

**UNIVERSITY PARK AIRPORT
PFAS SOIL SAMPLING REPORT
Penn State Project No. 00-08524.00**

2535 Fox Hill Rd
State College PA 16803
July 2022

**TRC Project Number:
469418**

Prepared For:
The Pennsylvania State University
Design and Construction
State College, PA
Attention: Mr. Kurt Coduti

Prepared By:
TRC Environmental, Inc.
1801 Market Street, Suite 1380
Philadelphia, PA 19103



TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	3
2.0 PURPOSE AND SCOPE.....	4
2.1 Geophysical Survey	4
2.2 Soil Investigation	5
2.3 Variances from PADEP Work Plan	6
3.0 SITE BACKGROUND	7
4.0 METHODOLOGY	9
4.1 Soil Sampling	9
4.2 Decontamination	9
4.3 Analytical Parameters	10
5.0 DATA QUALITY.....	11
5.1 Sample Receipt and Condition	11
5.2 Field QA/QC Samples.....	11
5.3 Data Usability Review	11
6.0 SAMPLING RESULTS.....	12
7.0 DISCUSSION	13
7.1 Application of Act 2 Values	14
8.0 CONCLUSIONS.....	16

TABLES

Table 1 Summary of Soil Analytical Results (Residential)
Table 2 Summary of Soil Analytical Results (Non-Residential)

FIGURES

Figure 1 Soil Sample/Boring Location Map
Figure 2 Soil Sample Results Summary

APPENDICES

Appendix A TRC December 17, 2021 PFAS Soil Sampling Workplan
Appendix B PADEP Work Plan
Appendix C TPI Environmental, Inc. Geophysical Survey Maps
Appendix D Soil Boring Logs
Appendix E Analytical Data Report
Appendix F Analytical Data Report (CD)

EXECUTIVE SUMMARY

TRC Environmental Corporation has completed soil sampling activities consistent with a Pennsylvania Department of Environmental Protection (PADEP) work plan entitled "Change Order No. 03 Work Plan and Cost Estimate 09082021 dated September 2, 2021 (herein "PADEP Work Plan") and prepared by HDR Engineering. The primary objective of this scope of work was to implement the soil sampling program described in the PADEP Work Plan that was developed for an area that encompasses a portion of the University Park Airport (UPA) in Benner Township, Centre County, PA. This report presents the results of soil sampling on the UPA portion of the plan established by PADEP with the understanding that PADEP will implement the soil sampling program for parcels that are not on the University Airport. The scope of work included the following:

- Preparation of a soil sampling work plan
- Preparation for soil sampling including a Site-Specific HASP
- Performance of a geophysical survey to clear potential soil boring locations for underground utilities and other subsurface features
- Advance six (6) soil borings to a targeted depth of twenty (20) feet below grade and collect composite soil samples from shallow and deep intervals for select Per- and Polyfluoroalkyl Substances (PFAS) analyses by a Pennsylvania Licensed Laboratory (Eurofins/Lancaster Laboratories).
- Collect (1) duplicate soil sample for Laboratory Quality Assurance (QA) /Quality Control (QC) purposes
- Containerize the aqueous decontamination liquids generated during drilling activities for proper disposal*

*Note: less than 20 gallons of decontamination water was accumulated and properly disposed off-site at a licensed facility

TRC collected a total of thirteen (13) soil samples at the University Park Airport location on December 21-22, 2021 which were submitted to Eurofins/Lancaster Laboratories for the analysis of perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorobutane sulfonate (PFBS), and perfluorohexanesulfonic acid (PFHxS) via EPA Method 537. It is noted that the work was performed in accordance with the PADEP work plan except for minimally adjusting certain boring locations in response to the potential for encountering underground obstacles.

Detection limits reported by the laboratory are below the screening values applied in this report. Screening values include residential soil to groundwater, residential direct contact, non-residential soil to groundwater, and non-residential direct contact. The source of the screening values is the Pennsylvania Land Recycling and Environmental Remediation Standard Act (Act 2) numerical values. Two sampling intervals were targeted for the investigation as follows:

- Shallow Interval – 0 to 2 ft. below ground surface (bgs)
- Deep Interval – 18 to 20 ft. bgs

With the exception of UPA-SB3, sampling at the deep interval was accomplished at the 18 to 20 ft. interval. For UPA-SB3, the deep sample was collected from 16.5 to 18.5 ft. bgs due to refusal at 18.5 ft.

Concentrations of PFHxS, PFOS, and PFOA were detected in the UPA-SB1 from the 0 to 2 ft. interval at respective concentrations of 2.4 ng/g, 58 ng/g and 0.57 ng/g. PFOA was detected in UPA-SB1 in the 18 to 20 ft. interval at 0.62 ng/g.

Duplicate soil samples were collected in UPA-SB-2 from the 0 to 2 ft. interval. Between the two duplicate samples the higher concentrations of PFHxS, PFOS, and PFOA were detected in UPA-SB2 (0'-2') Dup at 1.3 ng/g, 80 ng/g and 0.42 ng/g, respectively. The presence of 0.66J ng/g of PFHxS and 1.4 ng/g of PFOS in the deeper interval, is considered suspect due to potential for drag-down of surface soil during drilling. Although suspect, the 1.4 ng/g concentration of PFOS is an order of magnitude lower than the concentration observed in the shallow soil sample and indicative of the absence of significant vertical migration.

PFHxS, PFOS, and PFOA were detected in the shallow interval UPA-SB3 but at concentrations below screening levels. There were no compound detections in the deeper sample except for PFOA at an estimated value of 1.1I ng/g. The "I" flag represents an estimated maximum possible concentration due to isotope recovery issues associated with the sample.

PFHxS, PFOS, and PFOA were detected in the shallow interval of UPA-SB4 at 3.5 ng/g, 68 ng/g, and 0.58J ng/g, respectively. No compound was detected in the deeper soil interval.

PFHxS, and PFOS, were detected in the shallow interval of UPA-SB5 but at concentrations below screening levels. There were no compound detections in the deeper sample interval except for 0.39J ng/g of PFOA, which is below screening values.

PFHxS, PFOS, and PFOA were detected in the shallow interval UPA-SB6 at concentrations of 1.6 ng/g, 75 ng/g, and 0.91 ng/g, respectively. The concentrations of PFHxS at 0.36 ng/g and PFOS at 9.7 ng/g in the deeper sample interval, could be representative of septic system infiltration vertically through soil disturbed by septic tank construction.

It is noted that the deeper soil constituent concentrations are significantly lower than the concentrations detected in the shallow interval. With the exception of the 9.7 ng/l concentration of PFOS in the deep interval for UPA-SB6 (18'-20'), all other detected concentrations or detection limits were below screening values in the deep samples. In general, the detected concentrations in all samples are not indicative of a significant high-mass PFAS source area or areas.

Additionally, TRC reviewed "GTAC7 Benner Township PFAS Investigation, GTAC-4-106", prepared by HDR Engineering (June 2021). TRC review of the report resulted in TRC recommending further investigation of additional data gaps that were not addressed in the HDR report.

