:37	1
Br-Perfluorooctanesulfonic acid	**0.36**	**J**	2.9	0.23	ug/Kg		06/16/22 19:03	06/21/22 23:37	1
Total PFOS	**2.6**	**J**	2.9	0.23	ug/Kg		06/16/22 19:03	06/21/22 23:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*131*		*25 - 150*	*06/16/22 19:03*	*06/21/22 23:37*	*1*

Client Sample ID: NK283676

Date Collected: 04/11/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-4

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.98	0.23	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluoropentanoic acid (PFPeA)	ND		0.98	0.17	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluorohexanoic acid (PFHxA)	ND		0.98	0.27	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluoroheptanoic acid (PFHpA)	ND		0.98	0.11	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
L-Perfluorooctanoic acid	**0.21**	**J**	0.98	0.20	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Br-Perfluorooctanoic acid	ND		0.98	0.20	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Total PFOA	**0.21**	**J**	0.98	0.20	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluorononanoic acid (PFNA)	**0.17**	**J**	0.98	0.17	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluorodecanoic acid (PFDA)	ND		0.98	0.10	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluoroundecanoic acid (PFUnA)	ND		0.98	0.27	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.98	0.17	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.98	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Br-Perfluorohexanesulfonic acid	ND		0.98	0.15	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Total PFHxS	**0.25**	**J**	0.98	0.15	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
L-Perfluorohexanesulfonic acid	**0.25**	**J**	0.98	0.15	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.98	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
4:2 FTS	ND		0.98	0.26	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
6:2 FTS	ND		0.98	0.42	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
8:2 FTS	ND		0.98	0.098	ug/Kg		06/16/22 19:03	06/18/22 08:05	1
10:2 FTS	ND		0.98	0.099	ug/Kg		06/16/22 19:03	06/18/22 08:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*17*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C5 PFPeA	*91*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C2 PFHxA	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C4 PFHpA	*143*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C4 PFOA	*141*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C5 PFNA	*150*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C2 PFDA	*156*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C2 PFUnA	*169*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C3 PFBS	*140*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
18O2 PFHxS	*153*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C4 PFOS	*155*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
M2-4:2 FTS	*217*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
M2-6:2 FTS	*215*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
M2-8:2 FTS	*225*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*
13C2 10:2 FTS	*238*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:05*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**0.80**	**J**	2.5	0.20	ug/Kg		06/16/22 19:03	06/21/22 23:50	1
Br-Perfluorooctanesulfonic acid	**0.49**	**J**	2.5	0.20	ug/Kg		06/16/22 19:03	06/21/22 23:50	1
Total PFOS	**1.3**	**J**	2.5	0.20	ug/Kg		06/16/22 19:03	06/21/22 23:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*149*		*25 - 150*	*06/16/22 19:03*	*06/21/22 23:50*	*1*

Client Sample ID: NK283697

Date Collected: 01/26/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-5

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.2	0.29	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluoropentanoic acid (PFPeA)	ND		1.2	0.21	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluorohexanoic acid (PFHxA)	ND		1.2	0.33	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluoroheptanoic acid (PFHpA)	ND		1.2	0.14	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
L-Perfluorooctanoic acid	ND		1.2	0.25	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Br-Perfluorooctanoic acid	ND		1.2	0.25	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Total PFOA	ND		1.2	0.25	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluorononanoic acid (PFNA)	ND		1.2	0.21	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluorodecanoic acid (PFDA)	**0.14**	**J**	1.2	0.13	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluoroundecanoic acid (PFUnA)	ND		1.2	0.33	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.2	0.21	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.2	0.22	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Br-Perfluorohexanesulfonic acid	ND		1.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Total PFHxS	ND		1.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
L-Perfluorohexanesulfonic acid	ND		1.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.2	0.23	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
4:2 FTS	ND		1.2	0.32	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
6:2 FTS	ND		1.2	0.52	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
8:2 FTS	ND		1.2	0.12	ug/Kg		06/16/22 19:03	06/18/22 08:27	1
10:2 FTS	ND		1.2	0.12	ug/Kg		06/16/22 19:03	06/18/22 08:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*13*	*5-	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C5 PFPeA	*73*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C2 PFHxA	*110*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C4 PFHpA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C4 PFOA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C5 PFNA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C2 PFDA	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C2 PFUnA	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
18O2 PFHxS	*117*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C4 PFOS	*120*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
M2-4:2 FTS	*163*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
M2-6:2 FTS	*197*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
M2-8:2 FTS	*179*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*
13C2 10:2 FTS	*161*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:27*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**0.77**	**J**	3.0	0.25	ug/Kg		06/16/22 19:03	06/22/22 00:03	1
Br-Perfluorooctanesulfonic acid	ND		3.0	0.25	ug/Kg		06/16/22 19:03	06/22/22 00:03	1
Total PFOS	**0.77**	**J**	3.0	0.25	ug/Kg		06/16/22 19:03	06/22/22 00:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*06/16/22 19:03*	*06/22/22 00:03*	*1*

Client Sample ID: NK283613

Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-6

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.1	0.26	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluoropentanoic acid (PFPeA)	ND		1.1	0.19	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluorohexanoic acid (PFHxA)	ND		1.1	0.30	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluoroheptanoic acid (PFHpA)	ND		1.1	0.13	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
L-Perfluorooctanoic acid	ND		1.1	0.22	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Br-Perfluorooctanoic acid	ND		1.1	0.22	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Total PFOA	ND		1.1	0.22	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluorononanoic acid (PFNA)	**0.21**	**J**	1.1	0.19	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluorodecanoic acid (PFDA)	**0.29**	**J**	1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluoroundecanoic acid (PFUnA)	ND		1.1	0.30	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.18	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.1	0.20	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Br-Perfluorohexanesulfonic acid	ND		1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Total PFHxS	ND		1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
L-Perfluorohexanesulfonic acid	ND		1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.1	0.20	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
4:2 FTS	ND		1.1	0.29	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
6:2 FTS	ND		1.1	0.46	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
8:2 FTS	ND		1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 08:50	1
10:2 FTS	ND		1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 08:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*20*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C5 PFPeA	*90*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C2 PFHxA	*105*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C4 PFHpA	*105*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C4 PFOA	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C5 PFNA	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C2 PFDA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C2 PFUnA	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C3 PFBS	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
18O2 PFHxS	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C4 PFOS	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
M2-4:2 FTS	*151*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
M2-6:2 FTS	*146*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
M2-8:2 FTS	*147*		*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*
13C2 10:2 FTS	*177*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 08:50*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**3.7**	**I**	2.7	0.22	ug/Kg		06/16/22 19:03	06/22/22 00:16	1
Br-Perfluorooctanesulfonic acid	**0.22**	**J**	2.7	0.22	ug/Kg		06/16/22 19:03	06/22/22 00:16	1
Total PFOS	**3.9**		2.7	0.22	ug/Kg		06/16/22 19:03	06/22/22 00:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*109*		*25 - 150*	*06/16/22 19:03*	*06/22/22 00:16*	*1*

Client Sample ID: NK283614

Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-7

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.92	0.22	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluoropentanoic acid (PFPeA)	ND		0.92	0.16	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluorohexanoic acid (PFHxA)	ND		0.92	0.25	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluoroheptanoic acid (PFHpA)	ND		0.92	0.11	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
L-Perfluorooctanoic acid	**0.28**	**J**	0.92	0.19	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Br-Perfluorooctanoic acid	ND		0.92	0.19	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Total PFOA	**0.28**	**J**	0.92	0.19	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluorononanoic acid (PFNA)	**0.28**	**J**	0.92	0.16	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluorodecanoic acid (PFDA)	**0.41**	**J**	0.92	0.094	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluoroundecanoic acid (PFUnA)	ND		0.92	0.25	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.92	0.16	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.92	0.17	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Br-Perfluorohexanesulfonic acid	ND		0.92	0.14	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Total PFHxS	ND		0.92	0.14	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
L-Perfluorohexanesulfonic acid	ND		0.92	0.14	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.92	0.17	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
4:2 FTS	ND		0.92	0.24	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
6:2 FTS	ND		0.92	0.39	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
8:2 FTS	ND		0.92	0.092	ug/Kg		06/16/22 19:03	06/18/22 09:12	1
10:2 FTS	ND		0.92	0.093	ug/Kg		06/16/22 19:03	06/18/22 09:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*48*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C5 PFPeA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C2 PFHxA	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C4 PFHpA	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C4 PFOA	*128*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C5 PFNA	*129*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C2 PFDA	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C2 PFUnA	*154*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C3 PFBS	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
18O2 PFHxS	*131*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C4 PFOS	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
M2-4:2 FTS	*192*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
M2-6:2 FTS	*194*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
M2-8:2 FTS	*183*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*
13C2 10:2 FTS	*197*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 09:12*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**3.3**		2.3	0.19	ug/Kg		06/16/22 19:03	06/22/22 00:29	1
Br-Perfluorooctanesulfonic acid	**0.20**	**J**	2.3	0.19	ug/Kg		06/16/22 19:03	06/22/22 00:29	1
Total PFOS	**3.5**		2.3	0.19	ug/Kg		06/16/22 19:03	06/22/22 00:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*134*		*25 - 150*	*06/16/22 19:03*	*06/22/22 00:29*	*1*

Client Sample ID: NK283616

Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-8

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.94	0.22	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluoropentanoic acid (PFPeA)	ND		0.94	0.17	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluorohexanoic acid (PFHxA)	ND		0.94	0.26	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluoroheptanoic acid (PFHpA)	ND		0.94	0.11	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
L-Perfluorooctanoic acid	**0.20**	**J**	0.94	0.19	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Br-Perfluorooctanoic acid	ND		0.94	0.19	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Total PFOA	**0.20**	**J**	0.94	0.19	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluorononanoic acid (PFNA)	**0.28**	**J**	0.94	0.17	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluorodecanoic acid (PFDA)	**0.27**	**J**	0.94	0.097	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluoroundecanoic acid (PFUnA)	ND		0.94	0.26	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.94	0.16	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.94	0.17	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Br-Perfluorohexanesulfonic acid	ND		0.94	0.14	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Total PFHxS	ND		0.94	0.14	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
L-Perfluorohexanesulfonic acid	ND		0.94	0.14	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.94	0.17	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
4:2 FTS	ND		0.94	0.25	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
6:2 FTS	ND		0.94	0.40	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
8:2 FTS	ND		0.94	0.094	ug/Kg		06/16/22 19:03	06/18/22 10:20	1
10:2 FTS	ND		0.94	0.095	ug/Kg		06/16/22 19:03	06/18/22 10:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*8*	*5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C5 PFPeA	*41*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C2 PFHxA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C4 PFHpA	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C4 PFOA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C5 PFNA	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C2 PFDA	*124*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C2 PFUnA	*133*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
18O2 PFHxS	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C4 PFOS	*120*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
M2-4:2 FTS	*156*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
M2-6:2 FTS	*184*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
M2-8:2 FTS	*172*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*
13C2 10:2 FTS	*176*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:20*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**5.0**	**I**	2.4	0.19	ug/Kg		06/16/22 19:03	06/22/22 01:07	1
Br-Perfluorooctanesulfonic acid	**0.36**	**J**	2.4	0.19	ug/Kg		06/16/22 19:03	06/22/22 01:07	1
Total PFOS	**5.3**		2.4	0.19	ug/Kg		06/16/22 19:03	06/22/22 01:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*06/16/22 19:03*	*06/22/22 01:07*	*1*

Client Sample ID: NK283699

Date Collected: 04/04/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-9

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.25	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
L-Perfluorooctanoic acid	**0.24**	**J**	1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Br-Perfluorooctanoic acid	ND		1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Total PFOA	**0.24**	**J**	1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluorononanoic acid (PFNA)	**1.1**		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluorodecanoic acid (PFDA)	ND		1.0	0.11	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Br-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Total PFHxS	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
L-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
4:2 FTS	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
6:2 FTS	ND		1.0	0.44	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
8:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 10:43	1
10:2 FTS	ND		1.0	0.11	ug/Kg		06/16/22 19:03	06/18/22 10:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*8*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C5 PFPeA	*52*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C2 PFHxA	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C4 PFOA	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C5 PFNA	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C2 PFDA	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C2 PFUnA	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C3 PFBS	*106*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
18O2 PFHxS	*110*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C4 PFOS	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
M2-4:2 FTS	*152*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
M2-6:2 FTS	*199*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
M2-8:2 FTS	*212*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*
13C2 10:2 FTS	*208*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 10:43*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
L-Perfluorooctanesulfonic acid	**0.40**	**J**	2.6	0.21	ug/Kg		06/16/22 19:03	06/22/22 01:20	1
Br-Perfluorooctanesulfonic acid	**0.21**	**J**	2.6	0.21	ug/Kg		06/16/22 19:03	06/22/22 01:20	1
Total PFOS	**0.61**	**J**	2.6	0.21	ug/Kg		06/16/22 19:03	06/22/22 01:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*120*		*25 - 150*	*06/16/22 19:03*	*06/22/22 01:20*	*1*

Client Sample ID: NK283634

Date Collected: 01/31/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-10

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.24	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluoroheptanoic acid (PFHpA)	**0.15**	**J**	1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
L-Perfluorooctanoic acid	**9.4**		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Br-Perfluorooctanoic acid	**0.20**	**J**	1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Total PFOA	**9.6**		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluorononanoic acid (PFNA)	**73**		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluorodecanoic acid (PFDA)	**7.7**		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluoroundecanoic acid (PFUnA)	**0.79**	**J**	1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluoropentanesulfonic acid (PFPeS)	**4.6**		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Br-Perfluorohexanesulfonic acid	**26**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Total PFHxS	**640**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
L-Perfluorohexanesulfonic acid	**620**	**E**	1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Perfluoroheptanesulfonic acid (PFHpS)	**64**		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
L-Perfluorooctanesulfonic acid	**2000**	**E**	2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Br-Perfluorooctanesulfonic acid	**570**	**E**	2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
Total PFOS	**2600**		2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
6:2 FTS	ND		1.0	0.43	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
8:2 FTS	**4.2**		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 11:05	1
10:2 FTS	**0.18**	**J**	1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 11:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*19*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C5 PFPeA	*95*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C2 PFHxA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C4 PFHpA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C4 PFOA	*117*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C5 PFNA	*119*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C2 PFDA	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C2 PFUnA	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C3 PFBS	*117*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
18O2 PFHxS	*120*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
M2-4:2 FTS	*199*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
M2-6:2 FTS	*178*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
M2-8:2 FTS	*170*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*
13C2 10:2 FTS	*184*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:05*	*1*

Client Sample ID: NK283635

Date Collected: 01/30/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-11

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.24**	**J**	0.90	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluoropentanoic acid (PFPeA)	ND		0.90	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluorohexanoic acid (PFHxA)	ND		0.90	0.25	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluoroheptanoic acid (PFHpA)	**0.19**	**J**	0.90	0.10	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
L-Perfluorooctanoic acid	**12**		0.90	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Br-Perfluorooctanoic acid	**0.40**	**J**	0.90	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Total PFOA	**13**		0.90	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluorononanoic acid (PFNA)	**21**		0.90	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluorodecanoic acid (PFDA)	**2.8**		0.90	0.093	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluoroundecanoic acid (PFUnA)	**0.42**	**J**	0.90	0.25	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.90	0.15	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluoropentanesulfonic acid (PFPeS)	**5.7**		0.90	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Br-Perfluorohexanesulfonic acid	**26**		0.90	0.13	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Total PFHxS	**320**		0.90	0.13	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
L-Perfluorohexanesulfonic acid	**290**	**E**	0.90	0.13	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Perfluoroheptanesulfonic acid (PFHpS)	**15**		0.90	0.17	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
L-Perfluorooctanesulfonic acid	**630**	**E**	2.3	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Br-Perfluorooctanesulfonic acid	**170**	**E**	2.3	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
Total PFOS	**810**		2.3	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
4:2 FTS	ND		0.90	0.24	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
6:2 FTS	ND		0.90	0.38	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
8:2 FTS	**0.98**		0.90	0.090	ug/Kg		06/16/22 19:03	06/18/22 11:28	1
10:2 FTS	ND		0.90	0.091	ug/Kg		06/16/22 19:03	06/18/22 11:28	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*24*	*5-	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C5 PFPeA	*96*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C2 PFHxA	*108*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C4 PFHpA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C4 PFOA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C5 PFNA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C2 PFDA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C2 PFUnA	*127*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
18O2 PFHxS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C4 PFOS	*108*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
M2-4:2 FTS	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
M2-6:2 FTS	*133*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
M2-8:2 FTS	*136*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*
13C2 10:2 FTS	*173*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:28*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283675
Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-12
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.29**	**J**	1.1	0.25	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluoropentanoic acid (PFPeA)	ND		1.1	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluorohexanoic acid (PFHxA)	ND		1.1	0.29	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluoroheptanoic acid (PFHpA)	**0.13**	**J**	1.1	0.12	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
L-Perfluorooctanoic acid	**5.6**		1.1	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Br-Perfluorooctanoic acid	ND		1.1	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Total PFOA	**5.6**		1.1	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluorononanoic acid (PFNA)	**21**		1.1	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluorodecanoic acid (PFDA)	**3.8**		1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluoroundecanoic acid (PFUnA)	**0.61**	**J**	1.1	0.29	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.1	0.18	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluoropentanesulfonic acid (PFPeS)	**3.5**		1.1	0.19	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Br-Perfluorohexanesulfonic acid	**22**		1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Total PFHxS	**280**		1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
L-Perfluorohexanesulfonic acid	**250**	**E**	1.1	0.16	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Perfluoroheptanesulfonic acid (PFHpS)	**16**		1.1	0.19	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
L-Perfluorooctanesulfonic acid	**880**	**E**	2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Br-Perfluorooctanesulfonic acid	**280**	**E**	2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
Total PFOS	**1200**		2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
4:2 FTS	ND		1.1	0.28	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
6:2 FTS	ND		1.1	0.45	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
8:2 FTS	**1.9**		1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 11:51	1
10:2 FTS	**0.12**	**J**	1.1	0.11	ug/Kg		06/16/22 19:03	06/18/22 11:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*23*	*5-	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C5 PFPeA	*102*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C2 PFHxA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C4 PFOA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C5 PFNA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C2 PFDA	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C2 PFUnA	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C3 PFBS	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
18O2 PFHxS	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C4 PFOS	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
M2-4:2 FTS	*162*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
M2-6:2 FTS	*150*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
M2-8:2 FTS	*140*		*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*
13C2 10:2 FTS	*192*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 11:51*	*1*