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) has completed soil sampling activities consistent with a PADEP work plan entitled "Change Order No. 03 Work Plan and Cost Estimate 09082021 dated September 2, 2021, and prepared by HDR Engineering (PADEP Work Plan). The PADEP Work Plan provided a soil sampling plan for an investigation with a larger footprint than the work implemented by TRC. The scope of work discussed in this report involves the portion of the PADEP Work Plan that was carved-out as a scope of work to be performed by The Pennsylvania State University on the University Park Airport (UPA). The UPA scope of work involves the advancing the six soil borings on the airport property identified by PADEP as being performed by UPA. It is UPA's understanding that the remainder of the investigation activities presented in the PADEP work plan will be implemented by PADEP. The scope of work for this project is summarized below:

- Preparation of a soil sampling work plan (**Appendix A**)
- Preparation for soil sampling including a Site-Specific Health and Safety Plan (HASP)
- Performance of a geophysical survey to clear potential soil boring locations for underground utilities and other subsurface features
- Advancing soil borings and collecting soil samples from six soil locations selected by PADEP
- Soil Samples were Submitted to Eurofins/Lancaster Laboratories for analysis via USEPA Method 537 IDA

This report summarizes the results of the soil sampling and analysis program.

2.0 PURPOSE AND SCOPE

The primary objective of this scope of work is to implement the soil sampling scope of work detailed in the PADEP Work Plan. The general site location is depicted in the insert provided on **Figure 1**.

The scope of work included the following tasks:

- Preparation of a soil sampling work plan (**Appendix A**)
- Preparation for soil sampling including a Site-Specific HASP
- Performance of a geophysical survey to clear potential soil boring locations for underground utilities and other subsurface features
- Advance six (6) soil borings to a targeted depth of twenty (20) feet below grade and collect composite soil samples from shallow and deep intervals for select PFAS analyses by a Pennsylvania Licensed Laboratory. Eurofins/Lancaster Laboratories was identified as the analytical laboratory.
- Collect (1) duplicate soil sample for Laboratory Quality Assurance/Quality Control purposes
- Containerize the aqueous decontamination liquids generated during drilling activities for proper off-site disposal

The scope of work for the overall investigation is detailed in the PADEP Work Plan (Work Plan) and is included as **Appendix B**. The scope of work and variations from the PADEP scope of work are summarized below.

2.1 Geophysical Survey

At the direction of TRC, the geophysics contractor (TPI Environmental, Inc.) performed a non-intrusive investigation of the six (6) boring locations utilizing Ground Penetrating Radar (GPR), magnetometer, and Electromagnetic (EM) survey equipment. The UPA utility map references and as-built plans were provided to TRC which were relayed and reviewed with TPI Environmental Inc. during the course of the geophysical survey which took place on December 20, 2021. Prior to the GPR and boring program, Pennsylvania One Call respondents marked out utilities per the one-call request. The one-call ticket numbers are as follows:

20213482293
20213482406

The primary intent of the geophysical survey was to clear previously marked potential drilling locations for utilities. Maps showing the utilities identified by TPI Environmental Inc. during the geophysical survey are provided in **Appendix C**.

Soil Boring locations were adjusted generally by 10 feet or less to compensate for the findings of the geophysical survey, or in the case of the underground glycol tank (UPA-SB4), the boring

location was moved to adjust for the anticipated dimensions of the tank to prevent puncturing the tank during drilling. UPA-SB4 was positioned at the east end of the tank.

2.2 Soil Investigation

TRC, along with the selected drilling contractor, TPI Environmental, Inc. mobilized to the UPA Site on December 21-22, 2021. Six (6) boring locations were included in the investigation of the UPA Site and are described in the table below:

TRC, along with the selected drilling contractor, TPI Environmental, Inc. mobilized to the UPA Site on December 21-22, 2021. Six (6) boring locations were included in the investigation of the UPA Site based on reasons or rationales described in the PADEP Work Plan. The locations are further described in the table below:

Boring Number	Location Description
UPA-SB1 (PADEP Work Plan Boring Letter A)	One (1) boring at Aircraft Rescue Fire Fighting (ARFF) Area 4 where Aqueous Film Forming Foam (AFFF) was discharged to pavement and a grassy area during the 2009 ARFF training event. This location was identified as location A on the PADEP Work Plan Figure 10.
UPA-SB2 (PADEP Work Plan Boring Letter B)	One (1) boring at ARFF Area 3 where AFFF may potentially have discharged to a grassy area prior to 2006 during ARFF testing and training events. This location was identified as Location B on the PADEP Work Plan Figure 10.
UPA-SB3 (PADEP Work Plan Boring Letter C)	One (1) boring at ARFF Area 1 where AFFF may potentially have discharged to a grassy area prior to 2006 during ARFF training events. This location was identified as Location C on the PADEP Work Plan Figure 10.
UPA-SB4 (PADEP Work Plan Boring Number 5)	One (1) boring near the 50,000-gallon deicing (glycol) Underground Storage Tank (UST) where AFFF-containing liquids may have potentially overflowed. This location was identified as Location 5 on the PADEP Work Plan Figure 10.
UPA-SB5 (PADEP Work Plan Boring Number 7)	One (1) boring near the anticipated location of the former septic drain field where PFAS from various sources may potentially have discharged. This location was identified as Location 7 on the PADEP Work Plan Figure 10.
UPA-SB6 (PADEP Work Plan Boring Number 6)	One (1) boring near the former septic tanks where PFAS from various sources may potentially have discharged. This location was identified as Location 6 on the PADEP Work Plan Figure 10.

The sampling plan involved collecting two (2) soil samples from each boring as follows:

- One sample from the zero (0) to two (2) foot bgs interval
- One sample from 18 to 20 ft. bgs or the 2 ft. interval at refusal, whichever was encountered first. Refusal was not encountered in 5 of 6 borings. Borings where refusal was not observed were terminated at the target depth of 20 ft. bgs. Boring UPA-SB3 was terminated at 18.5 ft. bgs due to refusal; and
- The initial attempt at UPA-SB6 encountered refusal during drilling at a depth of 8 ft. bgs and the boring was moved a few feet to accomplish sampling to target depth.

One (1) duplicate soil sample was collected at the location of UPA-SB2 (0 to 2) for Laboratory Quality Assurance/Quality Control purposes.

Soil boring and sample locations are depicted on **Figure 1**. Coordinates using the State Plane Coordinate System (SPCS) for Zone 3701 – Pennsylvania North were recorded for each boring/sample location using a Trimble Geo 7X handheld unit prior to boring advancement. It is noted that the measurements were collected by a TRC field scientist. Recorded boring locations for the six (6) boring/sample locations are as follows:

- UPA-SB1 (X:1940333 Y:248889)
- UPA-SB2 (X:1941927 Y:249995)
- UPA-SB3 (X:1944410 Y:252120)
- UPA-SB4 (X:1943644 Y:251439)
- UPA-SB5 (X:1940369 Y:249214)
- UPA-SB6 (X:1940235 Y:249074)

Boreholes were backfilled with subsurface soils retrieved from the borehole that were mixed with bentonite, placed back into the borehole, and compacted. The soil samples recovered from the 0 to 2 ft. interval were spread at the ground surface at each respective boring location.

Soil boring logs from this sampling program are provided in **Appendix D**.

2.3 Variances from PADEP Work Plan

No significant variances from the PADEP Work Plan are noted in this investigation. Some of the boring locations were adjusted no more than 10 ft. in response to the geophysical survey, refusal, or based upon surface stormwater drain features observed during a pre-sampling Site visit. Boring SB-4, located near the 50,000-gallon glycol UST was adjusted to compensate for the tank dimensions to prevent encountering the tank with the drilling equipment. Horizontal coordinates measured for each boring using a Trimble field-survey tool are presented in Section 2.2.

3.0 SITE BACKGROUND

The soil sampling program is a component of the PADEP Work Plan, which was implemented subsequent to a due diligence evaluation performed by HDR Engineering, Inc. (HDR) of Mechanicsburg, Pennsylvania as summarized in a report entitled: GTAC7 Benner Township PFAS Investigation, GTAC-4-106 Due Diligence Summary Report, referred herein as "due diligence report" (HDR, June 2021). The rationale for performing the due diligence evaluation was described in the due diligence report as "an initial effort toward gaining a better understanding of the history and potential use of PFAS materials by properties in the vicinity of High Tech Road and Fox Hill Road in Benner Township, Centre County, Pennsylvania". The soil sampling that is the subject of this report describes some, but not necessarily all, of the additional study needed.

The due diligence report reviewed groundwater sampling results (but no soil sampling data) from certain properties in the vicinity of the due diligence study area, and also performed preliminary research into historical PFAS use in the study area. The report indicated that HDR made requests for information to certain specific, but not necessarily all, known current or historical operators in the study area. The operators from whom information was sought included: State of the Art; Matreya, LLC; Handy Delivery; Nittany Express; Centre County Airport Authority; State College Air National Guard Station; Penn State University; Federal Aviation Authority; Benner Township; and Spring Benner Walker Joint Authority. However, it appears that not all requests for information were responded to by all persons or entities receiving such requests. Any responsive information that was requested but not actually provided, for any reason, would have to be considered a data gap. The report also indicated that an Environmental Data Resources (EDR) database report was reviewed, as well as HDR having made certain reconnaissance visits to support its report preparation.

Based upon information gathered to date, HDR prepared a conceptual site model that concluded the airport property is the "only known significant source of PFAS in the immediate vicinity of the Study Area". The conceptual model also proceeded to present some hypothetical or assumed transport scenarios, such as transport along fracture traces in bedrock and overland flow in support of that conclusion.

However, HDR did not study the actual (i.e., non-hypothetical) hydrogeology of the site to verify, or prove, that its hypothetical transport mechanisms even exist. Nor could the conceptual site model's conclusions be supported by soil data that had not yet been acquired at the time the due diligence report was prepared, because no such sampling had by then been performed. This includes the information that is now the subject of this report.

The conceptual model did acknowledge that the absence of usage information from other property owners in the Study Area, including Pennsylvania Air National Guard, Nittany Express, and Cannon Instruments, is a data gap. However, what the conceptual model did not reflect is that there are significant other data gaps in the due diligence report, including, but not limited to, the following:

- Absent was the history of chemical usage at State of the Art between the time of start-up of operations in the 1980s through 2012, which information was not sought or studied in the preparation of the due diligence report.
- The due diligence report also contained no information on past operations by Pemetek, who, it is believed, supplied equipment and supplies to wholesalers and manufacturers of electronic equipment.
- The conceptual model likewise did not discuss the history of Polymics, manufacturer of engineering polymers, testing services, and plastic coating of metal components.

Based on the known descriptions of operations for these past and current businesses, all of these data gap properties show a reasonable potential for usage or storage of PFAS at locations that are separate and distinct from the airport property in the immediate vicinity of the Study Area. They should, thus, be further studied before any definitive conclusions about sources, fate and transport mechanisms, and the origin of PFAS contamination in soil and groundwater in the vicinity of the airport are drawn.

The area of soil sampling for this project is located within the confines of the University Park Airport and represents a specific limited component of the PADEP Work Plan for soil investigations that extend beyond the boundary of the airport property. Further investigation by PADEP, including but not necessarily limited to more extensive soil sampling, especially at certain locations that are not part of the airport property, is advisable and recommended for the several data gap properties listed above, and any other data gaps that may exist or later be discovered. However, such sampling was not included in the current PADEP Work Plan and thus, is beyond the scope of work for the soil investigation covered by this report.

4.0 METHODOLOGY

4.1 Soil Sampling

Soil samples were collected via direct-push methods using a Geoprobe® 54DT utilizing 2.25-inch diameter acetate sleeves to targeted depths required to meet sampling objectives. Soil borings were advanced, collected and logged for lithological characteristics in four (4) foot intervals. Soil samples were compositely collected from the zero (0) to two (2) foot interval directly beneath the ground's surface and from the 18 to 20 ft. interval bgs for all samples since groundwater and refusal were not encountered except as described in Section 2.3.

Following the retrieval of the first four (4) foot sample interval, the ground's surface material immediately around the borehole was removed by hand to a depth of approximately six (6) inches to one (1) foot depth in an effort to minimize the drawdown and/or fallback of surface material into the borehole for deeper sample retrieval. The surface material was removed via decontaminated hand tools and placed outside the immediate drilling area.

Soil sample material was transferred from dedicated acetate sleeves using nitrile gloves into decontaminated stainless-steel bowls and was homogenized with stainless-steel spoons. Soils, which generally consisted of hard clay, were homogenized, and transferred into laboratory-supplied bottle ware. Soil samples were labeled and immediately placed into an insulated sample cooler at less than 4°C (wet ice) for storage and future transport. Samples were submitted to and analyzed by Eurofins Lancaster Laboratory, a Pennsylvania licensed laboratory.

A copy of the TRC December 17, 2021 PFAS Soil Sampling Workplan is provided in **Appendix A**

4.2 Decontamination

Sample ware, consisting of stainless-steel bowls and stainless-steel spoons, utilized to composite soil samples collected during the investigation were pre-cleaned using Liquinox® detergent solution and rinsed with potable water prior to transport to the Site. The sample ware was field-rinsed with laboratory supplied PFAS-free deionized water prior to the collection of each composite soil sample. Once used for sampling, the sample ware underwent additional decontamination procedures consisting of a Liquinox® scrub/rinse, a potable water rinse followed by a final rinse with laboratory supplied PFAS-free deionized water.

All downhole boring equipment was pre-cleaned using a Liquinox® scrub/rinse which was followed by a potable water rinse. All downhole boring equipment underwent a final rinse with deionized water supplied by an environmental equipment vendor. Hand tools used to prepare the soil boring areas were decontaminated prior to each use in the same fashion as the downhole boring equipment. As discussed previously, the water was containerized for proper off-Site disposal.

4.3 Analytical Parameters

Soil samples were analyzed for the four PFAS compounds: perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorobutane sulfonate (PFBS), and perfluorohexanesulfonic acid (PFHxS) via EPA Method LCMS-537 IDA.

5.0 DATA QUALITY

5.1 Sample Receipt and Condition

Project samples that were collected from the UPA Site on December 21 and 22, 2021 (preserved on ice overnight) were hand delivered to Eurofins Lancaster Environmental Laboratories (Eurofins) in Lancaster Pennsylvania immediately following the sampling that took place on December 22, 2021. Samples were packaged as instructed by Eurofins delivered on ice to the analytical laboratory, and cooler temperatures reported by Eurofins were below 6 degrees Celsius.