Client Sample ID: NK283668

Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-13

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.84**	**J**	0.86	0.20	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluoropentanoic acid (PFPeA)	**0.26**	**J**	0.86	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluorohexanoic acid (PFHxA)	**0.43**	**J**	0.86	0.24	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluoroheptanoic acid (PFHpA)	**0.36**	**J**	0.86	0.10	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
L-Perfluorooctanoic acid	**40**		0.86	0.17	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Br-Perfluorooctanoic acid	**0.81**	**J**	0.86	0.17	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Total PFOA	**41**		0.86	0.17	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluorononanoic acid (PFNA)	**56**		0.86	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluorodecanoic acid (PFDA)	**5.8**		0.86	0.089	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluoroundecanoic acid (PFUnA)	**0.53**	**J**	0.86	0.23	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluorobutanesulfonic acid (PFBS)	**0.25**	**J**	0.86	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluoropentanesulfonic acid (PFPeS)	**6.2**		0.86	0.16	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Br-Perfluorohexanesulfonic acid	**44**		0.86	0.13	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Total PFHxS	**1100**		0.86	0.13	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
L-Perfluorohexanesulfonic acid	**1100**	**E**	0.86	0.13	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Perfluoroheptanesulfonic acid (PFHpS)	**54**		0.86	0.16	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
L-Perfluorooctanesulfonic acid	**1500**	**E**	2.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Br-Perfluorooctanesulfonic acid	**480**	**E**	2.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
Total PFOS	**1900**		2.2	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
4:2 FTS	ND		0.86	0.23	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
6:2 FTS	ND		0.86	0.37	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
8:2 FTS	**2.6**		0.86	0.086	ug/Kg		06/16/22 19:03	06/18/22 12:13	1
10:2 FTS	ND		0.86	0.087	ug/Kg		06/16/22 19:03	06/18/22 12:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*14*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C5 PFPeA	*77*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C2 PFHxA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C4 PFOA	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C5 PFNA	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C2 PFDA	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C2 PFUnA	*137*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C3 PFBS	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
18O2 PFHxS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C4 PFOS	*108*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
M2-4:2 FTS	*159*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
M2-6:2 FTS	*159*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
M2-8:2 FTS	*155*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*
13C2 10:2 FTS	*204*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:13*	*1*

Client Sample ID: NK283628

Date Collected: 01/20/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-14

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.2**		1.0	0.25	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluoroheptanoic acid (PFHpA)	**0.34**	**J**	1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
L-Perfluorooctanoic acid	**19**		1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Br-Perfluorooctanoic acid	**0.81**	**J**	1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Total PFOA	**20**		1.0	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluorononanoic acid (PFNA)	**15**		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluorodecanoic acid (PFDA)	**1.8**		1.0	0.11	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluorobutanesulfonic acid (PFBS)	**0.23**	**J**	1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluoropentanesulfonic acid (PFPeS)	**7.3**		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Br-Perfluorohexanesulfonic acid	**24**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Total PFHxS	**210**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
L-Perfluorohexanesulfonic acid	**190**	**E**	1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Perfluoroheptanesulfonic acid (PFHpS)	**10**		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
L-Perfluorooctanesulfonic acid	**470**	**E**	2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Br-Perfluorooctanesulfonic acid	**140**	**E**	2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
Total PFOS	**610**		2.6	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
4:2 FTS	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
6:2 FTS	ND		1.0	0.44	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
8:2 FTS	**0.75**	**J**	1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 12:36	1
10:2 FTS	ND		1.0	0.11	ug/Kg		06/16/22 19:03	06/18/22 12:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*13*	*5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C5 PFPeA	*73*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C2 PFHxA	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C4 PFOA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C5 PFNA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C2 PFDA	*122*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C2 PFUnA	*132*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C3 PFBS	*106*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
18O2 PFHxS	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C4 PFOS	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
M2-4:2 FTS	*188*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
M2-6:2 FTS	*206*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
M2-8:2 FTS	*180*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*
13C2 10:2 FTS	*191*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:36*	*1*

Client Sample ID: NK283603

Date Collected: 12/10/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-15

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.45**	**J**	1.0	0.24	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluoropentanoic acid (PFPeA)	**0.18**	**J**	1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluoroheptanoic acid (PFHpA)	**0.15**	**J**	1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
L-Perfluorooctanoic acid	**4.1**		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Br-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Total PFOA	**4.1**		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluorononanoic acid (PFNA)	**5.8**		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluorodecanoic acid (PFDA)	**1.7**		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluoroundecanoic acid (PFUnA)	**0.34**	**J**	1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluoropentanesulfonic acid (PFPeS)	**0.74**	**J**	1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Br-Perfluorohexanesulfonic acid	**11**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Total PFHxS	**330**		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
L-Perfluorohexanesulfonic acid	**320**	**E**	1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Perfluoroheptanesulfonic acid (PFHpS)	**15**		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
L-Perfluorooctanesulfonic acid	**740**	**E**	2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Br-Perfluorooctanesulfonic acid	**230**	**E**	2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
Total PFOS	**960**		2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
6:2 FTS	ND		1.0	0.43	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
8:2 FTS	**2.7**		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 12:58	1
10:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 12:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*21*	*5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C5 PFPeA	*103*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C2 PFHxA	*131*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C4 PFHpA	*134*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C4 PFOA	*133*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C5 PFNA	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C2 PFDA	*134*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C2 PFUnA	*149*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C3 PFBS	*133*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
18O2 PFHxS	*132*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C4 PFOS	*131*		*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
M2-4:2 FTS	*176*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
M2-6:2 FTS	*179*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
M2-8:2 FTS	*163*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*
13C2 10:2 FTS	*230*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 12:58*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283637
Date Collected: 01/31/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-16
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.84	0.20	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluoropentanoic acid (PFPeA)	ND		0.84	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluorohexanoic acid (PFHxA)	ND		0.84	0.23	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluoroheptanoic acid (PFHpA)	ND		0.84	0.097	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
L-Perfluorooctanoic acid	ND		0.84	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Br-Perfluorooctanoic acid	ND		0.84	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Total PFOA	ND		0.84	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluorononanoic acid (PFNA)	**2.5**		0.84	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluorodecanoic acid (PFDA)	**11**		0.84	0.087	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluoroundecanoic acid (PFUnA)	**3.9**		0.84	0.23	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.84	0.14	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.84	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Br-Perfluorohexanesulfonic acid	ND		0.84	0.12	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Total PFHxS	ND		0.84	0.12	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
L-Perfluorohexanesulfonic acid	ND		0.84	0.12	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.84	0.16	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
L-Perfluorooctanesulfonic acid	**48**		2.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Br-Perfluorooctanesulfonic acid	**3.2**		2.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
Total PFOS	**51**		2.1	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
4:2 FTS	ND		0.84	0.22	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
6:2 FTS	ND		0.84	0.36	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
8:2 FTS	ND		0.84	0.084	ug/Kg		06/16/22 19:03	06/18/22 13:21	1
10:2 FTS	ND		0.84	0.085	ug/Kg		06/16/22 19:03	06/18/22 13:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*18*	*5-	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C5 PFPeA	*85*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C2 PFHxA	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C4 PFHpA	*110*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C4 PFOA	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C5 PFNA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C2 PFDA	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C2 PFUnA	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C3 PFBS	*105*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
18O2 PFHxS	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C4 PFOS	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
M2-4:2 FTS	*131*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
M2-6:2 FTS	*145*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
M2-8:2 FTS	*141*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*
13C2 10:2 FTS	*167*	*5+	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:21*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283612
Date Collected: 01/16/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-17
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.24	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.28	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
L-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Br-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Total PFOA	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluorononanoic acid (PFNA)	**0.78**	**J**	1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluorodecanoic acid (PFDA)	**0.94**	**J**	1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluoroundecanoic acid (PFUnA)	**0.41**	**J**	1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Br-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Total PFHxS	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
L-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
L-Perfluorooctanesulfonic acid	**15**		2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Br-Perfluorooctanesulfonic acid	**2.5**		2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
Total PFOS	**17**		2.5	0.21	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
6:2 FTS	ND		1.0	0.43	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
8:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 13:44	1
10:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 13:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*17*	*5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C5 PFPeA	*87*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C2 PFHxA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C4 PFHpA	*123*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C4 PFOA	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C5 PFNA	*126*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C2 PFDA	*127*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C2 PFUnA	*144*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C3 PFBS	*118*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
18O2 PFHxS	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C4 PFOS	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
M2-4:2 FTS	*176*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
M2-6:2 FTS	*183*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
M2-8:2 FTS	*173*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*
13C2 10:2 FTS	*182*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 13:44*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283630
Date Collected: 01/15/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-18
Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.2**		0.82	0.19	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluoropentanoic acid (PFPeA)	ND		0.82	0.14	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluorohexanoic acid (PFHxA)	ND		0.82	0.22	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluoroheptanoic acid (PFHpA)	**0.16**	**J**	0.82	0.095	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
L-Perfluorooctanoic acid	**46**		0.82	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Br-Perfluorooctanoic acid	**0.59**	**J**	0.82	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Total PFOA	**46**		0.82	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluorononanoic acid (PFNA)	**58**		0.82	0.14	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluorodecanoic acid (PFDA)	**6.4**		0.82	0.084	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluoroundecanoic acid (PFUnA)	**0.62**	**J**	0.82	0.22	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.82	0.14	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluoropentanesulfonic acid (PFPeS)	**5.8**		0.82	0.15	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Br-Perfluorohexanesulfonic acid	**67**		0.82	0.12	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Total PFHxS	**1600**		0.82	0.12	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
L-Perfluorohexanesulfonic acid	**1500**	**E**	0.82	0.12	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Perfluoroheptanesulfonic acid (PFHpS)	**61**		0.82	0.15	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
L-Perfluorooctanesulfonic acid	**1700**	**E**	2.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Br-Perfluorooctanesulfonic acid	**540**	**E**	2.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
Total PFOS	**2300**		2.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
4:2 FTS	ND		0.82	0.22	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
6:2 FTS	ND		0.82	0.35	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
8:2 FTS	**2.7**		0.82	0.082	ug/Kg		06/16/22 19:03	06/18/22 14:51	1
10:2 FTS	ND		0.82	0.083	ug/Kg		06/16/22 19:03	06/18/22 14:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*15*	*5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C5 PFPeA	*80*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C2 PFHxA	*103*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C4 PFHpA	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C4 PFOA	*105*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C5 PFNA	*108*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C2 PFDA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C2 PFUnA	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C3 PFBS	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
18O2 PFHxS	*101*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C4 PFOS	*99*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
M2-4:2 FTS	*135*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
M2-6:2 FTS	*139*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
M2-8:2 FTS	*139*		*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*
13C2 10:2 FTS	*195*	*5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 14:51*	*1*

Client Sample ID: NK283610

Date Collected: 01/16/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-19

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.1**		0.78	0.18	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluoropentanoic acid (PFPeA)	ND		0.78	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluorohexanoic acid (PFHxA)	ND		0.78	0.21	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluoroheptanoic acid (PFHpA)	**0.16**	**J**	0.78	0.091	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
L-Perfluorooctanoic acid	**15**		0.78	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Br-Perfluorooctanoic acid	**0.32**	**J**	0.78	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Total PFOA	**15**		0.78	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluorononanoic acid (PFNA)	**29**		0.78	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluorodecanoic acid (PFDA)	**3.1**		0.78	0.080	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluoroundecanoic acid (PFUnA)	**0.31**	**J**	0.78	0.21	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluorobutanesulfonic acid (PFBS)	**0.14**	**J**	0.78	0.13	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluoropentanesulfonic acid (PFPeS)	**4.5**		0.78	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Br-Perfluorohexanesulfonic acid	**29**		0.78	0.12	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Total PFHxS	**400**		0.78	0.12	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
L-Perfluorohexanesulfonic acid	**370**	**E**	0.78	0.12	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Perfluoroheptanesulfonic acid (PFHpS)	**21**		0.78	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
L-Perfluorooctanesulfonic acid	**830**	**E**	2.0	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Br-Perfluorooctanesulfonic acid	**230**	**E**	2.0	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
Total PFOS	**1100**		2.0	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
4:2 FTS	ND		0.78	0.21	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
6:2 FTS	ND		0.78	0.33	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
8:2 FTS	**1.1**		0.78	0.078	ug/Kg		06/16/22 19:03	06/18/22 15:14	1
10:2 FTS	ND		0.78	0.079	ug/Kg		06/16/22 19:03	06/18/22 15:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*18*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C5 PFPeA	*94*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C2 PFHxA	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C4 PFHpA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C4 PFOA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C5 PFNA	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C2 PFDA	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C2 PFUnA	*127*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C3 PFBS	*109*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
18O2 PFHxS	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C4 PFOS	*106*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
M2-4:2 FTS	*141*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
M2-6:2 FTS	*139*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
M2-8:2 FTS	*138*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*
13C2 10:2 FTS	*197*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 15:14*	*1*

Client Sample ID: NK283666

Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-20

Matrix: Tissue

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.0**		0.93	0.22	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluoropentanoic acid (PFPeA)	**0.29**	**J**	0.93	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluorohexanoic acid (PFHxA)	**0.34**	**J**	0.93	0.25	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluoroheptanoic acid (PFHpA)	**0.41**	**J**	0.93	0.11	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
L-Perfluorooctanoic acid	**51**		0.93	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Br-Perfluorooctanoic acid	**1.2**		0.93	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Total PFOA	**52**		0.93	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluorononanoic acid (PFNA)	**59**		0.93	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluorodecanoic acid (PFDA)	**5.7**		0.93	0.095	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluoroundecanoic acid (PFUnA)	**0.47**	**J**	0.93	0.25	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluorobutanesulfonic acid (PFBS)	**0.32**	**J**	0.93	0.16	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluoropentanesulfonic acid (PFPeS)	**10**		0.93	0.17	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Br-Perfluorohexanesulfonic acid	**74**		0.93	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Total PFHxS	**1400**		0.93	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
L-Perfluorohexanesulfonic acid	**1300**	**E**	0.93	0.14	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Perfluoroheptanesulfonic acid (PFHpS)	**61**		0.93	0.17	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
L-Perfluorooctanesulfonic acid	**1600**	**E**	2.3	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Br-Perfluorooctanesulfonic acid	**490**	**E**	2.3	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
Total PFOS	**2100**		2.3	0.19	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
4:2 FTS	ND		0.93	0.25	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
6:2 FTS	ND		0.93	0.39	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
8:2 FTS	**2.4**		0.93	0.093	ug/Kg		06/16/22 19:03	06/18/22 15:37	1
10:2 FTS	ND		0.93	0.094	ug/Kg		06/16/22 19:03	06/18/22 15:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*22*	**5-*	*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C5 PFPeA	*102*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C2 PFHxA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C4 PFHpA	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C4 PFOA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C5 PFNA	*115*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C2 PFDA	*119*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C2 PFUnA	*133*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C3 PFBS	*116*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
18O2 PFHxS	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C4 PFOS	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
M2-4:2 FTS	*134*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
M2-6:2 FTS	*148*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
M2-8:2 FTS	*137*		*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*
13C2 10:2 FTS	*192*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 15:37*	*1*

Isotope Dilution Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Matrix: Tissue **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (25-150)	PFPeA (25-150)	PFHxA (25-150)	C4PFHA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)
320-88247-1	NK283617	37	111	114	118	118	118	122	130
320-88247-1 - RA	NK283617								
320-88247-2	NK283706	9 *5-	48	110	118	120	127	139	146
320-88247-2 - RA	NK283706								
320-88247-3	NK283721	17 *5-	92	122	125	127	129	150	155 *5+
320-88247-3 - RA	NK283721								
320-88247-4	NK283676	17 *5-	91	135	143	141	150	156 *5+	169 *5+
320-88247-4 - RA	NK283676								
320-88247-5	NK283697	13 *5-	73	110	111	116	113	122	130
320-88247-5 - RA	NK283697								
320-88247-6	NK283613	20 *5-	90	105	105	109	109	111	130
320-88247-6 - RA	NK283613								
320-88247-7	NK283614	48	112	125	123	128	129	135	154 *5+
320-88247-7 - RA	NK283614								
320-88247-8	NK283616	8 *5-	41	112	115	116	121	124	133
320-88247-8 - RA	NK283616								
320-88247-9	NK283699	8 *5-	52	107	113	115	122	123	135
320-88247-9 - RA	NK283699								
320-88247-10	NK283634	19 *5-	95	116	114	117	119	123	135
320-88247-11	NK283635	24 *5-	96	108	114	112	113	114	127
320-88247-12	NK283675	23 *5-	102	113	113	118	114	121	135
320-88247-13	NK283668	14 *5-	77	113	113	115	118	123	137
320-88247-14	NK283628	13 *5-	73	107	113	116	116	122	132
320-88247-15	NK283603	21 *5-	103	131	134	133	130	134	149
320-88247-16	NK283637	18 *5-	85	107	110	107	112	115	125
320-88247-17	NK283612	17 *5-	87	116	123	121	126	127	144
320-88247-18	NK283630	15 *5-	80	103	109	105	108	112	125
320-88247-19	NK283610	18 *5-	94	109	112	113	113	116	127
320-88247-20	NK283666	22 *5-	102	111	112	111	115	119	133
LCS 320-596158/2-A	Lab Control Sample	17 *5-	73	106	112	113	117	112	132
LCSD 320-596158/3-A	Lab Control Sample Dup	34	94	114	112	113	110	115	132
MB 320-596158/1-A	Method Blank	40	96	106	111	106	107	114	125

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	M102FTS (25-150)
320-88247-1	NK283617	122	129	132	135	143	152 *5+	169 *5+
320-88247-1 - RA	NK283617			123				
320-88247-2	NK283706	118	121	124	164 *5+	181 *5+	196 *5+	160 *5+
320-88247-2 - RA	NK283706			118				
320-88247-3	NK283721	124	130	135	169 *5+	186 *5+	215 *5+	204 *5+
320-88247-3 - RA	NK283721			131				
320-88247-4	NK283676	140	153 *5+	155 *5+	217 *5+	215 *5+	225 *5+	238 *5+
320-88247-4 - RA	NK283676			149				
320-88247-5	NK283697	112	117	120	163 *5+	197 *5+	179 *5+	161 *5+
320-88247-5 - RA	NK283697			118				
320-88247-6	NK283613	111	114	115	151 *5+	146	147	177 *5+
320-88247-6 - RA	NK283613			109				
320-88247-7	NK283614	123	131	130	192 *5+	194 *5+	183 *5+	197 *5+
320-88247-7 - RA	NK283614			134				

Isotope Dilution Summary

Client: University of New Mexico
Job ID: 320-88247-1
Project/Site: Holloman bird/mammal PFAS Project
SDG: Frozen muscle

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Matrix: Tissue
Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	C3PFBS (25-150)	PFHxS (25-150)	PFOS (25-150)	M242FTS (25-150)	M262FTS (25-150)	M282FTS (25-150)	M102FTS (25-150)
320-88247-8	NK283616	112	115	120	156 *5+	184 *5+	172 *5+	176 *5+
320-88247-8 - RA	NK283616			118				
320-88247-9	NK283699	106	110	113	152 *5+	199 *5+	212 *5+	208 *5+
320-88247-9 - RA	NK283699			120				
320-88247-10	NK283634	117	120	111	199 *5+	178 *5+	170 *5+	184 *5+
320-88247-11	NK283635	112	112	108	135	133	136	173 *5+
320-88247-12	NK283675	114	121	116	162 *5+	150	140	192 *5+
320-88247-13	NK283668	111	112	108	159 *5+	159 *5+	155 *5+	204 *5+
320-88247-14	NK283628	106	114	113	188 *5+	206 *5+	180 *5+	191 *5+
320-88247-15	NK283603	133	132	131	176 *5+	179 *5+	163 *5+	230 *5+
320-88247-16	NK283637	105	111	109	131	145	141	167 *5+
320-88247-17	NK283612	118	125	125	176 *5+	183 *5+	173 *5+	182 *5+
320-88247-18	NK283630	109	101	99	135	139	139	195 *5+
320-88247-19	NK283610	109	113	106	141	139	138	197 *5+
320-88247-20	NK283666	116	113	107	134	148	137	192 *5+
LCS 320-596158/2-A	Lab Control Sample	116	117	121	127	137	126	171 *5+
LCSD 320-596158/3-A	Lab Control Sample Dup	117	120	122	125	132	131	173 *5+
MB 320-596158/1-A	Method Blank	112	113	111	121	130	121	166 *5+

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
M102FTS = 13C2 10:2 FTS

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Lab Sample ID: MB 320-596158/1-A
Matrix: Tissue
Analysis Batch: 596945

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596158

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.0	0.24	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluoropentanoic acid (PFPeA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluorohexanoic acid (PFHxA)	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluoroheptanoic acid (PFHpA)	ND		1.0	0.12	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
L-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Br-Perfluorooctanoic acid	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Total PFOA	ND		1.0	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluorononanoic acid (PFNA)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluorodecanoic acid (PFDA)	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluoroundecanoic acid (PFUnA)	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.0	0.17	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.0	0.18	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Br-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Total PFHxS	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
L-Perfluorohexanesulfonic acid	ND		1.0	0.15	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.0	0.19	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
L-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Br-Perfluorooctanesulfonic acid	ND		2.5	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
Total PFOS	ND		2.5	0.20	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
4:2 FTS	ND		1.0	0.27	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
6:2 FTS	ND		1.0	0.42	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
8:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 05:49	1
10:2 FTS	ND		1.0	0.10	ug/Kg		06/16/22 19:03	06/18/22 05:49	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*40*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C5 PFPeA	*96*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C2 PFHxA	*106*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C4 PFHpA	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C4 PFOA	*106*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C5 PFNA	*107*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C2 PFDA	*114*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C2 PFUnA	*125*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
18O2 PFHxS	*113*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
M2-4:2 FTS	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
M2-6:2 FTS	*130*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
M2-8:2 FTS	*121*		*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*
13C2 10:2 FTS	*166*	**5+*	*25 - 150*	*06/16/22 19:03*	*06/18/22 05:49*	*1*

Lab Sample ID: LCS 320-596158/2-A
Matrix: Tissue
Analysis Batch: 596945

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596158

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	10.0	11.3		ug/Kg		113	76 - 136

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCS 320-596158/2-A
Matrix: Tissue
Analysis Batch: 596945

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596158

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Perfluoropentanoic acid (PFPeA)			10.0	9.89		ug/Kg		99	69 - 129		
Perfluorohexanoic acid (PFHxA)			10.0	9.33		ug/Kg		93	71 - 131		
Perfluoroheptanoic acid (PFHpA)			10.0	10.3		ug/Kg		103	71 - 131		
L-Perfluorooctanoic acid			10.0	9.94		ug/Kg		99	72 - 132		
Total PFOA			10.0	9.94		ug/Kg		99			
Perfluorononanoic acid (PFNA)			10.0	9.75		ug/Kg		98	73 - 133		
Perfluorodecanoic acid (PFDA)			10.0	10.2		ug/Kg		102	72 - 132		
Perfluoroundecanoic acid (PFUnA)			10.0	9.94		ug/Kg		99	66 - 126		
Perfluorobutanesulfonic acid (PFBS)			8.88	8.89		ug/Kg		100	69 - 129		
Perfluoropentanesulfonic acid (PFPeS)			9.38	9.32		ug/Kg		99	66 - 126		
Total PFHxS			9.12	9.16		ug/Kg		100			
L-Perfluorohexanesulfonic acid			9.12	9.16		ug/Kg		100	62 - 122		
Perfluoroheptanesulfonic acid (PFHpS)			9.54	9.85		ug/Kg		103	76 - 136		
L-Perfluorooctanesulfonic acid			9.30	8.93		ug/Kg		96	68 - 141		
Total PFOS			9.30	8.93		ug/Kg		96			
4:2 FTS			9.38	9.36		ug/Kg		100	68 - 143		
6:2 FTS			9.52	8.21		ug/Kg		86	73 - 139		
8:2 FTS			9.60	9.44		ug/Kg		98	75 - 135		
10:2 FTS			9.66	9.47		ug/Kg		98	69 - 145		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*17*	*5-	*25 - 150*
13C5 PFPeA	*73*		*25 - 150*
13C2 PFHxA	*106*		*25 - 150*
13C4 PFHpA	*112*		*25 - 150*
13C4 PFOA	*113*		*25 - 150*
13C5 PFNA	*117*		*25 - 150*
13C2 PFDA	*112*		*25 - 150*
13C2 PFUnA	*132*		*25 - 150*
13C3 PFBS	*116*		*25 - 150*
18O2 PFHxS	*117*		*25 - 150*
13C4 PFOS	*121*		*25 - 150*
M2-4:2 FTS	*127*		*25 - 150*
M2-6:2 FTS	*137*		*25 - 150*
M2-8:2 FTS	*126*		*25 - 150*
13C2 10:2 FTS	*171*	*5+	*25 - 150*

Lab Sample ID: LCSD 320-596158/3-A
Matrix: Tissue
Analysis Batch: 596945

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596158

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)			10.0	9.80		ug/Kg		98	76 - 136	14	30
Perfluoropentanoic acid (PFPeA)			10.0	9.65		ug/Kg		97	69 - 129	2	30
Perfluorohexanoic acid (PFHxA)			10.0	8.88		ug/Kg		89	71 - 131	5	30
Perfluoroheptanoic acid (PFHpA)			10.0	10.0		ug/Kg		100	71 - 131	3	30

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCSD 320-596158/3-A
Matrix: Tissue
Analysis Batch: 596945

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596158

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
L-Perfluorooctanoic acid			10.0	10.1		ug/Kg		101	72 - 132	2	30
Total PFOA			10.0	10.1		ug/Kg		101		2	
Perfluorononanoic acid (PFNA)			10.0	10.1		ug/Kg		101	73 - 133	4	30
Perfluorodecanoic acid (PFDA)			10.0	9.87		ug/Kg		99	72 - 132	3	30
Perfluoroundecanoic acid (PFUnA)			10.0	10.2		ug/Kg		102	66 - 126	3	30
Perfluorobutanesulfonic acid (PFBS)			8.88	8.85		ug/Kg		100	69 - 129	0	30
Perfluoropentanesulfonic acid (PFPeS)			9.38	9.36		ug/Kg		100	66 - 126	0	30
Total PFHxS			9.12	8.96		ug/Kg		98		2	
L-Perfluorohexanesulfonic acid			9.12	8.96		ug/Kg		98	62 - 122	2	30
Perfluoroheptanesulfonic acid (PFHpS)			9.54	9.80		ug/Kg		103	76 - 136	1	30
L-Perfluorooctanesulfonic acid			9.30	8.80		ug/Kg		95	68 - 141	1	30
Total PFOS			9.30	8.80		ug/Kg		95		1	
4:2 FTS			9.38	8.97		ug/Kg		96	68 - 143	4	30
6:2 FTS			9.52	9.23		ug/Kg		97	73 - 139	12	30
8:2 FTS			9.60	9.33		ug/Kg		97	75 - 135	1	30
10:2 FTS			9.66	9.10		ug/Kg		94	69 - 145	4	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*34*		*25 - 150*
13C5 PFPeA	*94*		*25 - 150*
13C2 PFHxA	*114*		*25 - 150*
13C4 PFHpA	*112*		*25 - 150*
13C4 PFOA	*113*		*25 - 150*
13C5 PFNA	*110*		*25 - 150*
13C2 PFDA	*115*		*25 - 150*
13C2 PFUnA	*132*		*25 - 150*
13C3 PFBS	*117*		*25 - 150*
18O2 PFHxS	*120*		*25 - 150*
13C4 PFOS	*122*		*25 - 150*
M2-4:2 FTS	*125*		*25 - 150*
M2-6:2 FTS	*132*		*25 - 150*
M2-8:2 FTS	*131*		*25 - 150*
13C2 10:2 FTS	*173*	*5+	*25 - 150*

LCMS

Prep Batch: 596158

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88247-1	NK283617	Total/NA	Tissue	SHAKE	
320-88247-1 - RA	NK283617	Total/NA	Tissue	SHAKE	
320-88247-2	NK283706	Total/NA	Tissue	SHAKE	
320-88247-2 - RA	NK283706	Total/NA	Tissue	SHAKE	
320-88247-3	NK283721	Total/NA	Tissue	SHAKE	
320-88247-3 - RA	NK283721	Total/NA	Tissue	SHAKE	
320-88247-4	NK283676	Total/NA	Tissue	SHAKE	
320-88247-4 - RA	NK283676	Total/NA	Tissue	SHAKE	
320-88247-5	NK283697	Total/NA	Tissue	SHAKE	
320-88247-5 - RA	NK283697	Total/NA	Tissue	SHAKE	
320-88247-6	NK283613	Total/NA	Tissue	SHAKE	
320-88247-6 - RA	NK283613	Total/NA	Tissue	SHAKE	
320-88247-7	NK283614	Total/NA	Tissue	SHAKE	
320-88247-7 - RA	NK283614	Total/NA	Tissue	SHAKE	
320-88247-8	NK283616	Total/NA	Tissue	SHAKE	
320-88247-8 - RA	NK283616	Total/NA	Tissue	SHAKE	
320-88247-9	NK283699	Total/NA	Tissue	SHAKE	
320-88247-9 - RA	NK283699	Total/NA	Tissue	SHAKE	
320-88247-10	NK283634	Total/NA	Tissue	SHAKE	
320-88247-11	NK283635	Total/NA	Tissue	SHAKE	
320-88247-12	NK283675	Total/NA	Tissue	SHAKE	
320-88247-13	NK283668	Total/NA	Tissue	SHAKE	
320-88247-14	NK283628	Total/NA	Tissue	SHAKE	
320-88247-15	NK283603	Total/NA	Tissue	SHAKE	
320-88247-16	NK283637	Total/NA	Tissue	SHAKE	
320-88247-17	NK283612	Total/NA	Tissue	SHAKE	
320-88247-18	NK283630	Total/NA	Tissue	SHAKE	
320-88247-19	NK283610	Total/NA	Tissue	SHAKE	
320-88247-20	NK283666	Total/NA	Tissue	SHAKE	
MB 320-596158/1-A	Method Blank	Total/NA	Tissue	SHAKE	
LCS 320-596158/2-A	Lab Control Sample	Total/NA	Tissue	SHAKE	
LCSD 320-596158/3-A	Lab Control Sample Dup	Total/NA	Tissue	SHAKE	

Analysis Batch: 596945

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88247-1	NK283617	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-2	NK283706	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-3	NK283721	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-4	NK283676	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-5	NK283697	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-6	NK283613	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-7	NK283614	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-8	NK283616	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-9	NK283699	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-10	NK283634	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-11	NK283635	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-12	NK283675	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-13	NK283668	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-14	NK283628	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-15	NK283603	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-16	NK283637	Total/NA	Tissue	B/L/T PFAS	596158

LCMS (Continued)

Analysis Batch: 596945 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88247-17	NK283612	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-18	NK283630	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-19	NK283610	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-20	NK283666	Total/NA	Tissue	B/L/T PFAS	596158
MB 320-596158/1-A	Method Blank	Total/NA	Tissue	B/L/T PFAS	596158
LCS 320-596158/2-A	Lab Control Sample	Total/NA	Tissue	B/L/T PFAS	596158
LCSD 320-596158/3-A	Lab Control Sample Dup	Total/NA	Tissue	B/L/T PFAS	596158

Analysis Batch: 597578

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88247-1 - RA	NK283617	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-2 - RA	NK283706	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-3 - RA	NK283721	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-4 - RA	NK283676	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-5 - RA	NK283697	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-6 - RA	NK283613	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-7 - RA	NK283614	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-8 - RA	NK283616	Total/NA	Tissue	B/L/T PFAS	596158
320-88247-9 - RA	NK283699	Total/NA	Tissue	B/L/T PFAS	596158

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283617
Date Collected: 12/12/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-1
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.64 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 06:57	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.64 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 23:12	MEO	TAL SAC

Client Sample ID: NK283706
Date Collected: 12/11/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-2
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.29 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 07:19	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.29 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 23:25	MEO	TAL SAC

Client Sample ID: NK283721
Date Collected: 12/05/21 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-3
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.87 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 07:42	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.87 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 23:37	MEO	TAL SAC

Client Sample ID: NK283676
Date Collected: 04/11/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-4
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.02 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 08:05	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		1.02 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/21/22 23:50	MEO	TAL SAC

Client Sample ID: NK283697
Date Collected: 01/26/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-5
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.82 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 08:27	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.82 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/22/22 00:03	MEO	TAL SAC

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283613
Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-6
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.92 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 08:50	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.92 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/22/22 00:16	MEO	TAL SAC

Client Sample ID: NK283614
Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-7
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.09 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 09:12	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		1.09 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/22/22 00:29	MEO	TAL SAC

Client Sample ID: NK283616
Date Collected: 01/23/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-8
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.06 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 10:20	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		1.06 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/22/22 01:07	MEO	TAL SAC

Client Sample ID: NK283699
Date Collected: 04/04/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-9
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.96 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 10:43	AEC	TAL SAC
Total/NA	Prep	SHAKE	RA		0.96 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RA	1			597578	06/22/22 01:20	MEO	TAL SAC

Client Sample ID: NK283634
Date Collected: 01/31/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-10
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.99 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 11:05	AEC	TAL SAC

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283635
Date Collected: 01/30/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-11
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.11 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 11:28	AEC	TAL SAC

Client Sample ID: NK283675
Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-12
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.95 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 11:51	AEC	TAL SAC

Client Sample ID: NK283668
Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-13
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.16 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 12:13	AEC	TAL SAC

Client Sample ID: NK283628
Date Collected: 01/20/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-14
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.96 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 12:36	AEC	TAL SAC

Client Sample ID: NK283603
Date Collected: 12/10/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-15
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.99 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 12:58	AEC	TAL SAC

Client Sample ID: NK283637
Date Collected: 01/31/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-16
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.19 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 13:21	AEC	TAL SAC

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Client Sample ID: NK283612
Date Collected: 01/16/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-17
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			0.99 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 13:44	AEC	TAL SAC

Client Sample ID: NK283630
Date Collected: 01/15/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-18
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.22 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 14:51	AEC	TAL SAC

Client Sample ID: NK283610
Date Collected: 01/16/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-19
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.28 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 15:14	AEC	TAL SAC

Client Sample ID: NK283666
Date Collected: 01/08/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88247-20
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			1.08 g	10.0 mL	596158	06/16/22 19:03	AM	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596945	06/18/22 15:37	AEC	TAL SAC

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Laboratory: Eurofins Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-22
Arkansas DEQ	State	88-0691	06-17-22 *
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-22
Florida	NELAP	E87570	06-30-22
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-22
Louisiana	NELAP	01944	06-30-22
Louisiana (All)	NELAP	01944	06-30-22
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	08-31-22
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-22
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	04-30-23
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-22
Wisconsin	State	998204680	08-31-22
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Method	Method Description	Protocol	Laboratory
B/L/T PFAS	Branched, Linear and Total PFAS	EPA	TAL SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88247-1
SDG: Frozen muscle