Samples were received in their requested bottle ware with proper preservative where applicable. Samples were analyzed within method-specified holding times.

5.2 Field QA/QC Samples

Field Quality Assurance (QA) samples collected during project implementation included one duplicate sample.

5.3 Data Usability Review

The data associated with soil samples collected on December 21 and 22, 2021 were reviewed. Criteria reviewed included holding times, sample preservation, blanks, isotopically labeled surrogates, laboratory control samples, matrix spike/matrix spike duplicate, field duplicates, and reporting limits. The data are usable for project decisions based on a review of accuracy, precision, and sensitivity of the data. The data are valid as reported and may be used for decision-making purposes with the following limitations.

- Table 1 summarizes the soil analytical results. Several samples were re-extracted due to low recoveries of isotopically labeled surrogates. For samples that were reanalyzed due to isotope dilution, if the reanalysis indicated that the isotope dilutions were within control limits, the reanalysis results are presented on **Table 1**. If the second run continued to show an isotope dilution that was out of control limits, the highest value of the two runs is reported on **Table 1** and a “*5” qualifier is indicated. In the case of UPA-SB3 (16.5 to 18.5) the higher value for PFOA is used with an “I” qualifier indicating that the value is estimated at the possible maximum concentration.
- Potential uncertainty exists for the detected PFOA results in samples UPA-SB1 (18-20') and UPA-SB3 (16.5-18.5') due to low percentage recoveries of the associated isotopically labeled surrogate and ion ratios outside of the acceptance criteria. The low isotope recovery flags are associated with low or non-detect concentrations, providing some level of confidence that the sample is relatively free of target compounds.

6.0 SAMPLING RESULTS

Table 1 summarizes the soil sampling analytical results. **Table 1** compares the soil analytical results to the PADEP Land Recycling and Environmental Remediation Standards Act (Act 2) residential direct contact, non-residential direct contact, residential soil to groundwater, and non-residential soil to groundwater numerical values established in the Statewide Health Standards. It is noted that PADEP has established numerical values for PFBS, PFOS, and PFOA. PADEP has not established numerical values for PFHxS.

7.0 DISCUSSION

Figure 2 summarizes the soil sampling results. The following summarizes observations made upon reviewing the data:

- UPA-SB1 (0' – 2') – The 58 ng/g concentration of PFOS and 2.4 ng/g concentration of PFHxS, and 0.57J ng/g of PFOA are significantly lower than typical Fire Training Area concentrations observed at larger airports, which typically range from 500 ng/g to 10,000 ng/g. The concentrations observed in this sample may represent an impact by a lower mass source such as blowing foam and/or sheet flow distribution from a smaller point source of AFFF.
Note: UPA-SB2 (0' – 2'), UPA-SB4 (0' – 2'), and UPA-SB6 (0' – 2') exhibit similar results to UPA-SB1 (0' – 2') and the description for SB-1 (0' – 2') applies.
- UPA-SB1 (18' – 20') – the data on **Table 1** indicates that all compounds except PFOA are non-detect. The PFOA concentration of 0.62 ng/g reflects the value resulting from the isotopic re-extraction discussed in Section 5.3. Due to the relative absence of other parameters such as PFOS, the 0.62 ng/g concentration reported for this sample is insignificant and significantly below screening values.
- UPA-SB2 (0' – 2') - as discussed previously, the analytical results for this sample are similar to the shallow UPA-SB1 sample and are representative of impact by a lower mass source such as blowing foam. The duplicate analyses exhibit some variability as summarized below:

Compound	Original (ng/g)	Duplicate (ng/g)
PFBS	<0.45	<0.45
PFHxS	0.70	1.3
PFOS	40	80
PFOA	0.33	0.42

The variability is likely attributed to the clayey nature of the soil which affects homogenization in the field. The actual concentrations are relatively low compared to a typical airport fire training or nozzle testing area. The clayey nature of the soil throughout the boring would prohibit vertical migration.

- UPA-SB2 (18' - 20') - the PFOS concentration of 1.4 ng/g is just above reporting limit of 0.78 ng/g. The presence of concentrations at this depth may suggest the potential for drag-down from the surface soil despite our precautions of removing surface soil from the boring location. We believe that the very clayey nature of the soil between sampling intervals would prohibit vertical migration.
- UPA-SB3 – the concentrations in the shallow component (0' - 2') likely represent airport background conditions near taxiways and runways. The deep (18' – 20') sample exhibited no detections except for PFOA, which is a reanalysis due to isotope recoveries. The value is well below screening values.
- UPA-SB4 – the shallow sample (0' – 2') reflects similar concentrations to the shallow component of UPA-SB1 and could be representative of conditions near the deicing tank. The deep (18' – 20') component parameters were non-detect.

- UPA-SB5 – the shallow (0' – 2') concentrations likely represent airport operational areas background conditions near taxiways and runways. The deep sample (18' – 20') exhibited no detections except for PFOA, which was detected at 0.39J ng/g, which is significantly below screening values.
- UPA-SB6 – shallow (0' - 2') component PFOS 75 ng/g, PFHxS 1.6 ng/g, PFOA 0.91 ng/g – possible overflow or spillage associated with septic tank or soil impacted by blowing foam and/or sheet flow distribution from smaller point source of AFFF (point source could be the location of condensed blown foam). UPA-SB6 (18'-20') contained PFOS at 9.7 ng/g and PFHxS at 0.36 ng/g. The deeper soil sample is possibly impacted by vertical migration through the permeable backfill of the former septic system. As demonstrated by comparison of boring logs in **Appendix D**, soil conditions at UPA-SB6 reflect a more permeable condition than other boring locations due to anthropologic disturbance, likely during septic system installation. The anthropologic disturbance appears to terminate at 16-feet bgs where native clay was encountered. The constituent impact is deeper than the septic tank invert, but the constituent concentration pattern (PFOS>PFHxS>PFOA>PFBS) seen in virtually all shallow soil samples is repeated at depth.

7.1 Application of Act 2 Values

PADEP has developed a series of numerical values under the Land Recycling and Environmental Remediation Standards Act (Act 2). These values are summarized in a series of tables with the values provided in the tables described as Medium Specific Concentrations (MSCs). The two tables of MSCs relevant to this project are the values for organic compounds in soil as follows:

PADEP Table 3A (found on the PADEP Land Recycling webpage: <https://www.dep.pa.gov/Business/Land/Pages/default.aspx>) – Medium Specific Concentrations (MSCs) for Organic Regulated Substances in Soil – Direct Contact Numerical Values.

PADEP Table 3B (found on the PADEP Land Recycling webpage: <https://www.dep.pa.gov/Business/Land/Pages/default.aspx>) – Medium Specific Concentrations (MSCs) for Organic Regulated Substances in Soil – Soil to Groundwater Numerical Values.

The current Act 2 Guidance Manual (PADEP Document 261-0300-101, March 27, 2021) provides guidance for the selection of remediation standards under the Act 2 program. For the purpose of this evaluation, the residential and non-residential direct contact and soil to groundwater numerical values have been used for comparison purposes. The residential direct contact values are calculated by PADEP using available toxicological data, USEPA guidance, and application of exposure scenarios incorporating long-term residency by adult and child populations. The non-residential values are generally less stringent than the residential values. Two sets of non-residential numerical values are provided in PADEP Table 3A, one value for the 0 to 2 ft. bgs depth interval and the other value is for the 2 to 15 ft. bgs depth interval. For the purpose of this evaluation, the non-residential direct contact values used for comparison purposes on the summary tables in this report represent the more conservative 0 to 2 ft. interval.

The soil to groundwater numerical values utilized for comparison purposes in this evaluation are based upon used aquifer conditions with Total Dissolved Solids (TDS) less than or equal to 2,500 milligrams per liter (mg/l). The used aquifer values are more conservative than other values listed

in PADEP Table 3B, such as the nonuse aquifer values. PADEP Table 3B typically provides two numerical soil to groundwater values each for the residential and non-resident settings that are identified as "generic" and "100 X GW MSC". The generic value is calculated by PADEP to conservatively simulate vertical transport of constituents from soil to the groundwater table. The 100 X GW MSC value is a simple multiplication of the PADEP groundwater numerical values presented in PADEP Act 2 Table 1 by 100 and does not involve application of transport simulation.

PADEP typically presents a soil buffer value to accompany the soil to groundwater numerical values. The buffer value is a thickness of soil that would attenuate an observed shallow soil concentration so that if there is soil data that indicates soil is clean within the buffer zone, there is no complete soil to groundwater pathway. PADEP has not yet determined a buffer value for PFAS compounds.

Additionally, PADEP has only established one soil to groundwater value for PFAS and that is the 100 X GW MSC and these values are shown on **Table 1**. Because the anticipated depth to groundwater at UPA is greater than 25 ft., it is improbable that constituents observed in the shallow soil at the Site would be transported vertically through the native soil column to the water table. Although it is not expected for the shallow soil constituents to migrate to the water table due to the clayey texture of the subsurface soil at the Site, the soil to groundwater numerical values are provided on **Table 1** for comparison purposes.

8.0 CONCLUSIONS

The following conclusions are presented based upon review of the soil analytical data, as well as review of background reports:

- As discussed in Section 3.0, additional important data gaps exist that have not been addressed in the PADEP due diligence report to date. Further investigation of those data gaps is strongly recommended before any final conclusions are drawn about either the source or extent of PFAS contamination in the immediate vicinity of the study area.
- As discussed in Section 7.0, the surface soil sampling analytical results are generally representative of low-mass source conditions and do not represent concentrations that would represent a significant source of PFAS to groundwater.
- The highest constituent concentrations are present in the 0' – 2' depth interval with the deeper depth interval generally exhibiting non-detect values with detection limits below the screening criteria. For a limited number of borings, certain compounds were detected in the 18' – 20' interval including PFOA in UPA-SB1 at 0.62J ng/g, PFHxS at 0.66 ng/g and PFOS at 1.4 ng/g in UPA-SB2, and PFOS at 9.7 ng/g and PFHxS at 0.36 ng/g in UPA-SB6.
- With just one exception the detected constituent concentrations that are detected in the deeper interval are generally lower by an order of magnitude than the concentrations observed in the shallow interval. The exception is UPA-SB1 where shallow and deep intervals exhibit a similar concentration of PFOA (0.57J ng/g versus 0.62J ng/g) but both are reported as estimated 'J' values and there are laboratory QA/QC concerns regarding surrogate recoveries in the deeper sample.
- UPA-SB6 is the only deep interval sample that exhibits a constituent concentration above the soil to groundwater screening value with PFOS detected at 9.7 ng/g versus the soil to groundwater screening value of 7 ng/g. This is a marginal exceedance and does not reflect a significant potential contribution to groundwater. Based upon the data evaluation, there is minimal likelihood for the shallow soil concentrations observed at the site to have a vertical migration pathway to groundwater.
- Unlike the other boring locations, the area of UPA-SB6 has been disturbed to a depth of approximately 16-feet bgs where native clay is present and contains construction debris as well as more sand than other borings. These conditions were most likely created during septic system construction to a depth of 16-feet bgs resulting in a more permeable condition than the non-disturbed native conditions observed at other borings.

TABLES

Table 1
University Airport PFAS Soil Sampling Program
Summary of Soil Analytical Results

Sample ID	Screening Values				UPA-SB1(0'-2')	UPA-SB1(18'-20')	UPA-SB2(0'-2')	UPA-SB2(0'-2')-Dup.	UPA-SB2(18'-20')	UPA-SB3(0'-2')	UPA-SB3(16.5'-18.5')								
	PADEP Res-DC	PADEP Res-STG	PADEP NonRes-DC	PADEP NonRes-STG	410-67976-1	410-67976-2	410-67976-3	410-67976-4	410-67976-5	410-67976-6	410-67976-7								
Sampling Date					12/22/2021	12/22/2021	12/21/2021	12/21/2021	12/21/2021	12/21/2021	12/21/2021								
Method: LCMS - 537 IDA	CAS#				Result	Q	Result	Q	Result	Q	Result	Q							
Perfluorobutanesulfonic acid (PFBS)	375-73-5	66,000	1,000	960,000	2,900	<0.47	U	<0.47	U	<0.45	U	<0.52	U	<0.45	U	<0.44	U		
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	--	--	--	--	2.4		<0.23	U	0.70	1.3	0.66	J	1.1		<0.22	U		
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	4,400	7	64,000	7	58		<0.23	U	40	80	1.4		0.49	J	<0.22	5- cn		
Perfluorooctanoic acid (PFOA)	335-67-1	4,400	7	64,000	7	0.57	J	0.62	J	0.33	J	0.42	J	<0.26	U	0.32	J	1.1	J
*5: Isotope dilution analyte is outside acceptance limits, low biased.																			

Notes:

All Values & Results reported in nanograms per gram (ng/g)

PADEP: Pennsylvania Department of Environmental Protection

Res/NonRes: Residential/Non Residential

DC: Direct Contact

STG: Soil to Groundwater

Q: Qualifier

Hyphen (-) Means no PADEP Value Established

*5: Isotope dilution analyte is outside acceptance limits, low biased.

For samples that were reanalyzed due to isotope dilution, if the reanalysis indicated that the isotope dilutions were within control limits, the reanalysis results are presented on the table. If the reanalysis continued to show an isotope dilution that was out of control limits, the highest value of the two runs is reported on the table with the *5 qualifier. In the case of UPA-SB3 (16.5 to 18.5) the higher value is used and was labeled by the lab to be "estimates possible maximum concentration."