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-88247-1	NK283617	Tissue	12/12/21 11:00	05/24/22 10:00
320-88247-2	NK283706	Tissue	12/11/21 11:00	05/24/22 10:00
320-88247-3	NK283721	Tissue	12/05/21 11:00	05/24/22 10:00
320-88247-4	NK283676	Tissue	04/11/22 11:00	05/24/22 10:00
320-88247-5	NK283697	Tissue	01/26/22 11:00	05/24/22 10:00
320-88247-6	NK283613	Tissue	01/23/22 10:00	05/24/22 10:00
320-88247-7	NK283614	Tissue	01/23/22 10:00	05/24/22 10:00
320-88247-8	NK283616	Tissue	01/23/22 10:00	05/24/22 10:00
320-88247-9	NK283699	Tissue	04/04/22 10:00	05/24/22 10:00
320-88247-10	NK283634	Tissue	01/31/22 10:00	05/24/22 10:00
320-88247-11	NK283635	Tissue	01/30/22 10:00	05/24/22 10:00
320-88247-12	NK283675	Tissue	01/08/22 10:00	05/24/22 10:00
320-88247-13	NK283668	Tissue	01/08/22 10:00	05/24/22 10:00
320-88247-14	NK283628	Tissue	01/20/22 10:00	05/24/22 10:00
320-88247-15	NK283603	Tissue	12/10/21 10:00	05/24/22 10:00
320-88247-16	NK283637	Tissue	01/31/22 10:00	05/24/22 10:00
320-88247-17	NK283612	Tissue	01/16/22 10:00	05/24/22 10:00
320-88247-18	NK283630	Tissue	01/15/22 10:00	05/24/22 10:00
320-88247-19	NK283610	Tissue	01/16/22 10:00	05/24/22 10:00
320-88247-20	NK283666	Tissue	01/08/22 10:00	05/24/22 10:00

Eurofins Environment Testing Northern California
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600

Chain of Custody Record

eurofins Environment Testing America

Client Contact	Report To:	Site Contact:	13-May-22	COC No:
Museum of Southwestern Biology, University of New Mexico	Tel/Fax:	Lab Contact:	Carrier:	____ of ____ COCs
CERIA 83, rm 204, 1 University of New Mexico	Analysis Turnaround Time			Job No.
Albuquerque, New Mexico 87131	Calendar (C) or Work Days (W) ___C___			
505 277-1359	TAT if different from Below _____			SDG No.
FAX:	[x] 2 weeks			
Holloman bird/mammal PFAS Project	[ ] 1 week			
Site:	[ ] 2 days			
P O #	[ ] 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Sample Specific Notes:
NK283617	12/12/2021	11:00				n	frozen muscle
NK283706	12/11/2021	11:00				n	frozen muscle
NK283721	12/5/2021	11:00				n	frozen muscle
NK283676	4/11/2022	11:00				n	frozen muscle
NK283697	1/26/2022	11:00				n	frozen muscle
NK283613	1/23/2022	10:00				n	frozen muscle
NK283614	1/23/2022	11:00				n	frozen muscle
NK283616	1/23/2022	10:00				n	frozen muscle
NK283699	4/4/2022	10:00				n	frozen muscle
NK283634	1/31/2022	10:00				n	frozen muscle
NK283635	1/30/2022	10:00				n	frozen muscle
NK283675	1/8/2022	10:00				n	frozen muscle
NK283668	1/8/2022	10:00				n	frozen muscle
NK283628	1/20/2022	10:00				n	frozen muscle
NK283603	12/10/2021	10:00				n	frozen muscle
NK283637	1/31/2022	10:00				n	frozen muscle
NK283612	1/16/2022	10:00				n	frozen muscle
NK283630	1/15/2022	10:00				n	frozen muscle
NK283610	1/16/2022	10:00				n	frozen muscle
NK283666	1/8/2022	10:00				n	frozen muscle

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] Return To Client [x] Disposal By Lab [ ] Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by: Andy Johnson	Company: Museum of SW Biology, University of New Mexico	Date/Time: 2022-05-19	Received by:	Company:	Date/Time:
Relinquished by:	Company: MSB UNM	Date/Time: 5/23/22	Received by:	Company: FEDEX	Date/Time: 5/24/22 1000
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

-47.2C

320-88247 Chain of Custody

Login Sample Receipt Checklist

Client: University of New Mexico

Job Number: 320-88247-1
SDG Number: Frozen muscle

Login Number: 88247
List Number: 1
Creator: Her, David A

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1685157
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Requested analyses are not listed on COC
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-88248-1
Laboratory Sample Delivery Group: Fresh Blood
Client Project/Site: Holloman bird/mammal PFAS Project

For:
University of New Mexico
Museum of Southwestern Biology
Division of Mammals
CERIA Bldg 83, Room 204
Albuquerque, New Mexico 87131

Attn: Jean-Luc Cartron

Linda C. Laver

Authorized for release by:
6/22/2022 3:15:03 PM

Linda C. Laver, Senior Project Manager
(916)374-4362
Linda.Laver@et.eurofinsus.com

LINKS

Review your project results through my EOL

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-88248-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-88248-1

Comment
The Mitra tips submitted for the following sample did not contain 2 tips that were fully saturated; thus the analysis could not be performed: NK310904_blood (320-88248-2).

Receipt
The samples were received on 5/24/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 18.1º C.

Receipt Exceptions
The requested analysis is not listed on the Chain-of-Custody (COC). Samples were logged in for PFAS based on the quote that was provided prior to receipt of samples.

LCMS
Method B/L/T PFAS: The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range. Sample extracts that exhibited potentially saturated peak response were diluted. Historical data indicate that for the isotope dilution method, and in the absence of peak saturation, dilution and re-analysis will not produce significantly different results from those reported above the calibration range. Sample results have been qualified as needed. NK310903_blood (320-88248-1), NK310910_blood (320-88248-3), NK310911_blood (320-88248-4), NK310945_blood (320-88248-6), MSB340117_blood (320-88248-7), NK310921_blood (320-88248-8), NK310914_blood (320-88248-9), MSB341485_blood (320-88248-10) and MSB340103_blood (320-88248-11)

Method B/L/T PFAS: Some results were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract for the following samples. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits. NK310921_blood (320-88248-8), NK310914_blood (320-88248-9), MSB341485_blood (320-88248-10) and MSB340103_blood (320-88248-11)

Method B/L/T PFAS: The "I" qualifier means the transition mass ratio for the analyte Perfluorooctanesulfonic acid (PFOS) was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some elevated bias. However, analyst judgment was used to positively identify the analyte. NK310903_blood (320-88248-1), NK310910_blood (320-88248-3), NK310911_blood (320-88248-4), NK310945_blood (320-88248-6), MSB340117_blood (320-88248-7), NK310921_blood (320-88248-8), NK310914_blood (320-88248-9), MSB341485_blood (320-88248-10), MSB340103_blood (320-88248-11)

Method B/L/T PFAS: The method blank for preparation batch 320-596272 and analytical batch 320-596508 contained 6:2 FTS above the reporting limit (RL). Sample NK310921_blood (320-88248-8) was re-extracted (-RE) and analyte is reported from that analysis. All other samples associated with this method blank did not contain the target compound, therefore the data have been reported.

Method B/L/T PFAS: The method blank for preparation batch 320-596272 and analytical batch 320-596508 contained 6:2 FTS above the reporting limit (RL). Sample NK310921_blood (320-88248-8) was re-extracted (-RE) and analyte is reported from that analysis. All other samples associated with this method blank did not contain the target compound, therefore the data from the original extraction have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: NK310903_blood — Lab Sample ID: 320-88248-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.075	J	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.29		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	0.15	J	0.50	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	0.27	J	0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	3.7	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.85		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOA	0.27	J	0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.39		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.99		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	230	E B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	4.6		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	24		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	290	E I B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	310	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS - RE	0.81		0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310910_blood — Lab Sample ID: 320-88248-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.059	J	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	1.5	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.37		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.13		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	7.6		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	14		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	150	E I B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	160	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310911_blood — Lab Sample ID: 320-88248-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.054	J B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.56	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.35		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.13		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.2	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	4.1		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	20		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	250	E I B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	270	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310941_blood — Lab Sample ID: 320-88248-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.067	J B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.082	J B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	0.062	J	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: NK310941_blood (Continued) — Lab Sample ID: 320-88248-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
L-Perfluorooctanesulfonic acid	0.29	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	0.35	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - RE	0.060	J B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - RE	0.42	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS - RE	0.48	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310945_blood — Lab Sample ID: 320-88248-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.16		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.34		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	0.20	J	0.50	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.10	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.70	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.57		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.23		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.071	J	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.91		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	110	E B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	5.0		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	32		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	390	E I B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	430	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	0.15	J	0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: MSB340117_blood — Lab Sample ID: 320-88248-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.22		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.056	J B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	0.53	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.18	J	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.13		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	1.7		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid	10		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid	79	E I B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOS	89	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	0.058	J	0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310921_blood — Lab Sample ID: 320-88248-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.0		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.82	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	0.39		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	14		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	12	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	0.74		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOA	15		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: NK310921_blood (Continued)

Lab Sample ID: 320-88248-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.19		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	1.2		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	540	E B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	52	E	0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	0.24	J	0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - DL	180		4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - DL	1700	E I B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
Total PFOS - DL	1900	B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
6:2 FTS - RE	4.8		1.0	0.40	ng/mL	1		B/L/T PFAS	Total/NA

Client Sample ID: NK310914_blood

Lab Sample ID: 320-88248-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.36		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.12	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	0.28	J	0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	5.2	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	1.2		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOA	0.28	J	0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.72		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.11		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150	E B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	26		0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	0.087	J	0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - DL	89		4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - DL	1500	E I B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
Total PFOS - DL	1600	B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA

Client Sample ID: MSB341485_blood

Lab Sample ID: 320-88248-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.42		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.066	J	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	0.83		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	25	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	2.0		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOA	0.83		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.44		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.28		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	720	E B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	170	E	0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	5.8		0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - DL	360		4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - DL	5600	E I B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
Total PFOS - DL	5900	B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: MSB340103_blood

Lab Sample ID: 320-88248-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.1		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanoic acid (PFPeA)	0.29		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanoic acid (PFHxA)	1.5		0.50	0.10	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanoic acid (PFHpA)	11	B	0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Br-Perfluorooctanoic acid	6.4		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
L-Perfluorooctanoic acid	170	E	0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorononanoic acid (PFNA)	34	B	0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorodecanoic acid (PFDA)	2.4		0.20	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Total PFOA	170		0.30	0.14	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.20		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.31		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	11		0.10	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluoroheptanesulfonic acid (PFHpS)	310	E	0.20	0.10	ng/mL	1		B/L/T PFAS	Total/NA
6:2 FTS	54	E B	1.0	0.40	ng/mL	1		B/L/T PFAS	Total/NA
8:2 FTS	2.2		0.50	0.050	ng/mL	1		B/L/T PFAS	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	2700	E B	2.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
Br-Perfluorooctanesulfonic acid - DL	400		4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
L-Perfluorooctanesulfonic acid - DL	6200	E I B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA
Total PFOS - DL	6600	B	4.0	1.0	ng/mL	20		B/L/T PFAS	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: NK310903_blood

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-1

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.075**	**J**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluoropentanoic acid (PFPeA)	**0.29**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluorohexanoic acid (PFHxA)	**0.15**	**J**	0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluoroheptanoic acid (PFHpA)	**0.11**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:34	1
L-Perfluorooctanoic acid	**0.27**	**J**	0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluorononanoic acid (PFNA)	**3.7**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluorodecanoic acid (PFDA)	**0.85**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Total PFOA	**0.27**	**J**	0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluoroundecanoic acid (PFUnA)	**0.39**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluoropentanesulfonic acid (PFPeS)	**0.99**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluorohexanesulfonic acid (PFHxS)	**230**	**E B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Perfluoroheptanesulfonic acid (PFHpS)	**4.6**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Br-Perfluorooctanesulfonic acid	**24**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
L-Perfluorooctanesulfonic acid	**290**	**E I B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
Total PFOS	**310**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 19:34	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C5 PFPeA	*94*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C2 PFHxA	*94*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C4 PFHpA	*96*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C4 PFOA	*96*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C5 PFNA	*100*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C2 PFDA	*107*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C2 PFUnA	*98*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C3 PFBS	*94*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
18O2 PFHxS	*92*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C4 PFOS	*85*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
M2-4:2 FTS	*136*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
M2-6:2 FTS	*185*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:34*	*1*
13C2 10:2 FTS	*145*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:34*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
8:2 FTS	**0.81**		0.50	0.050	ng/mL		06/19/22 13:15	06/20/22 05:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-8:2 FTS	*186*		*5 - 200*	*06/19/22 13:15*	*06/20/22 05:41*	*1*

Client Sample ID: NK310910_blood

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-3

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluoroheptanoic acid (PFHpA)	**0.059**	**J**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:44	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluorononanoic acid (PFNA)	**1.5**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluorodecanoic acid (PFDA)	**0.37**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluoroundecanoic acid (PFUnA)	**0.13**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluorohexanesulfonic acid (PFHxS)	**30**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Perfluoroheptanesulfonic acid (PFHpS)	**7.6**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Br-Perfluorooctanesulfonic acid	**14**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
L-Perfluorooctanesulfonic acid	**150**	**E I B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
Total PFOS	**160**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 19:44	1
8:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*33*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C5 PFPeA	*66*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C2 PFHxA	*76*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C4 PFHpA	*82*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C4 PFOA	*80*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C5 PFNA	*81*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C2 PFDA	*84*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C2 PFUnA	*78*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C3 PFBS	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
18O2 PFHxS	*81*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C4 PFOS	*72*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
M2-4:2 FTS	*107*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
M2-6:2 FTS	*151*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
M2-8:2 FTS	*160*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:44*	*1*
13C2 10:2 FTS	*108*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:44*	*1*

Client Sample ID: NK310911_blood

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-4

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluoroheptanoic acid (PFHpA)	**0.054**	**J B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:54	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluorononanoic acid (PFNA)	**0.56**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluorodecanoic acid (PFDA)	**0.35**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluoroundecanoic acid (PFUnA)	**0.13**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluorohexanesulfonic acid (PFHxS)	**5.2**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Perfluoroheptanesulfonic acid (PFHpS)	**4.1**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Br-Perfluorooctanesulfonic acid	**20**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
L-Perfluorooctanesulfonic acid	**250**	**E I B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
Total PFOS	**270**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 19:54	1
8:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*28*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C5 PFPeA	*59*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C2 PFHxA	*75*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C4 PFHpA	*77*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C4 PFOA	*74*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C5 PFNA	*70*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C2 PFDA	*71*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C2 PFUnA	*71*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C3 PFBS	*73*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
18O2 PFHxS	*71*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C4 PFOS	*62*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
M2-4:2 FTS	*94*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
M2-6:2 FTS	*133*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
M2-8:2 FTS	*102*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:54*	*1*
13C2 10:2 FTS	*84*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:54*	*1*

Client Sample ID: NK310941_blood

Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-5

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluoroheptanoic acid (PFHpA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:04	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluorononanoic acid (PFNA)	**0.067**	**J B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluoroundecanoic acid (PFUnA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluorohexanesulfonic acid (PFHxS)	**0.082**	**J B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Br-Perfluorooctanesulfonic acid	**0.062**	**J**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
L-Perfluorooctanesulfonic acid	**0.29**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
Total PFOS	**0.35**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 20:04	1
8:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*25*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C5 PFPeA	*59*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C2 PFHxA	*76*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C4 PFHpA	*82*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C4 PFOA	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C5 PFNA	*82*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C2 PFDA	*82*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C2 PFUnA	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C3 PFBS	*80*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
18O2 PFHxS	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C4 PFOS	*74*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
M2-4:2 FTS	*103*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
M2-6:2 FTS	*160*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
M2-8:2 FTS	*145*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:04*	*1*
13C2 10:2 FTS	*107*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:04*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Br-Perfluorooctanesulfonic acid	**0.060**	**J B**	0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 06:10	1
L-Perfluorooctanesulfonic acid	**0.42**	**B**	0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 06:10	1
Total PFOS	**0.48**	**B**	0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 06:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*81*		*5 - 150*	*06/19/22 13:15*	*06/20/22 06:10*	*1*

Client Sample ID: NK310945_blood

Date Collected: 05/06/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-6

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.16**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluoropentanoic acid (PFPeA)	**0.34**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluorohexanoic acid (PFHxA)	**0.20**	**J**	0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluoroheptanoic acid (PFHpA)	**0.10**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:14	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluorononanoic acid (PFNA)	**0.70**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluorodecanoic acid (PFDA)	**0.57**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluoroundecanoic acid (PFUnA)	**0.23**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluorobutanesulfonic acid (PFBS)	**0.071**	**J**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluoropentanesulfonic acid (PFPeS)	**0.91**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluorohexanesulfonic acid (PFHxS)	**110**	**E B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Perfluoroheptanesulfonic acid (PFHpS)	**5.0**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Br-Perfluorooctanesulfonic acid	**32**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
L-Perfluorooctanesulfonic acid	**390**	**E I B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
Total PFOS	**430**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 20:14	1
8:2 FTS	**0.15**	**J**	0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*24*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C5 PFPeA	*59*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C2 PFHxA	*80*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C4 PFHpA	*81*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C4 PFOA	*76*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C5 PFNA	*76*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C2 PFDA	*82*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C2 PFUnA	*77*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C3 PFBS	*80*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
18O2 PFHxS	*77*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C4 PFOS	*66*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
M2-4:2 FTS	*105*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
M2-6:2 FTS	*136*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
M2-8:2 FTS	*125*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:14*	*1*
13C2 10:2 FTS	*95*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:14*	*1*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: MSB340117_blood

Date Collected: 10/30/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-7

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.22**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluoroheptanoic acid (PFHpA)	**0.056**	**J B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:23	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluorononanoic acid (PFNA)	**0.53**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluorodecanoic acid (PFDA)	**0.18**	**J**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluoroundecanoic acid (PFUnA)	**0.13**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluorohexanesulfonic acid (PFHxS)	**12**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Perfluoroheptanesulfonic acid (PFHpS)	**1.7**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Br-Perfluorooctanesulfonic acid	**10**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
L-Perfluorooctanesulfonic acid	**79**	**E I B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
Total PFOS	**89**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 20:23	1
8:2 FTS	**0.058**	**J**	0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*56*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C5 PFPeA	*84*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C2 PFHxA	*74*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C4 PFHpA	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C4 PFOA	*90*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C5 PFNA	*97*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C2 PFDA	*93*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C2 PFUnA	*85*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C3 PFBS	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
18O2 PFHxS	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C4 PFOS	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
M2-4:2 FTS	*120*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
M2-6:2 FTS	*171*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
M2-8:2 FTS	*186*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:23*	*1*
13C2 10:2 FTS	*118*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:23*	*1*

Client Sample ID: NK310921_blood

Date Collected: 05/05/22 10:30
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-8

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.0**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluoroheptanoic acid (PFHpA)	**0.82**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Br-Perfluorooctanoic acid	**0.39**		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:33	1
L-Perfluorooctanoic acid	**14**		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluorononanoic acid (PFNA)	**12**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluorodecanoic acid (PFDA)	**0.74**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Total PFOA	**15**		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluoroundecanoic acid (PFUnA)	**0.19**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluoropentanesulfonic acid (PFPeS)	**1.2**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluorohexanesulfonic acid (PFHxS)	**540**	**E B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
Perfluoroheptanesulfonic acid (PFHpS)	**52**	**E**	0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 20:33	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
8:2 FTS	**0.24**	**J**	0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 20:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*23*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C5 PFPeA	*53*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C2 PFHxA	*64*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C4 PFHpA	*62*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C4 PFOA	*66*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C5 PFNA	*54*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C2 PFDA	*68*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C2 PFUnA	*67*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C3 PFBS	*70*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
18O2 PFHxS	*63*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C4 PFOS	*47*		*5 - 150*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
M2-4:2 FTS	*89*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
M2-8:2 FTS	*104*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:33*	*1*
13C2 10:2 FTS	*80*		*5 - 200*	*06/17/22 12:23*	*06/17/22 20:33*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Br-Perfluorooctanesulfonic acid	**180**		4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 01:51	20
L-Perfluorooctanesulfonic acid	**1700**	**E I B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 01:51	20
Total PFOS	**1900**	**B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 01:51	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*62*		*5 - 150*	*06/17/22 12:23*	*06/22/22 01:51*	*20*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTS	**4.8**		1.0	0.40	ng/mL		06/19/22 13:15	06/20/22 06:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-6:2 FTS	*146*		*5 - 200*	*06/19/22 13:15*	*06/20/22 06:41*	*1*

Client Sample ID: NK310914_blood

Date Collected: 05/05/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-9

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.36**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluoroheptanoic acid (PFHpA)	**0.12**	**B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:02	1
L-Perfluorooctanoic acid	**0.28**	**J**	0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluorononanoic acid (PFNA)	**5.2**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluorodecanoic acid (PFDA)	**1.2**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Total PFOA	**0.28**	**J**	0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluoroundecanoic acid (PFUnA)	**0.72**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluoropentanesulfonic acid (PFPeS)	**0.11**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluorohexanesulfonic acid (PFHxS)	**150**	**E B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
Perfluoroheptanesulfonic acid (PFHpS)	**26**		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 21:02	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 21:02	1
8:2 FTS	**0.087**	**J**	0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*27*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C5 PFPeA	*66*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C2 PFHxA	*90*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C4 PFHpA	*90*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C4 PFOA	*87*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C5 PFNA	*75*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C2 PFDA	*94*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C2 PFUnA	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C3 PFBS	*91*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
18O2 PFHxS	*85*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C4 PFOS	*63*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
M2-4:2 FTS	*118*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
M2-6:2 FTS	*164*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
M2-8:2 FTS	*167*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:02*	*1*
13C2 10:2 FTS	*112*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:02*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Br-Perfluorooctanesulfonic acid	**89**		4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:10	20
L-Perfluorooctanesulfonic acid	**1500**	**E I B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:10	20
Total PFOS	**1600**	**B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:10	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*88*		*5 - 150*	*06/17/22 12:23*	*06/22/22 02:10*	*20*

Client Sample ID: MSB341485_blood

Date Collected: 03/03/22 12:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-10

Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.42**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluoroheptanoic acid (PFHpA)	**0.066**	**J**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:12	1
L-Perfluorooctanoic acid	**0.83**		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluorononanoic acid (PFNA)	**25**	**B**	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluorodecanoic acid (PFDA)	**2.0**		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Total PFOA	**0.83**		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluoroundecanoic acid (PFUnA)	**0.44**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluoropentanesulfonic acid (PFPeS)	**0.28**		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluorohexanesulfonic acid (PFHxS)	**720**	**E B**	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
Perfluoroheptanesulfonic acid (PFHpS)	**170**	**E**	0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 21:12	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 21:12	1
8:2 FTS	**5.8**		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*41*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C5 PFPeA	*76*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C2 PFHxA	*87*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C4 PFHpA	*77*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C4 PFOA	*87*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C5 PFNA	*48*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C2 PFDA	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C2 PFUnA	*83*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C3 PFBS	*91*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
18O2 PFHxS	*78*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C4 PFOS	*38*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
M2-4:2 FTS	*112*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
M2-6:2 FTS	*156*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
M2-8:2 FTS	*140*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:12*	*1*
13C2 10:2 FTS	*99*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:12*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Br-Perfluorooctanesulfonic acid	**360**		4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:30	20
L-Perfluorooctanesulfonic acid	**5600**	**E I B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:30	20
Total PFOS	**5900**	**B**	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:30	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*79*		*5 - 150*	*06/17/22 12:23*	*06/22/22 02:30*	*20*

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: MSB340103_blood
Date Collected: 10/03/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-11
Matrix: Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.1		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluoropentanoic acid (PFPeA)	0.29		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluorohexanoic acid (PFHxA)	1.5		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluoroheptanoic acid (PFHpA)	11	B	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Br-Perfluorooctanoic acid	6.4		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:22	1
L-Perfluorooctanoic acid	170	E	0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluorononanoic acid (PFNA)	34	B	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluorodecanoic acid (PFDA)	2.4		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Total PFOA	170		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluoroundecanoic acid (PFUnA)	0.20		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluorobutanesulfonic acid (PFBS)	0.31		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluoropentanesulfonic acid (PFPeS)	11		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
Perfluoroheptanesulfonic acid (PFHpS)	310	E	0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 21:22	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
6:2 FTS	54	E B	1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 21:22	1
8:2 FTS	2.2		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 21:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*57*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C5 PFPeA	*89*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C2 PFHxA	*96*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C4 PFHpA	*54*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C4 PFOA	*84*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C5 PFNA	*53*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C2 PFDA	*90*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C2 PFUnA	*94*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C3 PFBS	*99*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C4 PFOS	*40*		*5 - 150*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
M2-4:2 FTS	*127*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
M2-6:2 FTS	*146*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
M2-8:2 FTS	*134*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:22*	*1*
13C2 10:2 FTS	*121*		*5 - 200*	*06/17/22 12:23*	*06/17/22 21:22*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	2700	E B	2.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:49	20
Br-Perfluorooctanesulfonic acid	400		4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:49	20
L-Perfluorooctanesulfonic acid	6200	E I B	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:49	20
Total PFOS	6600	B	4.0	1.0	ng/mL		06/17/22 12:23	06/22/22 02:49	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*127*		*5 - 150*	*06/17/22 12:23*	*06/22/22 02:49*	*20*
13C4 PFOS	*83*		*5 - 150*	*06/17/22 12:23*	*06/22/22 02:49*	*20*

Isotope Dilution Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Matrix: Blood **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (5-150)	PFPeA (5-150)	PFHxA (5-150)	C4PFHA (5-150)	PFOA (5-150)	PFNA (5-150)	PFDA (5-150)	PFUnA (5-150)
320-88248-1	NK310903_blood	79	94	94	96	96	100	107	98
320-88248-1 - RE	NK310903_blood								
320-88248-3	NK310910_blood	33	66	76	82	80	81	84	78
320-88248-4	NK310911_blood	28	59	75	77	74	70	71	71
320-88248-5	NK310941_blood	25	59	76	82	79	82	82	79
320-88248-5 - RE	NK310941_blood								
320-88248-6	NK310945_blood	24	59	80	81	76	76	82	77
320-88248-7	MSB340117_blood	56	84	74	89	90	97	93	85
320-88248-8	NK310921_blood	23	53	64	62	66	54	68	67
320-88248-8 - RE	NK310921_blood								
320-88248-8 - DL	NK310921_blood								
320-88248-9	NK310914_blood	27	66	90	90	87	75	94	89
320-88248-9 - DL	NK310914_blood								
320-88248-10	MSB341485_blood	41	76	87	77	87	48	89	83
320-88248-10 - DL	MSB341485_blood								
320-88248-11	MSB340103_blood	57	89	96	54	84	53	90	94
320-88248-11 - DL	MSB340103_blood								

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	C3PFBS (5-150)	PFHxS (5-150)	PFOS (5-150)	M242FTS (5-200)	M262FTS (5-200)	M282FTS (5-200)	M102FTS (5-200)
320-88248-1	NK310903_blood	94	92	85	136	185		145
320-88248-1 - RE	NK310903_blood						186	
320-88248-3	NK310910_blood	79	81	72	107	151	160	108
320-88248-4	NK310911_blood	73	71	62	94	133	102	84
320-88248-5	NK310941_blood	80	79	74	103	160	145	107
320-88248-5 - RE	NK310941_blood			81				
320-88248-6	NK310945_blood	80	77	66	105	136	125	95
320-88248-7	MSB340117_blood	89	89	79	120	171	186	118
320-88248-8	NK310921_blood	70	63	47	89		104	80
320-88248-8 - RE	NK310921_blood					146		
320-88248-8 - DL	NK310921_blood			62				
320-88248-9	NK310914_blood	91	85	63	118	164	167	112
320-88248-9 - DL	NK310914_blood			88				
320-88248-10	MSB341485_blood	91	78	38	112	156	140	99
320-88248-10 - DL	MSB341485_blood			79				
320-88248-11	MSB340103_blood	99		40	127	146	134	121
320-88248-11 - DL	MSB340103_blood		127	83				

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
M102FTS = 13C2 10:2 FTS

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Matrix: Tissue **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (5-150)	PFPeA (5-150)	PFHxA (5-150)	C4PFHA (5-150)	PFOA (5-150)	PFNA (5-150)	PFDA (5-150)	PFUnA (5-150)
LCS 320-596272/2-A	Lab Control Sample	73	92	92	94	86	74	61	53
LCS 320-596813/2-A	Lab Control Sample								
LCSD 320-596272/3-A	Lab Control Sample Dup	77	94	97	97	92	85	73	66
LCSD 320-596813/3-A	Lab Control Sample Dup								
MB 320-596272/1-A	Method Blank	81	92	92	91	87	79	68	65
MB 320-596813/1-A	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	C3PFBS (5-150)	PFHxS (5-150)	PFOS (5-150)	M242FTS (5-200)	M262FTS (5-200)	M282FTS (5-200)	M102FTS (5-200)
LCS 320-596272/2-A	Lab Control Sample	89	85	59	101	163	85	57
LCS 320-596813/2-A	Lab Control Sample			57		139	85	
LCSD 320-596272/3-A	Lab Control Sample Dup	94	91	70	124	165	103	72
LCSD 320-596813/3-A	Lab Control Sample Dup			52		132	79	
MB 320-596272/1-A	Method Blank	90	87	67	115	160	96	68
MB 320-596813/1-A	Method Blank			62		138	87	

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
PFHxA = 13C2 PFHxA
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
C3PFBS = 13C3 PFBS
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
M102FTS = 13C2 10:2 FTS

Method: B/L/T PFAS - Branched, Linear and Total PFAS

Lab Sample ID: MB 320-596272/1-A
Matrix: Tissue
Analysis Batch: 596508

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596272

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluoropentanoic acid (PFPeA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluorohexanoic acid (PFHxA)	ND		0.50	0.10	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluoroheptanoic acid (PFHpA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Br-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:05	1
L-Perfluorooctanoic acid	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluorononanoic acid (PFNA)	0.0676	J	0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Total PFOA	ND		0.30	0.14	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluoroundecanoic acid (PFUnA)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluoropentanesulfonic acid (PFPeS)	ND		0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluorohexanesulfonic acid (PFHxS)	0.0532	J	0.10	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		0.20	0.10	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Br-Perfluorooctanesulfonic acid	ND		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
L-Perfluorooctanesulfonic acid	ND		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
Total PFOS	ND		0.20	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
4:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
6:2 FTS	1.32		1.0	0.40	ng/mL		06/17/22 12:23	06/17/22 19:05	1
8:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1
10:2 FTS	ND		0.50	0.050	ng/mL		06/17/22 12:23	06/17/22 19:05	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*81*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C5 PFPeA	*92*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C2 PFHxA	*92*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C4 PFHpA	*91*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C4 PFOA	*87*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C5 PFNA	*79*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C2 PFDA	*68*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C2 PFUnA	*65*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C3 PFBS	*90*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
18O2 PFHxS	*87*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C4 PFOS	*67*		*5 - 150*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
M2-4:2 FTS	*115*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
M2-6:2 FTS	*160*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
M2-8:2 FTS	*96*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:05*	*1*
13C2 10:2 FTS	*68*		*5 - 200*	*06/17/22 12:23*	*06/17/22 19:05*	*1*

Lab Sample ID: LCS 320-596272/2-A
Matrix: Tissue
Analysis Batch: 596508

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596272

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	4.17	4.18		ng/mL		100	60 - 140
Perfluoropentanoic acid (PFPeA)	4.17	3.75		ng/mL		90	60 - 140
Perfluorohexanoic acid (PFHxA)	4.17	3.54		ng/mL		85	60 - 140

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCS 320-596272/2-A
Matrix: Tissue
Analysis Batch: 596508

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596272

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroheptanoic acid (PFHpA)	4.17	3.72		ng/mL		89	60 - 140
L-Perfluorooctanoic acid	4.17	3.71		ng/mL		89	60 - 140
Perfluorononanoic acid (PFNA)	4.17	3.98		ng/mL		96	60 - 140
Perfluorodecanoic acid (PFDA)	4.17	3.92		ng/mL		94	60 - 140
Total PFOA	4.17	3.71		ng/mL		89	60 - 140
Perfluoroundecanoic acid (PFUnA)	4.17	4.04		ng/mL		97	60 - 140
Perfluorobutanesulfonic acid (PFBS)	3.68	3.42		ng/mL		93	60 - 140
Perfluoropentanesulfonic acid (PFPeS)	3.91	3.60		ng/mL		92	60 - 140
Perfluorohexanesulfonic acid (PFHxS)	3.79	3.50		ng/mL		92	60 - 140
Perfluoroheptanesulfonic acid (PFHpS)	3.97	4.92		ng/mL		124	50 - 150
L-Perfluorooctanesulfonic acid	3.87	3.56		ng/mL		92	60 - 140
Total PFOS	3.87	3.56		ng/mL		92	60 - 140
4:2 FTS	3.89	4.06		ng/mL		104	60 - 140
6:2 FTS	3.95	4.79		ng/mL		121	60 - 140
8:2 FTS	3.99	3.75		ng/mL		94	60 - 140
10:2 FTS	4.02	3.61		ng/mL		90	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*73*		*5 - 150*
13C5 PFPeA	*92*		*5 - 150*
13C2 PFHxA	*92*		*5 - 150*
13C4 PFHpA	*94*		*5 - 150*
13C4 PFOA	*86*		*5 - 150*
13C5 PFNA	*74*		*5 - 150*
13C2 PFDA	*61*		*5 - 150*
13C2 PFUnA	*53*		*5 - 150*
13C3 PFBS	*89*		*5 - 150*
18O2 PFHxS	*85*		*5 - 150*
13C4 PFOS	*59*		*5 - 150*
M2-4:2 FTS	*101*		*5 - 200*
M2-6:2 FTS	*163*		*5 - 200*
M2-8:2 FTS	*85*		*5 - 200*
13C2 10:2 FTS	*57*		*5 - 200*

Lab Sample ID: LCSD 320-596272/3-A
Matrix: Tissue
Analysis Batch: 596508

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596272

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	4.17	4.49		ng/mL		108	60 - 140	7	30
Perfluoropentanoic acid (PFPeA)	4.17	4.20		ng/mL		101	60 - 140	11	30
Perfluorohexanoic acid (PFHxA)	4.17	3.99		ng/mL		96	60 - 140	12	30
Perfluoroheptanoic acid (PFHpA)	4.17	4.13		ng/mL		99	60 - 140	10	30
L-Perfluorooctanoic acid	4.17	4.14		ng/mL		99	60 - 140	11	30
Perfluorononanoic acid (PFNA)	4.17	4.41		ng/mL		106	60 - 140	10	30

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: LCSD 320-596272/3-A
Matrix: Tissue
Analysis Batch: 596508

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596272

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorodecanoic acid (PFDA)			4.17	4.44		ng/mL		106	60 - 140	12	30
Total PFOA			4.17	4.14		ng/mL		99	60 - 140	11	30
Perfluoroundecanoic acid (PFUnA)			4.17	4.26		ng/mL		102	60 - 140	5	30
Perfluorobutanesulfonic acid (PFBS)			3.68	3.79		ng/mL		103	60 - 140	10	30
Perfluoropentanesulfonic acid (PFPeS)			3.91	3.91		ng/mL		100	60 - 140	8	30
Perfluorohexanesulfonic acid (PFHxS)			3.79	3.85		ng/mL		102	60 - 140	9	30
Perfluoroheptanesulfonic acid (PFHpS)			3.97	5.06		ng/mL		128	50 - 150	3	30
L-Perfluorooctanesulfonic acid			3.87	4.11		ng/mL		106	60 - 140	14	30
Total PFOS			3.87	4.11		ng/mL		106	60 - 140	14	30
4:2 FTS			3.89	3.56		ng/mL		91	60 - 140	13	30
6:2 FTS			3.95	5.32		ng/mL		135	60 - 140	10	30
8:2 FTS			3.99	4.29		ng/mL		108	60 - 140	13	30
10:2 FTS			4.02	3.90		ng/mL		97	60 - 140	8	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*77*		*5 - 150*
13C5 PFPeA	*94*		*5 - 150*
13C2 PFHxA	*97*		*5 - 150*
13C4 PFHpA	*97*		*5 - 150*
13C4 PFOA	*92*		*5 - 150*
13C5 PFNA	*85*		*5 - 150*
13C2 PFDA	*73*		*5 - 150*
13C2 PFUnA	*66*		*5 - 150*
13C3 PFBS	*94*		*5 - 150*
18O2 PFHxS	*91*		*5 - 150*
13C4 PFOS	*70*		*5 - 150*
M2-4:2 FTS	*124*		*5 - 200*
M2-6:2 FTS	*165*		*5 - 200*
M2-8:2 FTS	*103*		*5 - 200*
13C2 10:2 FTS	*72*		*5 - 200*