I: Estimated Maximum Concentration

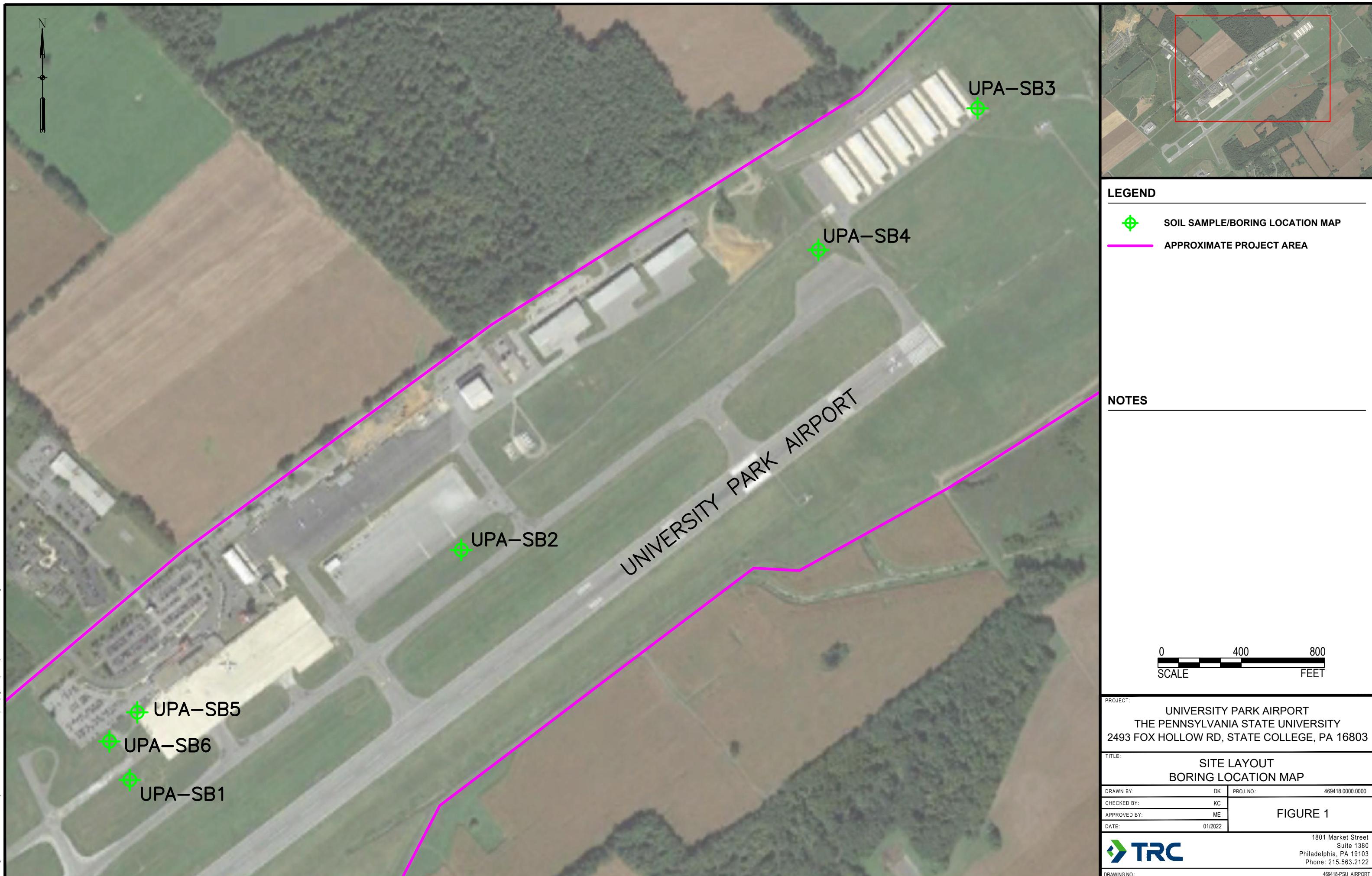
J: Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value

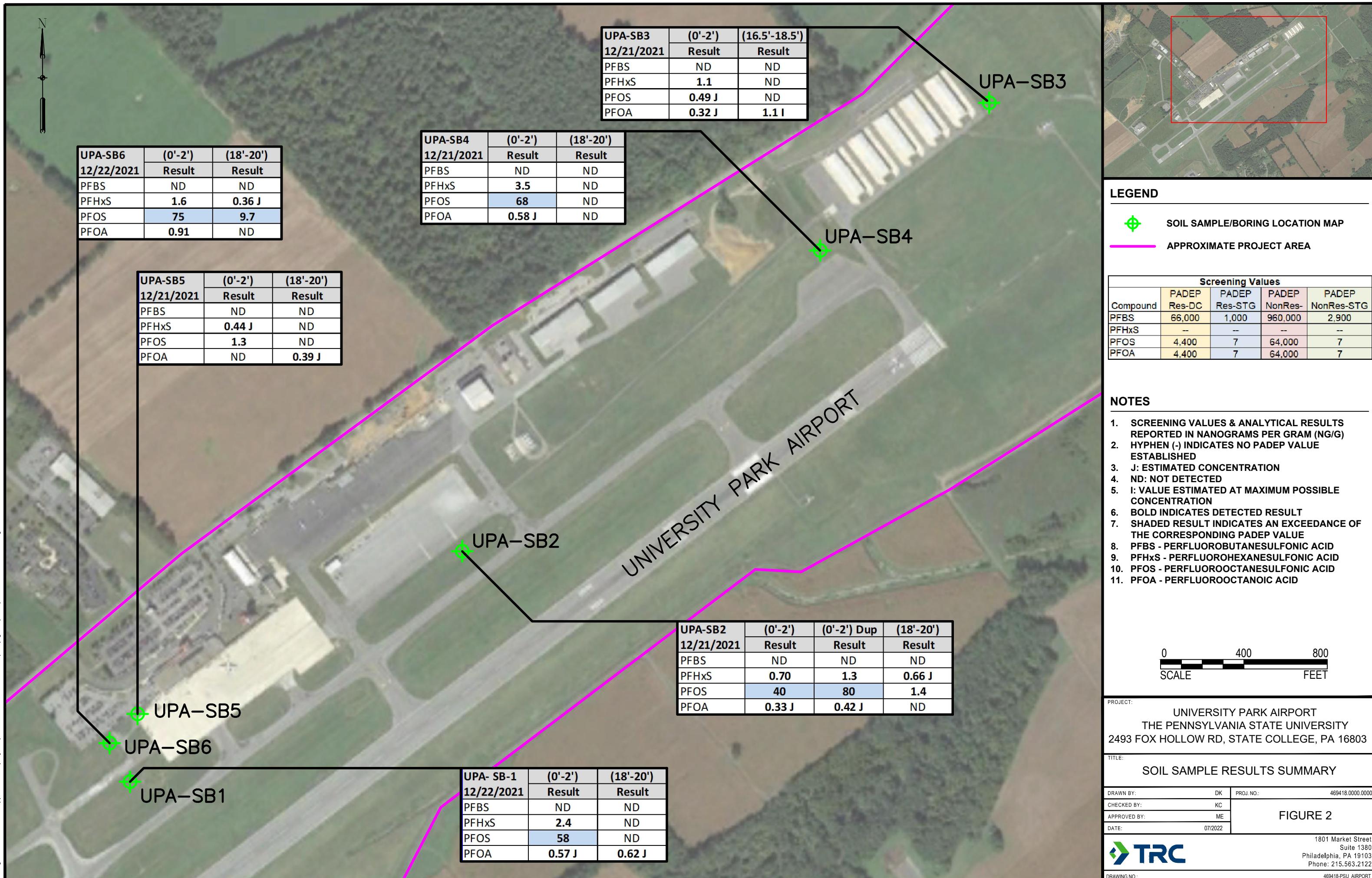
U: Indicates the analyte was analyzed for but not detected.