Lab Sample ID: MB 320-596813/1-A
Matrix: Tissue
Analysis Batch: 596919

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596813

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Br-Perfluorooctanesulfonic acid	ND		0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 05:11	1
L-Perfluorooctanesulfonic acid	ND		0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 05:11	1
Total PFOS	ND		0.20	0.050	ng/mL		06/19/22 13:15	06/20/22 05:11	1
6:2 FTS	ND		1.0	0.40	ng/mL		06/19/22 13:15	06/20/22 05:11	1
8:2 FTS	ND		0.50	0.050	ng/mL		06/19/22 13:15	06/20/22 05:11	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*62*		*5 - 150*	*06/19/22 13:15*	*06/20/22 05:11*	*1*
M2-6:2 FTS	*138*		*5 - 200*	*06/19/22 13:15*	*06/20/22 05:11*	*1*

Method: B/L/T PFAS - Branched, Linear and Total PFAS (Continued)

Lab Sample ID: MB 320-596813/1-A
Matrix: Tissue
Analysis Batch: 596919

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 596813

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-8:2 FTS	87		5 - 200	06/19/22 13:15	06/20/22 05:11	1

Lab Sample ID: LCS 320-596813/2-A
Matrix: Tissue
Analysis Batch: 596919

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 596813

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
L-Perfluorooctanesulfonic acid			3.87	4.10		ng/mL		106	60 - 140		
Total PFOS			3.87	4.10		ng/mL		106	60 - 140		
6:2 FTS			3.95	4.23		ng/mL		107	60 - 140		
8:2 FTS			3.99	3.69		ng/mL		92	60 - 140		

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOS	57		5 - 150
M2-6:2 FTS	139		5 - 200
M2-8:2 FTS	85		5 - 200

Lab Sample ID: LCSD 320-596813/3-A
Matrix: Tissue
Analysis Batch: 596919

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 596813

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
L-Perfluorooctanesulfonic acid			3.87	4.31		ng/mL		111	60 - 140	5	30
Total PFOS			3.87	4.31		ng/mL		111	60 - 140	5	30
6:2 FTS			3.95	4.33		ng/mL		110	60 - 140	2	30
8:2 FTS			3.99	4.08		ng/mL		102	60 - 140	10	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C4 PFOS	52		5 - 150
M2-6:2 FTS	132		5 - 200
M2-8:2 FTS	79		5 - 200

LCMS

Prep Batch: 596272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88248-1	NK310903_blood	Total/NA	Blood	PFAS Prep	
320-88248-3	NK310910_blood	Total/NA	Blood	PFAS Prep	
320-88248-4	NK310911_blood	Total/NA	Blood	PFAS Prep	
320-88248-5	NK310941_blood	Total/NA	Blood	PFAS Prep	
320-88248-6	NK310945_blood	Total/NA	Blood	PFAS Prep	
320-88248-7	MSB340117_blood	Total/NA	Blood	PFAS Prep	
320-88248-8 - DL	NK310921_blood	Total/NA	Blood	PFAS Prep	
320-88248-8	NK310921_blood	Total/NA	Blood	PFAS Prep	
320-88248-9 - DL	NK310914_blood	Total/NA	Blood	PFAS Prep	
320-88248-9	NK310914_blood	Total/NA	Blood	PFAS Prep	
320-88248-10	MSB341485_blood	Total/NA	Blood	PFAS Prep	
320-88248-10 - DL	MSB341485_blood	Total/NA	Blood	PFAS Prep	
320-88248-11	MSB340103_blood	Total/NA	Blood	PFAS Prep	
320-88248-11 - DL	MSB340103_blood	Total/NA	Blood	PFAS Prep	
MB 320-596272/1-A	Method Blank	Total/NA	Tissue	PFAS Prep	
LCS 320-596272/2-A	Lab Control Sample	Total/NA	Tissue	PFAS Prep	
LCSD 320-596272/3-A	Lab Control Sample Dup	Total/NA	Tissue	PFAS Prep	

Analysis Batch: 596508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88248-1	NK310903_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-3	NK310910_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-4	NK310911_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-5	NK310941_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-6	NK310945_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-7	MSB340117_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-8	NK310921_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-9	NK310914_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-10	MSB341485_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-11	MSB340103_blood	Total/NA	Blood	B/L/T PFAS	596272
MB 320-596272/1-A	Method Blank	Total/NA	Tissue	B/L/T PFAS	596272
LCS 320-596272/2-A	Lab Control Sample	Total/NA	Tissue	B/L/T PFAS	596272
LCSD 320-596272/3-A	Lab Control Sample Dup	Total/NA	Tissue	B/L/T PFAS	596272

Prep Batch: 596813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88248-1 - RE	NK310903_blood	Total/NA	Blood	PFAS Prep	
320-88248-5 - RE	NK310941_blood	Total/NA	Blood	PFAS Prep	
320-88248-8 - RE	NK310921_blood	Total/NA	Blood	PFAS Prep	
MB 320-596813/1-A	Method Blank	Total/NA	Tissue	PFAS Prep	
LCS 320-596813/2-A	Lab Control Sample	Total/NA	Tissue	PFAS Prep	
LCSD 320-596813/3-A	Lab Control Sample Dup	Total/NA	Tissue	PFAS Prep	

Analysis Batch: 596919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88248-1 - RE	NK310903_blood	Total/NA	Blood	B/L/T PFAS	596813
320-88248-5 - RE	NK310941_blood	Total/NA	Blood	B/L/T PFAS	596813
320-88248-8 - RE	NK310921_blood	Total/NA	Blood	B/L/T PFAS	596813
MB 320-596813/1-A	Method Blank	Total/NA	Tissue	B/L/T PFAS	596813
LCS 320-596813/2-A	Lab Control Sample	Total/NA	Tissue	B/L/T PFAS	596813
LCSD 320-596813/3-A	Lab Control Sample Dup	Total/NA	Tissue	B/L/T PFAS	596813

QC Association Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

LCMS

Analysis Batch: 597521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-88248-8 - DL	NK310921_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-9 - DL	NK310914_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-10 - DL	MSB341485_blood	Total/NA	Blood	B/L/T PFAS	596272
320-88248-11 - DL	MSB340103_blood	Total/NA	Blood	B/L/T PFAS	596272

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: NK310903_blood
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-1
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 19:34	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	RE		60 uL	500 uL	596813	06/19/22 13:15	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RE	1			596919	06/20/22 05:41	GWO	TAL SAC

Client Sample ID: NK310910_blood
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-3
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 19:44	GWO	TAL SAC

Client Sample ID: NK310911_blood
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-4
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 19:54	GWO	TAL SAC

Client Sample ID: NK310941_blood
Date Collected: 05/05/22 11:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-5
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 20:04	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	RE		60 uL	500 uL	596813	06/19/22 13:15	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RE	1			596919	06/20/22 06:10	GWO	TAL SAC

Client Sample ID: NK310945_blood
Date Collected: 05/06/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-6
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 20:14	GWO	TAL SAC

Client Sample ID: MSB340117_blood
Date Collected: 10/30/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-7
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 20:23	GWO	TAL SAC

Lab Chronicle

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Client Sample ID: NK310921_blood
Date Collected: 05/05/22 10:30
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-8
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 20:33	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	RE		60 uL	500 uL	596813	06/19/22 13:15	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	RE	1			596919	06/20/22 06:41	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	DL		60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	DL	20			597521	06/22/22 01:51	GWO	TAL SAC

Client Sample ID: NK310914_blood
Date Collected: 05/05/22 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-9
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 21:02	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	DL		60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	DL	20			597521	06/22/22 02:10	GWO	TAL SAC

Client Sample ID: MSB341485_blood
Date Collected: 03/03/22 12:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-10
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 21:12	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	DL		60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	DL	20			597521	06/22/22 02:30	GWO	TAL SAC

Client Sample ID: MSB340103_blood
Date Collected: 10/03/21 10:00
Date Received: 05/24/22 10:00

Lab Sample ID: 320-88248-11
Matrix: Blood

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS		1			596508	06/17/22 21:22	GWO	TAL SAC
Total/NA	Prep	PFAS Prep	DL		60 uL	500 uL	596272	06/17/22 12:23	EH	TAL SAC
Total/NA	Analysis	B/L/T PFAS	DL	20			597521	06/22/22 02:49	GWO	TAL SAC

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Laboratory: Eurofins Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-24
ANAB	ISO/IEC 17025	L2468	01-20-24
Arizona	State	AZ0708	08-11-22
Arkansas DEQ	State	88-0691	06-17-22 *
California	State	2897	01-31-23
Colorado	State	CA0004	08-31-22
Florida	NELAP	E87570	06-30-22
Georgia	State	4040	01-30-23
Hawaii	State	<cert No.>	01-29-23
Illinois	NELAP	200060	03-17-24
Kansas	NELAP	E-10375	10-31-22
Louisiana	NELAP	01944	06-30-22
Louisiana (All)	NELAP	01944	06-30-22
Maine	State	CA00004	04-14-24
Michigan	State	9947	01-31-23
Nevada	State	CA00044	08-31-22
New Hampshire	NELAP	2997	04-18-23
New Jersey	NELAP	CA005	06-30-22
New York	NELAP	11666	04-01-23
Ohio	State	41252	01-29-23
Oregon	NELAP	4040	01-29-23
Texas	NELAP	T104704399-19-13	05-31-23
US Fish & Wildlife	US Federal Programs	58448	07-31-22
USDA	US Federal Programs	P330-18-00239	01-23-23
Utah	NELAP	CA000442021-12	02-28-23
Virginia	NELAP	460278	03-14-23
Washington	State	C581	05-05-23
West Virginia (DW)	State	9930C	12-31-22
Wisconsin	State	998204680	08-31-22
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Method	Method Description	Protocol	Laboratory
B/L/T PFAS	Branched, Linear and Total PFAS	EPA	TAL SAC
PFAS Prep	Preparation, Dilution for PFAS	TAL-SAC	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

TAL-SAC = Eurofins Sacramento, Facility Standard Operating Procedure.

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: University of New Mexico
Project/Site: Holloman bird/mammal PFAS Project

Job ID: 320-88248-1
SDG: Fresh Blood

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-88248-1	NK310903_blood	Blood	05/05/22 11:00	05/24/22 10:00
320-88248-3	NK310910_blood	Blood	05/05/22 11:00	05/24/22 10:00
320-88248-4	NK310911_blood	Blood	05/05/22 11:00	05/24/22 10:00
320-88248-5	NK310941_blood	Blood	05/05/22 11:00	05/24/22 10:00
320-88248-6	NK310945_blood	Blood	05/06/22 10:00	05/24/22 10:00
320-88248-7	MSB340117_blood	Blood	10/30/21 10:00	05/24/22 10:00
320-88248-8	NK310921_blood	Blood	05/05/22 10:30	05/24/22 10:00
320-88248-9	NK310914_blood	Blood	05/05/22 10:00	05/24/22 10:00
320-88248-10	MSB341485_blood	Blood	03/03/22 12:00	05/24/22 10:00
320-88248-11	MSB340103_blood	Blood	10/03/21 10:00	05/24/22 10:00

Eurofins Environment Testing Northern California
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600

Chain of Custody Record

eurofins | Environment Testing America

Client Contact	Report To:	Site Contact:	20-May-22	COC No:
Museum of Southwestern Biology, University of New Mexico	Tel/Fax:	Lab Contact:	Carrier:	of COCs
CERIA 83, rm 204, 1 University of New Mexico	Analysis Turnaround Time			Job No.
Albuquerque, New Mexico 87131	Calendar (C) or Work Days (W) C			
505 277-9262	TAT if different from Below			SDG No.
FAX:	[x] 2 weeks			
Holloman bird/mammal PFAS Project	[ ] 1 week			
Site:	[ ] 2 days			
P O #	[ ] 1 day			

320-88248 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Sample Specific Notes:
NK310903_blood	5/5/22	11:00					fresh blood sampled in field
NK310904_blood	5/5/22	11:00					fresh blood sampled in field
NK310910_blood	5/5/22	11:00					fresh blood sampled in field
NK310911_blood	5/5/22	11:00					fresh blood sampled in field
NK310941_blood	5/5/22	11:00					fresh blood sampled in field
NK310945_blood	5/6/22	10:00					fresh blood sampled in field
MSB340117_blood	10/30/21	10:00					frozen blood thawed then sampled
NK310921_blood	5/5/22	10:30					fresh blood sampled in field
NK310914_blood	5/5/22	10:00					fresh blood sampled in field
MSB341485_blood	3/3/22	12:00					frozen blood thawed then sampled
MSB340103_blood	10/3/21	10:00					frozen blood thawed then sampled

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
[ ] Non-Hazard [ ] Flammable [ ] Skin Irritant Poison B [ ] Unknown [ ]

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
[ ] Return To Client [x] Disposal By Lab [ ] Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Museum of Southwestern Biology, University of New Mexico	20 MAY 2022 12:30 pm			5/24/22 1600
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

18.1c

Login Sample Receipt Checklist

Client: University of New Mexico

Job Number: 320-88248-1
SDG Number: Fresh Blood

Login Number: 88248
List Number: 1
Creator: Her, David A

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Requested analyses are not listed on COC
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix H

Groundwater Modeling

DBS&A
Daniel B. Stephens & Associates, Inc.

Appendix H. Groundwater Modeling

Huff (2005) presents a USGS numerical groundwater model of the basin fill aquifer of the Tularosa Basin, including the Holloman AFB area and downgradient (USGS Tularosa model). DBS&A has obtained the USGS Tularosa modeling files, and future work may focus on numerical modeling of contaminant fate and transport using the USGS model as a starting point. Figure H-1 in Appendix H shows the extent of the USGS Tularosa model overlaid with the Holloman AFB boundary and relevant PFAS sampling locations. Future numerical modeling (e.g., with MODFLOW-6 or MT3D) may be conducted that would account for variable groundwater flow directions, the impact of variable pumping rates, variable source concentrations, and calibration to available PFAS groundwater data.

For the purpose of this study, screening-level analytical groundwater fate and transport modeling was conducted in order to assess potential transport of PFOS and PFOA downgradient of contaminated areas at the Hollman AFB with bounding cases. These analytical modeling results may be used to inform (1) subsequent downgradient groundwater monitoring by identifying potential PFAS groundwater plume length and (2) future numerical modeling by identifying key parameters (e.g., source concentrations, aquifer properties, and chemical properties) that influence predicted PFAS plume length.

The analytical approach of Domenico and Schwartz (1987), including improvements of Martin-Hayden and Robbins (1997), which accounts for one-dimensional groundwater flow, three-dimensional dispersion, biodegradation, and sorption (Domenico model) was used for this analysis. The Domenico model is a standard methodology and is the same modeling approach used by the EPA in the BIOCHLOR (U.S. EPA, 2000) and RBCA models.

Figure H-2 presents the Domenico model governing equations and parameters. The Domenico model assumes a continuous contaminant source emanating from an area of specified width and vertical thickness, and considers advection, longitudinal, transverse, and vertical dispersion, sorption, and first order biodegradation (degradation was assumed to be zero for PFAS compounds in this analysis). A spreadsheet model was developed to execute the Domenico model for the Holloman AFB site and surrounding area. The spreadsheet has previously been tested against the EPA BIOCHLOR model for example conditions to ensure agreement.

Holloman AFB site-specific conservative parameters were used in the analytical modeling, and a sensitivity analysis was also conducted to obtain an understanding of groundwater fate and transport variability in response to a range of site specific parameter values. PFOS and PFOA baseline parameter values and sources are listed in Tables H-1 and H-2, respectively. Baseline hydraulic conductivity was obtained from the USGS Tularosa model and was assumed as the largest value in the vicinity of PFAS exceedances at Holloman AFB, 2.46 feet per day (ft/d) (0.75 meters per day, see Figure H-3). Porosity and effective porosity were assumed to be 0.42 and 0.35 respectively. The magnitude and direction of the hydraulic gradient were obtained using a three-point analysis of groundwater elevations extracted from the USGS model; hydraulic gradient was assumed to have a value of 0.0022 foot per feet toward the southwest (Figure H-4).

Longitudinal, transverse, and vertical dispersivity values were obtained based on standard methods (Xu and Eckstein, 1995; Al-Suwaiyan, 1996; U.S. EPA, 2000). Lateral source dimension was assumed to be 2,640 feet, the width between FT31-LM5 and MW05001 for PFOS, and 3,426 feet, the width between FT31-LM4 and MW-02&05-10 for PFOA. Vertical source dimension was assumed to be 20.84 feet, which is the water saturated screened interval from MW05001, the largest height measured from provided well data. This well also had the highest concentration of PFOS in January 2022. Source concentrations were assumed based on the highest detected PFOS and PFOA concentrations, and model runs were conducted assuming 50 years of a continuous source (based on the length of time AFFF containing PFOS and PFOA was used on the Holloman site).

Organic-carbon sorption coefficient values (K_{oc}) were assumed as the 25th percentile for PFOS and PFOA values compiled from the scientific literature by ITRC (2021). Contaminant sorption is represented by the retardation factor (R), which is the ratio of average contaminant linear velocity to groundwater linear velocity (a value of 1.0 relates to no sorption, and larger values relate to more sorption). Contaminant degradation was neglected in all analytical modeling (i.e., the degradation rate was assumed to be zero).