Bold Indicates detected result. Shaded cell Indicates an exceedence of corresponding shaded PADEP Value

Res-STG and NonRes-STG Screening Values are equal for PFOS and PFOA. A PFOS/PFOA exceeding result reverts to Res-STG shading (blue) to indicate an exceedance of both values

FIGURES





APPENDIX A

TRC December 17, 2021 PFAS Soil Sampling Workplan



1801 Market Street
Suite 1380
Philadelphia, PA 19103

T 215.563.2122
TRCcompanies.com

December 17, 2021

**PFAS Soil Sampling Work Plan
Pennsylvania University Airport
PSU Project Number 00-08524.00**

This soil sampling work plan has been prepared to present the scope of work and work process for the University Park Airport, State College, PA (UPA) PFAS Soil Sampling Program. The following presents an outline of the work plan:

- Section 1 – Introduction
- Section 2 – Soil Sample Locations and Description
- Section 3 - Soil Sampling Procedures
- Section 4 - Analytical Parameters
- Section 5 - Quality Assurance/Quality Control

1.0 Introduction

TRC will be implementing the soil sampling program outlined in a Pennsylvania Department of Environmental Protection Change Order Request dated September 2, 2021 (PADEP Work Plan) and modified based upon communication with PADEP. The PADEP Work Plan was prepared by HDR, Inc. (HDR) and included a scope of work for performing a regional soil sampling program on behalf of PADEP. This scope of work included herein represents the portion of the HDR Work Plan that relates to the UPA Site.

2.0 Soil Sample Locations and Descriptions

The following are descriptions of the soil boring locations from the PADEP Work Plan. The boring descriptions have been modified from the PADEP Work Plan to assign boring numbers to the descriptions.

Boring Number	Location Description
UPA - SB1 Location A on the HDR Map	One (1) boring at ARFF Area 4 (AFFF discharged to pavement and a grass during the 2009 ARFF training event)
UPA-SB2 Location B on the HDR Map	One (1) boring at ARFF Area 3 (AFFF discharged to grass prior to 2006 during ARFF training events)
UPA-SB3 Location C on the HDR Map	One (1) boring at ARFF Area 1 (AFFF discharged to grass prior to 2006 during ARFF training events)

UPA-SB4 Location 5 on the HDR Map	One (1) boring near the 50,000 gallon deicing tank for the potential overflow of AFFF
UPA-SB5 Location 7 on the HDR Map	One (1) boring near the former septic drain field
WPA-SB-6 Location 6 on the HDR Map	One (1) boring near the former septic tanks

The map from the PADEP Work Plan is provided as Attachment 1. The sample locations may be adjusted slightly based upon field conditions and the results of a geophysical survey to clear boring locations for underground utilities.

The sampling plan involves collecting two soil samples from each boring as follows:

- One sample from the 0 to 2 Ft. below grade interval
- Once sample from the 2 ft. interval encountered at refusal or 20 ft., whichever comes first.

Groundwater is not anticipated to be encountered within 20 ft. of ground surface. If groundwater is encountered before refusal, the deep soil sample will be collected from the 2 ft. interval above the water table.

3.0 Soil Sampling Procedures

Attachment 2 presents the PFAS sampling protocols from TRC's Soil Sampling Standard Operating Procedure. The flowing specifies additional soil sampling considerations.

- Soil samples will be collected via direct-push sampling methodology, such as Geoprobe.
- Soil Samples will be collected in acetate liners
- Soil samples will consist of a 2 ft. sampling interval that will be composited in stainless steel bowls
- Stainless steel bowls will be pre-cleaned using Liquinox detergent solution and rinsed with potable water. Stainless steel bowls will be final-rinsed in the field with PFAS-free water provided by the laboratory.
- TRC will utilize gloved hands to retrieve the sample from the acetate liners and will use dedicated sampling spoons to homogenize the samples prior to placing the samples into laboratory-provided sampling containers.
- Soil samples will be labelled in the field and transported under chain of custody to Eurofins Laboratories of Lancaster, PA.
- Decontamination water will be containerized and placed in a drum at a location designated by UPA personnel.
- Soil cuttings from the deep portion of the boring will be mixed with bentonite and placed back into the borehole. Cuttings from the surface soil sample will be placed onto the ground surface next to the soil boring.
- Drummed decontamination water will be labelled as non-hazardous by TRC field personnel and disposed of by UPA personnel. TRC will collect a water sample of the decontamination water for analysis of the four (4) compounds identified in Section 4.0.



- The soil and water samples will be analyzed for PFOA, PFOS, PFBS and PFHxS.

4.0 Analytical Parameters

Soil samples and water will be analyzed for PFOA, PFOS, PFBS and PFHxS. via USEPA Method 537 IDA.

5.0 Quality Assurance/Quality Control

One duplicate soil sample will be collected for Quality Assurance/Quality Control purposes. The duplicate sample will be analyzed for the parameters listed in Section 4.0.

This plan has been prepared by Michael Edelman and approved by Robert Goldman as signed below.