A sensitivity analysis was conducted to aid in the understanding of how variation of parameter inputs effects plume length across the Holloman AFB site. Five input parameters were varied from the baseline run to create a total of 11 sensitivity runs. Sensitivity run descriptions can be found in Table H-3. Hydraulic conductivity was varied based on values in the USGS model, and the maximum from on-site slug testing results. K_{oc} values were varied based on the range of values for each compound in ITRC (2021). Vertical source dimension was varied to values as

high as 100 feet. A larger hydraulic gradient of 0.0041 was also tested based on on-site groundwater monitoring results from Swift River/Versar (2002). Lastly, a sensitivity run was conducted with a combination of parameters from those tested that would result in a "maximum" plume length (i.e., larger hydraulic gradient, hydraulic conductivity, and vertical source dimension, and smaller K_{oc}).

Baseline groundwater linear velocity is calculated to be 0.02 ft/d based on the hydraulic conductivity, gradient, and effective porosity described above. The baseline retardation factor for PFOS and PFOA is 3.31 and 1.35, respectively, resulting in average contaminant velocities of 0.0047 ft/d and 0.011 ft/d for PFOS and PFOA, respectively (Tables H-1 and H-2).

Analytical modeling results are provided in Table H-4. Plume length was measured along the centerline from the source area to a concentration of 1 ng/L (lengths to lower concentrations would be somewhat larger, on the scale of several hundred feet). Baseline centerline plume length for PFOS and PFOA are 435 and 820 feet, respectively (Table H-4). Plume lengths are predicted to be longer for PFOA compared to PFOS due to a lower sorption coefficient (ITRC, 2021). Predicted plume lengths range as large as 3,750 feet for PFOS and 5,060 feet for PFOA considering the range of parameter values (Table H-4 and Figures H-5 and H-6). Predicted plume lengths are sensitive to assumed values of hydraulic conductivity and gradient and K_{oc}.

Analytical modeling results are subject to assumptions of a homogenous aquifer, uniform gradient, constant source concentration, and one-dimensional groundwater flow direction. Results also represent the plume from a single source area (in this case representing an area several thousand feet wide that may encompass several smaller sources). Multiple source areas would result in higher concentration values and a longer overall plume length (e.g., Woldt et al., 1992). Analytical modeling with the Domenico solution is also subject to potential error; however, potential error is more significant for larger dispersivity values than those assumed in this study (Srinivasan et al., 2007). Modeling results presented in this study provide bounding cases for potential downgradient plume length, and may guide future modeling and data collection efforts.

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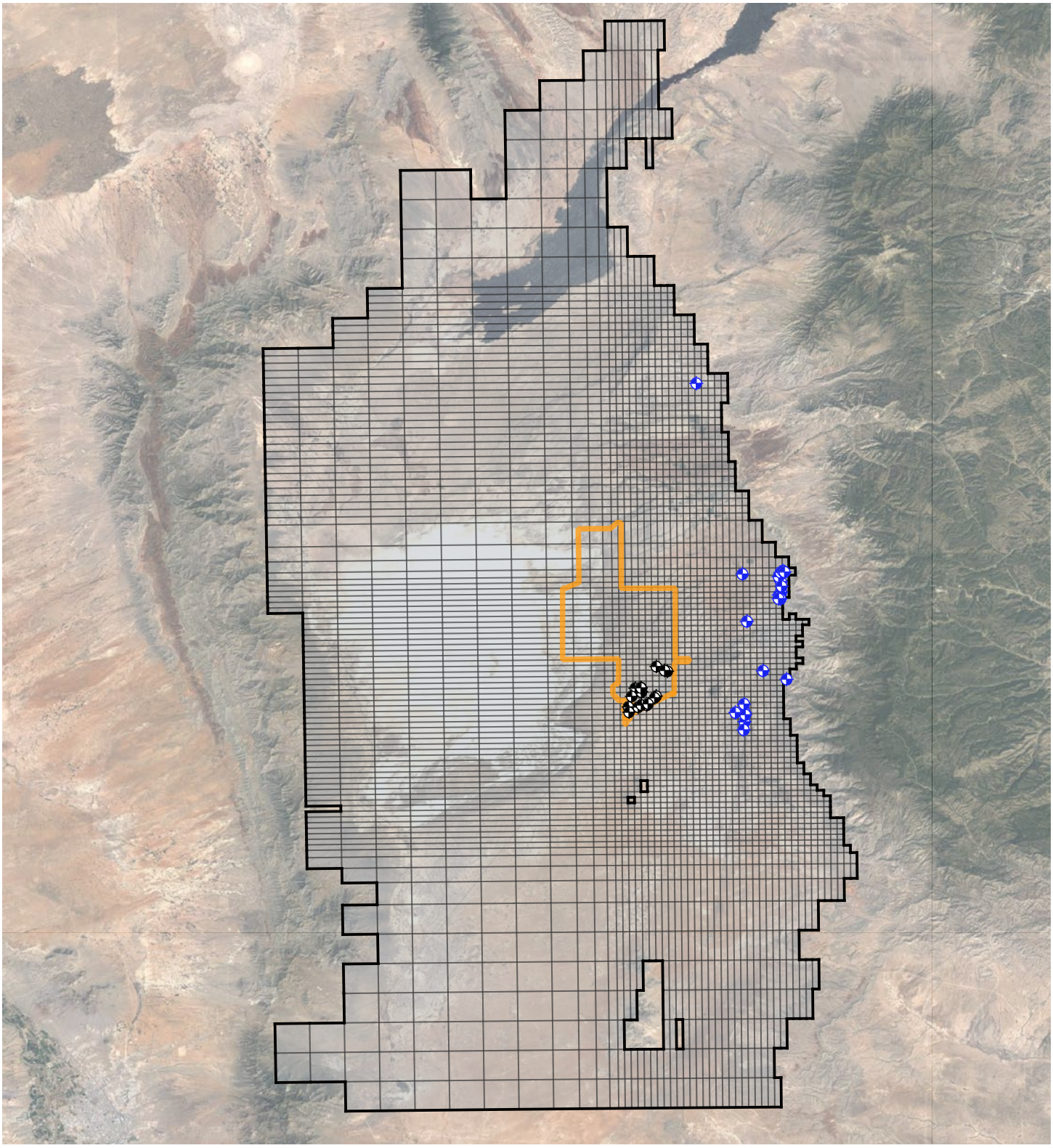
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Appendix H Figures



NMED PFAS INVESTIGATION, HOLLOMAN AFB

USGS Active Model Grid

Figure H-1

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Domenico Model with First Order Decay

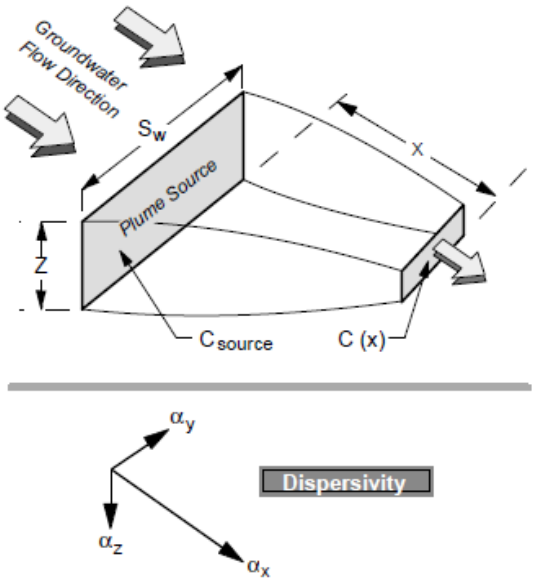
$$C(x,y,z,t) = \frac{C_O}{8} f_x f_y f_z$$

$$f_x = \exp\left(\frac{x\left[1-\left(1+4\lambda\alpha_x/v_s\right)^{0.5}\right]}{2\alpha_x}\right) * erfc\left(\frac{x - vt\left(1+4\lambda\alpha_x/v_s\right)^{0.5}}{2\left(\alpha_x vt\right)^{0.5}}\right) +$$

$$\exp\left(\frac{x\left[1+\left(1+4\lambda\alpha_x/v_s\right)^{0.5}\right]}{2\alpha_x}\right) * erfc\left(\frac{x + vt\left(1+4\lambda\alpha_x/v_s\right)^{0.5}}{2\left(\alpha_x vt\right)^{0.5}}\right)$$

$$f_y = \text{erf}\left(\frac{(y+Y/2)}{2\left(\alpha_y x\right)^{0.5}}\right) - \text{erf}\left(\frac{(y-Y/2)}{2\left(\alpha_y x\right)^{0.5}}\right) \qquad f_z = \text{erf}\left(\frac{z+Z}{2\left(\alpha_z x\right)^{0.5}}\right) - \text{erf}\left(\frac{(z-Z)}{2\left(\alpha_z x\right)^{0.5}}\right)$$

Definitions



C(x, y, z, t)	Concentration at distance x downstream of source and distance y off centerline of plume at time t (mg/L)
Co	Concentration in Source Area at t=0 (mg/L)
x	Distance downgradient of source (ft)
y	Distance from plume centerline of source (ft)
z	Distance from top of saturated zone to measurement point (assumed to be 0; concentration is always given at top of saturated zone).
α_x	Longitudinal ground-water dispersivity (ft)
α_y	Transverse ground-water dispersivity (ft)
α_z	Vertical ground-water dispersivity (ft)
θ_e	Effective Soil Porosity
λ	First-Order Degradation Rate Coefficient(day^{-1})
v_s	Seepage Velocity (ft/yr)=Ki/(θ_e)
v	Chemical Velocity (ft/yr)=v_s/R
K	Hydraulic Conductivity (ft/yr)
R	Constituent retardation factor
i	Hydraulic Gradient (cm/cm)
Y	Source Width (ft)
Z	Source Depth (ft)

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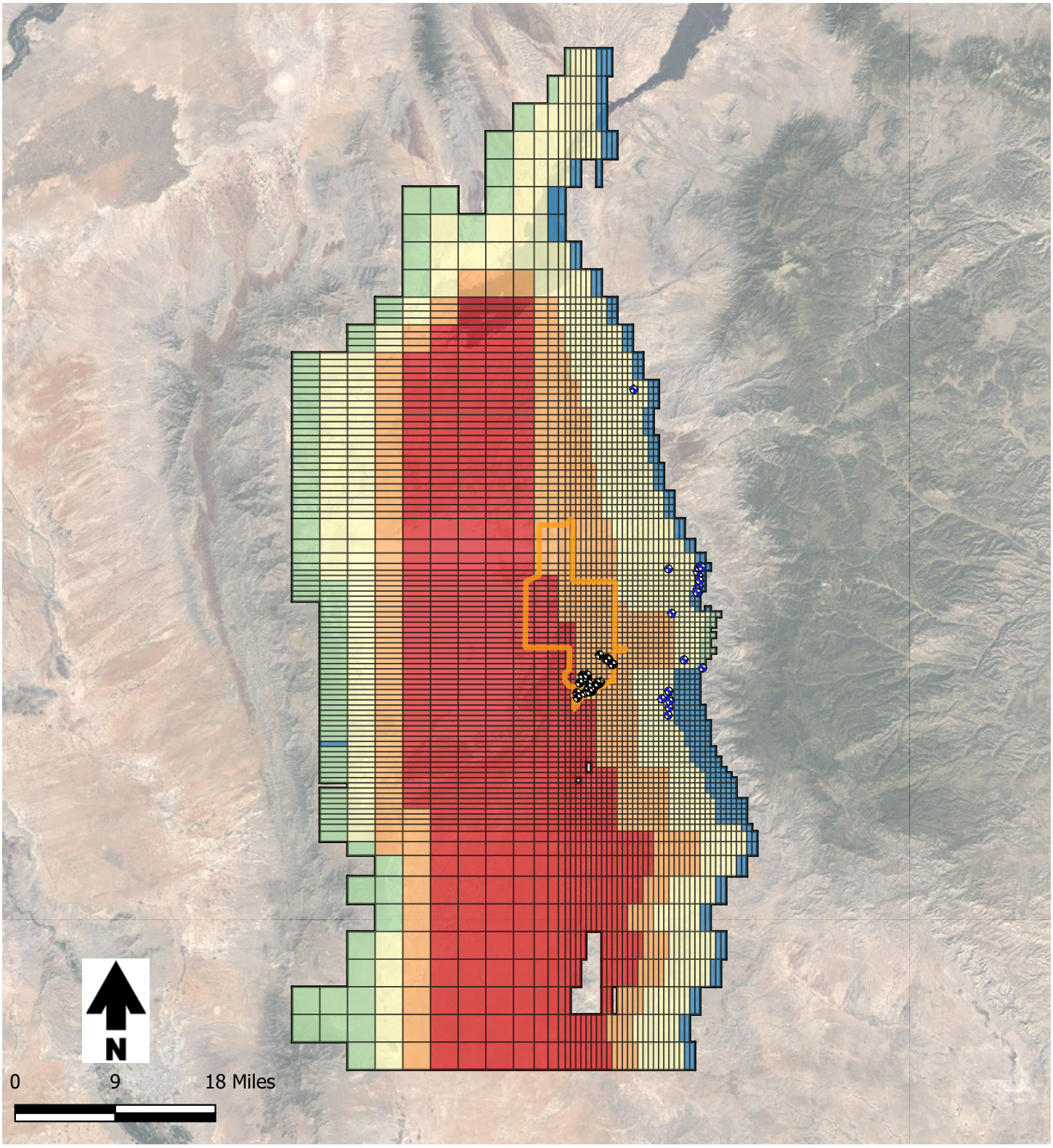
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NMED PFAS INVESTIGATION, HOLLOMAN AFB

Domenico Model Explanation

Figure H-2



Explanation

- Groundwater well
- USGS supply well
- Holloman boundary
- Active model grid outline

Hydraulic conductivity (meters/day)

- 0.6
- 0.75
- 1.0
- 3.0
- 5.0

NMED PFAS INVESTIGATION, HOLLOMAN AFB

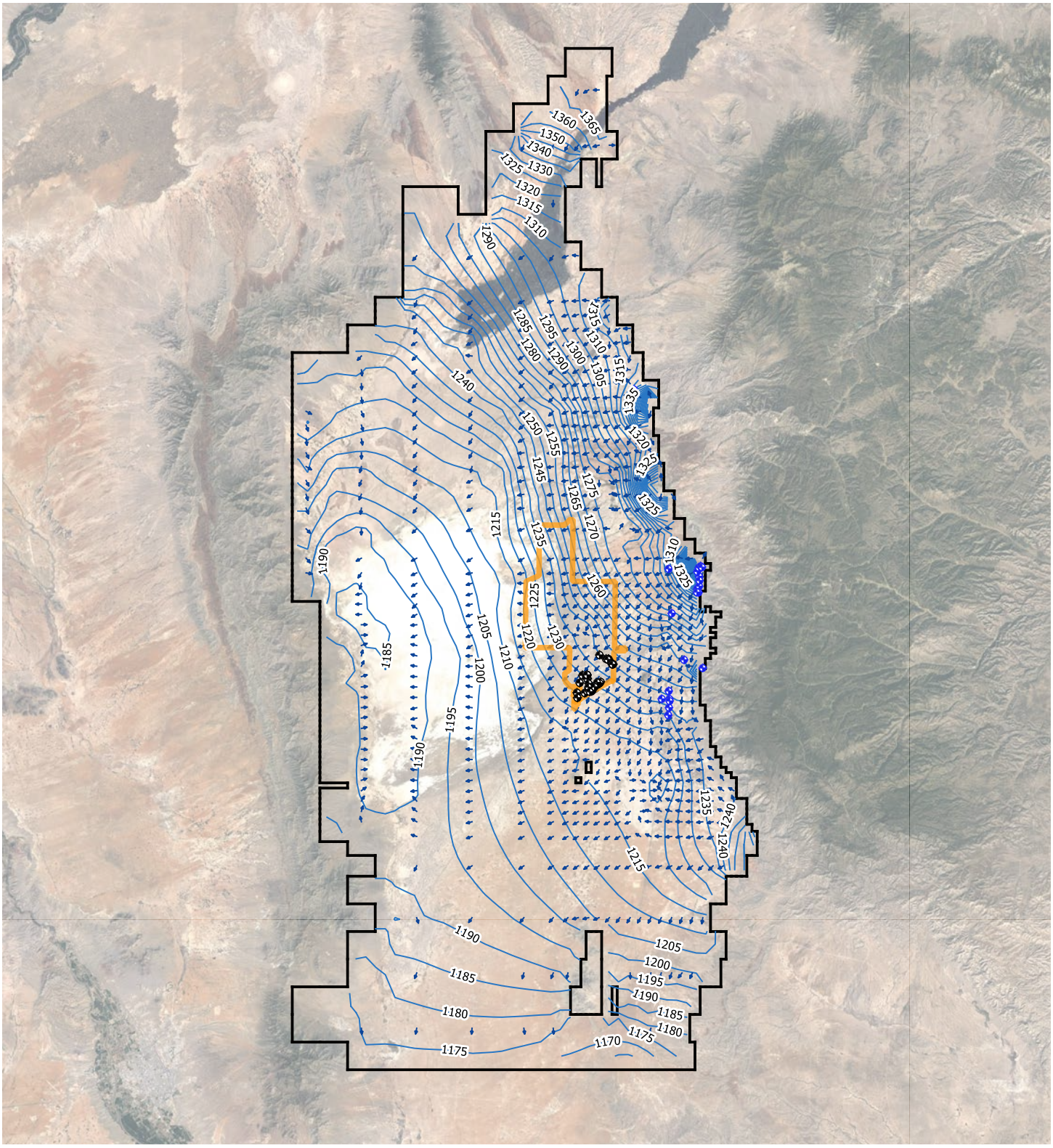
USGS Active Model

Layer 1, Hydraulic Conductivity

Figure H-3

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Explanation

- Groundwater well
- USGS supply well
- Holloman boundary
- Active model grid outline
- 1995 Groundwater elevation contour (meters)
- Groundwater flow direction

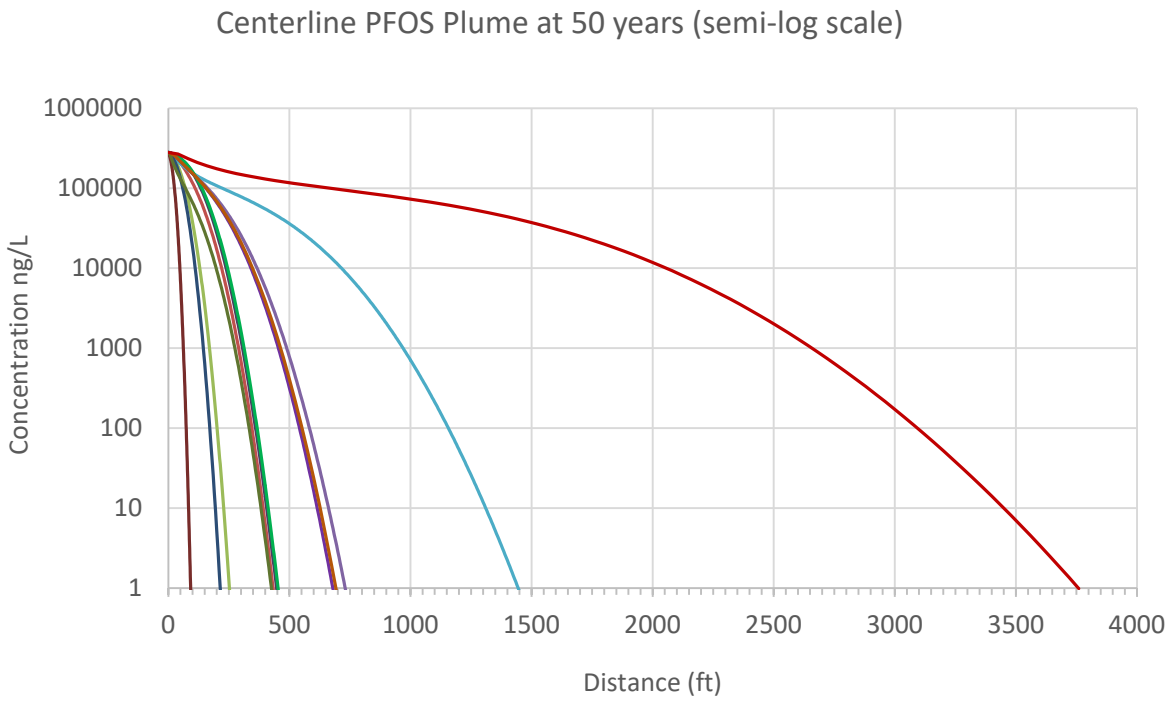
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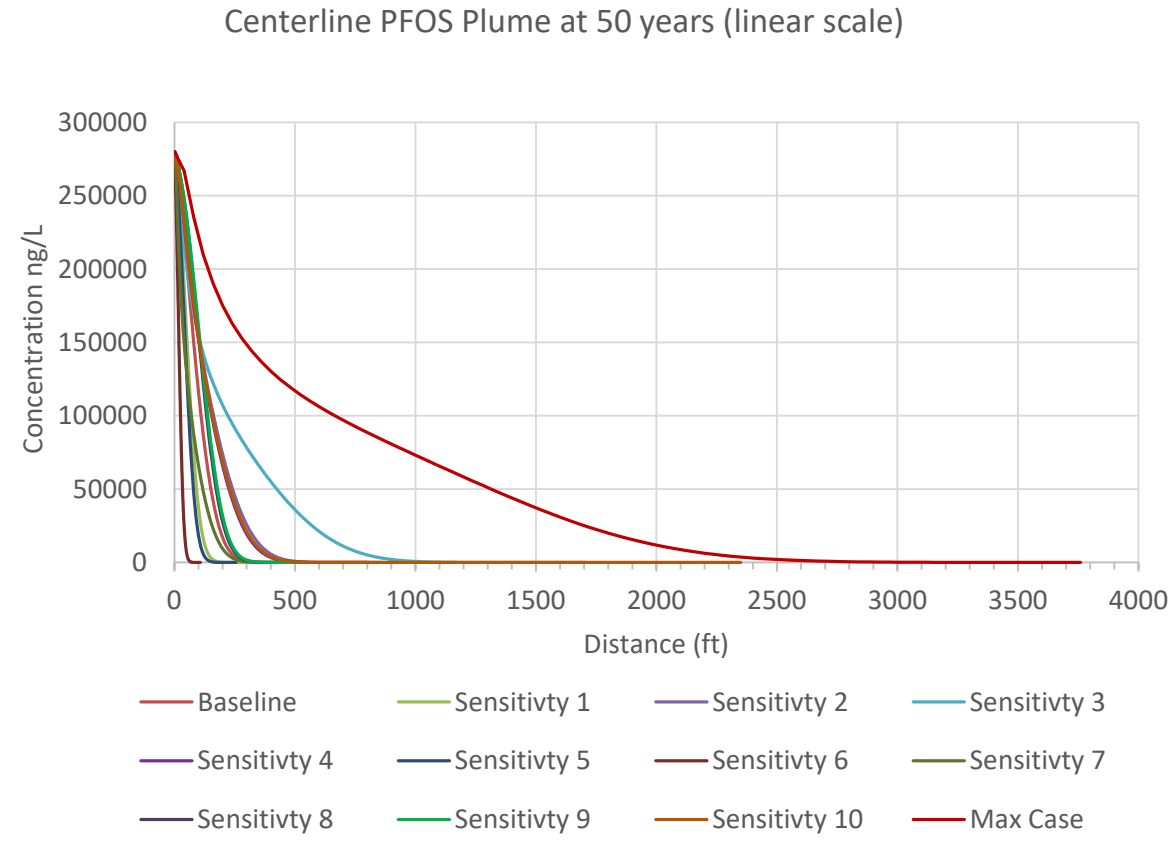
USGS Active Model Groundwater Elevation Contours

Figure H-4

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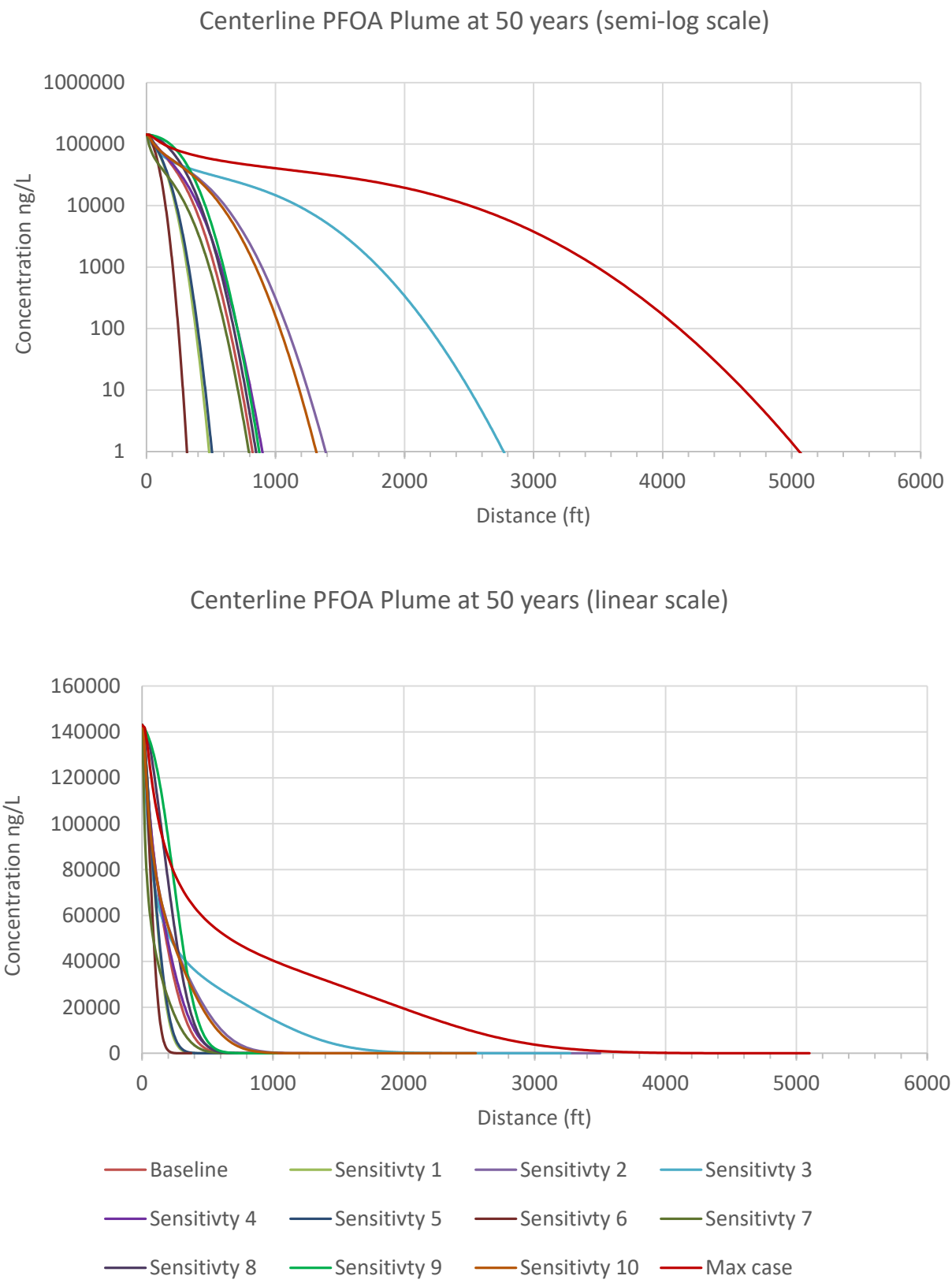
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Analytical Modeling Results, PFOS Sensitivity Run Comparison, Centerline of Plume

Figure H-5

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NMED PFAS INVESTIGATION, HOLLOMAN AFB

Analytical Modeling Results, PFOA Sensitivity Run Comparison, Centerline of Plume

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Figure H-6

Appendix H Tables

Table H-1 Baseline Parameters and Sources, PFOS

Symbol	Parameter	Calculation	Value	Units	Source
Input Parameters					
K	Hydraulic conductivity	—	2.46	ft/d	USGS model
i	Hydraulic gradient	—	0.0022	ft/ft	3-pt analysis, USGS model inputs
	Effective porosity		0.35		Fetter, 2001
n	Porosity	—	0.42	—	
foc	Fraction organic carbon content	—	0.001	—	
x_t	Longitudinal flow field distance	—	435	feet	
			133	meters	
α_{rh}	Ratio, longitudinal and transverse dispersivity	—	10	—	Aziz et al., 2000
α_{rv}	Ratio, longitudinal and vertical dispersivity	—	20	—	Aziz et al., 2000
C_o	Initial concentration	—	280,000	ng/L	Peak concentration observed on Site, MW05001
ρ_s	Particle density	—	2.65	g/cc	Fetter, 2001
K_{oc}	Organic carbon partition coefficient	—	631	cc/g	IRTC Table 4-1, 25th percentile
Z	Vertical source dimension	—	20.84	feet	Well water column height from well with highest PFOS concentration, (MW05001, 1/11/2022)
Y	Lateral source dimension	—	2640	feet	Maximum lateral distance between wells perpendicular to flow (SED-6, SED-11)
	Decay constant	—	0	1/day	Assumed
t	Time of continuous source	—	50	years	Assumed
			18,263	days	
Calculated Parameters					
ρ_b	Bulk density	$\rho_b = (1-n) * \rho_s$	1.54	g/cc	Fetter, 2001
v	Groundwater linear velocity	$v = (K*i) / n_e$	0.02	ft/d	Fetter, 1999; Domenico and Schwartz, 1998
R	Retardation coefficient	$R = 1 + ((K_{oc}*f_{oc}*\rho_b) / n)$	3.31	—	Lin and Banin, 2006; Ma et al., 2021
v	Solute velocity in groundwater	$v = v / R$	4.7×10^{-3}	ft/d	Fetter, 1999; Domenico and Schwartz, 1998
α_x	Longitudinal dispersivity	$\alpha_x = 1.15 * (\text{Log}(x_t))^{3.013}$	36	feet	Xu and Eckstein (1995); Al-Suwaiyan (1996) Eq 12b
α_y	Transverse dispersivity	$\alpha_y = \alpha_x / \alpha_{rh}$	3.6	feet	Calculated based on dispersivity ratios
α_z	Vertical dispersivity	$\alpha_z = \alpha_x / \alpha_{rz}$	1.82	feet	Calculated based on dispersivity ratios

ft/d = Feet per day
USGS = U.S. Geological Survey
ft/ft = Feet per foot
ng/L = Nanograms per liter
g/cc = Grams per cubic centimeter
cc/g = Cubic centimeters per gram

Table H-2. Baseline Parameters and Sources, PFOA

Symbol	Parameter	Calculation	Value	Units	Source
Input Parameters					
K	Hydraulic conductivity	—	2.46	ft/d	USGS model
i	Hydraulic gradient	—	0.0022	ft/ft	3-pt analysis, USGS model inputs
	Effective porosity		0.35		Fetter, 2001
n	Porosity	—	0.42	—	
foc	Fraction organic carbon content	—	0.001	—	
x_t	Longitudinal flow field distance	—	820	feet	
			250	meters	
α_{rh}	Ratio, longitudinal and transverse dispersivity	—	10	—	Aziz et al., 2000
α_{rv}	Ratio, longitudinal and vertical dispersivity	—	20	—	Aziz et al., 2000
C_o	Initial concentration	—	143,000	ng/L	Peak concentration observed on site, FT31-LM5
ρ_s	Particle density	—	2.65	g/cc	Fetter, 2001
K_{oc}	Organic carbon partition coefficient	—	97	cc/g	IRTC Table 4-1, 25th percentile
Z	Vertical source dimension	—	20.84	feet	Well water column height from well with highest PFOS concentration, (MW05001, 1/11/2022)
Y	Lateral source dimension	—	3,246	feet	lateral distance between wells with detects (FT31-LM4 and MW-02&05-10)
	Decay constant	—	0	1/day	Assumed
t	Time of continuous source	—	50	years	Assumed
			18,263	days	
Calculated Parameters					
ρ_b	Bulk density	$\rho_b = (1-n) * \rho_s$	1.54	g/cc	Fetter, 2001
v	Groundwater linear velocity	$v = (K*i) / n_e$	0.02	ft/d	Fetter, 1999; Domenico and Schwartz, 1998
R	Retardation coefficient	$R = 1 + ((K_{oc}*f_{oc}*\rho_b) / n)$	1.35	—	Lin and Banin, 2006; Ma et al., 2021
v	Solute velocity in groundwater	$v = v / R$	1.1×10^{-2}	ft/d	Fetter, 1999; Domenico and Schwartz, 1998
α_x	Longitudinal dispersivity	$\alpha_x = 1.15 * (\text{Log}(x_t))^{3.013}$	53	feet	Xu and Eckstein (1995); Al-Suwaiyan (1996) Eq 12b
α_y	Transverse dispersivity	$\alpha_y = \alpha_x / \alpha_{rh}$	5.3	feet	Calculated based on dispersivity ratios
α_z	Vertical dispersivity	$\alpha_z = \alpha_x / \alpha_{rz}$	2.63	feet	Calculated based on dispersivity ratios

ft/d = Feet per day
USGS = U.S. Geological Survey
ft/ft = Feet per foot
ng/L = Nanograms per liter
g/cc = Grams per cubic centimeter
cc/g = Cubic centimeters per gram

Table H-3. Analytical Modeling, Sensitivity Run Descriptions

Sensitivity Run	Description
Baseline	—
1	USGS model hydraulic conductivity divided by 2
2	USGS model hydraulic conductivity multiplied by 2
3	Maximum slug test hydraulic conductivity
4	10th percentile organic carbon partition Coefficient, ITRC Table 4.1
5	50th percentile organic carbon partition Coefficient, ITRC Table 4.1
6	75th percentile organic carbon partition Coefficient, ITRC Table 4.1
7	Vertical source dimension divided by 2
8	Vertical source dimension multiplied by 2
9	Vertical source dimension of 100-ft
10	Increased gradient consistent with Swift River/Versar, 2022
Max case	Combination of parameters resulting in longest plume length

Table H-4. Analytical Modeling Sensitivity Run Parameters and Results

Parameter	Sensitivity Test											
	Baseline	1	2	3	4	5	6	7	8	9	10	Max Case
PFOS Domenico Schwartz Sensitivity Analysis												
Initial concentration (ng/L)	280,000	—	—	—	—	—	—	—	—	—	—	280,000
Hydraulic conductivity (ft/d)	2.46	1.23	4.92	12.16	—	—	—	—	—	—	—	12.16
Organic carbon partition coefficient (cc/g)	631	—	—	—	225	1,950	5,661	—	—	—	—	225
Saturated thickness (feet)	20.84	—	—	—	—	—	—	10.42	41.68	100	—	41.68
Hydraulic gradient (ft/ft)	0.0022	—	—	—	—	—	—	—	—	—	0.0041	0.0041
Plume length (feet)	435	252	730	1,445	680	215	91	425	447	453	690	3,750
PFOA Domenico Schwartz Sensitivity Analysis												
Initial concentration (ng/L)	143,000	—	—	—	—	—	—	—	—	—	—	143,000
Hydraulic conductivity (ft/d)	2.46	1.23	4.92	12.16	—	—	—	—	—	—	—	12.16
Organic carbon partition coefficient (cc/g)	97	—	—	—	56	427	1,031	—	—	—	—	56
Saturated thickness (feet)	20.84	—	—	—	—	—	—	10.42	41.68	100	—	41.68
Hydraulic gradient (ft/ft)	53	—	—	—	—	—	—	—	—	—	0.0041	0.0041
Plume length (feet)	820	485	1,390	2,768	898	508	313	793	849	874	1,315	5,060

ng/L = Nanograms per liter
ft/d = Feet per day
cc/g = Cubic centimeters per gram
ft/ft = Feet per foot