Michel Edelman, PG
Project Director

ATTACHEMENT 1
PADEP WORK PLAN MAP

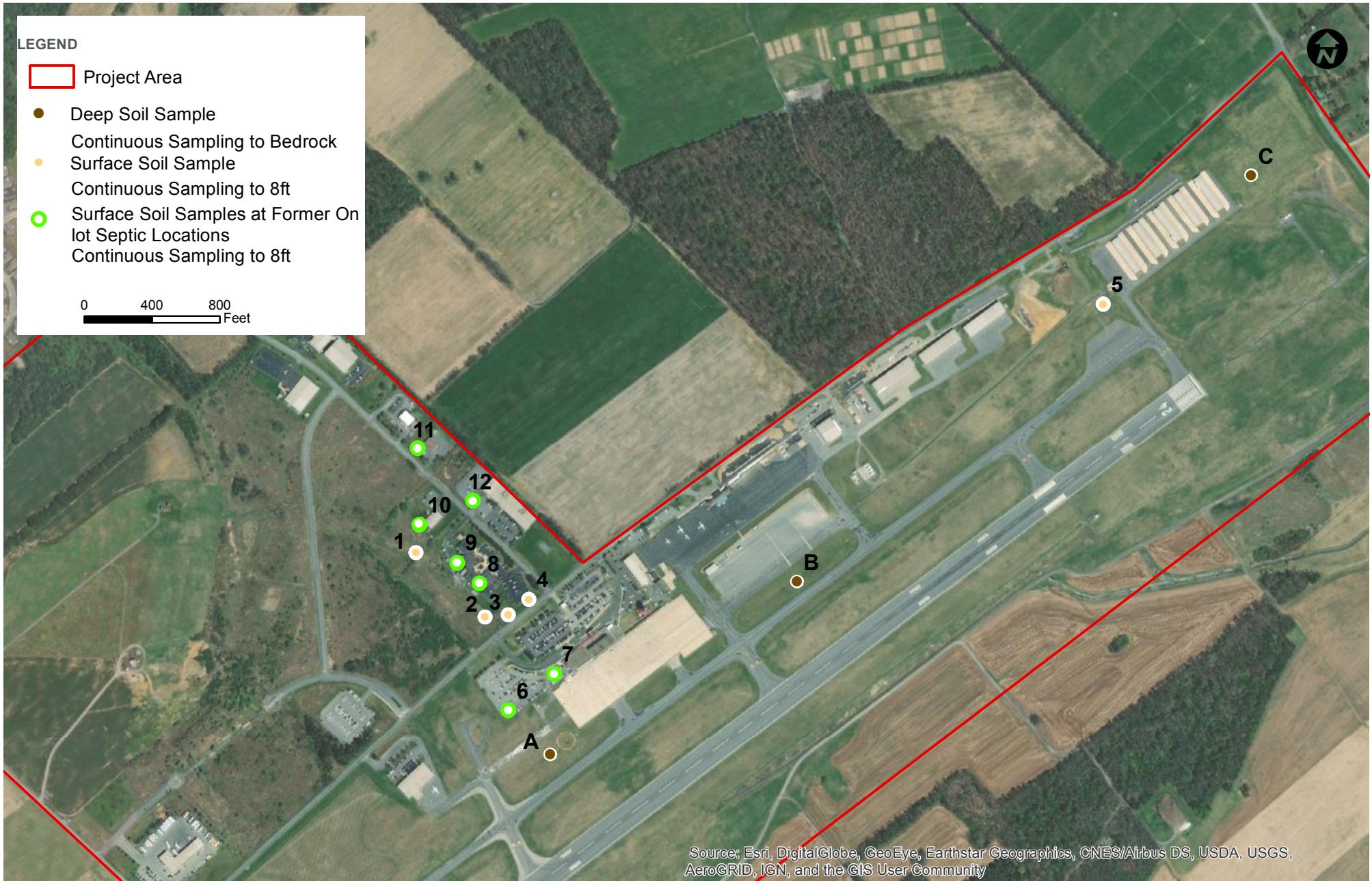


FIGURE 10
PROPOSED SOIL SAMPLE LOCATIONS
BENNER TWP PFAS SITE

ATTACHMENT 2
TRC PFAS SAMPLING PROCEDURES

SOP Section Number	Modifications to SOP
1.3	<ul style="list-style-type: none"> ▪ Do not use equipment utilizing Teflon® during sample handling or mobilization/demobilization. This includes waterproof/resistant paper products, certain personal protective equipment (PPE) (see below), and Teflon® tape. ▪ Blue Ice® (chemical ice packs) must not be used to cool samples or be used in sample coolers. Regular ice in Ziploc® bags can be used. ▪ Do not use low density polyethylene (LDPE)1 or glass sample containers or containers with Teflon-lined lids. HDPE or polypropylene containers are acceptable for sample storage. HDPE or polypropylene caps are acceptable. ▪ Do not use aluminum foil. ▪ Waterproof field books, plastic clipboards and spiral bound notebooks should not be used. Field notes should be recorded on loose paper field forms maintained in aluminum or Masonite clipboards. Field notes should be attached to the project-specific field book or folder upon returning to the office. ▪ Avoid using waterproof labels for sample bottles. The use of paper labels covered with clear tape or placed in Ziploc® bags to avoid moisture on the sample label is acceptable. ▪ Do not use Post-It Notes during sample handling or mobilization/ demobilization. ▪ Refer to TRC's SOP ECR-010 Equipment Decontamination for PFAS-specific decontamination protocols. Ensure that PFAS-free water is used during the decontamination procedure.
1.5	<p>Always consult the Site Specific Health and Safety Plan (HASP) prior to conducting field work. The following considerations should be made with regards to field preparation during PFAS sampling:</p> <ul style="list-style-type: none"> ▪ Tyvek® suits should not be worn during PFAS sampling events. Cotton coveralls may be worn. ▪ Boots and other field clothing containing Gore-Tex™ or other waterproof/resistant material should not be worn. This includes rain gear. Boots made with polyurethane and polyvinyl chloride (PVC) are acceptable. ▪ Stain resistant clothing should not be worn. ▪ Food and drink should not be allowed within the exclusion area. Pre-wrapped food or snacks should not be in the possession of sampling personnel during sampling. Bottled water and hydration drinks (e.g., Gatorade®) may be consumed in the staging area only. ▪ Personnel involved with sample collection and handling should wear nitrile gloves at all times while collecting and handling samples or sampling equipment. Avoid handling unnecessary items with nitrile gloves. A new pair of gloves must be donned prior to collecting each sample. ▪ Wash hands with Alconox or Liquinox and deionized water after leaving vehicle before setting up at a soil sampling location.
1.6	<ul style="list-style-type: none"> ▪ Avoid wearing clothing laundered with fabric softeners. ▪ Avoid wearing new clothing (recommended 6 washings since purchase). Clothing made of cotton is preferred.

SOP Section Number	Modifications to SOP
	<ul style="list-style-type: none"> ▪ Avoid using cosmetics, moisturizers, hand creams, or other related products as part of cleaning/showering on the day of sampling. ▪ Avoid using sunscreens or insect repellants that are not natural or chemical free. ▪ If installing borings for PFAS sampling, assume the surface soil is contaminated with PFAS and remove the top six inches and transfer to drums prior to installing the borings. Clear an area of at least 1.5 feet by 1.5 feet. Keep all site surface soil in one drum, if possible. It is important to minimize PFAS in the surface soil from getting into the boring during soil sampling or well construction. ▪ If sampling for PFAS under a roadway, move the dense aggregate subgrade out of the way prior to sampling. ▪ Efficient and consistent homogenization procedures must be performed on soil samples; this is critical due to the small mass used by the laboratory. Do not homogenize soil in aluminum pie pans; use a decontaminated stainless-steel bowl.
2.2	<ul style="list-style-type: none"> ▪ LDPE and/or glass containers should not be used for sampling. Teflon®-lined caps should also not be used during sample collection. Instead, HDPE or polypropylene containers are acceptable for sample storage. HDPE or polypropylene caps are acceptable. Do not homogenize soil in aluminum pie pans. Use a decontaminated stainless-steel bowl. ▪ Stainless steel tools should not be wrapped in aluminum foil after decontaminating prior to and in between uses. ▪ Homogenize the soil sample in a decontaminated, stainless-steel bowl and place in an appropriate laboratory-provided sample container (as listed above) following the collection of VOC, VPH or GRO samples.
2.2.3	<ul style="list-style-type: none"> ▪ Do not use Teflon® liners for direct push sampling methods. Cellulose acetate butyrate (CAB) liners are acceptable.
2.2.7	<ul style="list-style-type: none"> ▪ Homogenize the soil sample in a decontaminated, stainless-steel bowl and place in an appropriate laboratory-provided sample container (as listed above) following the collection of VOC, VPH

APPENDIX B

PADEP Workplan

Task Summary: Change Order 03
Benner Township Site
Requisition Number GTAC7-4-106
September 2021

WBS	Current Task Authorization	Est. Remaining Funding (as of 9/1/21)	Change Order 3 Funding Request	New Total Authorization
Task 1000- Project Management	\$ 2,289.69	\$ 287.46	\$1,941.98	\$ 4,231.67
Task 1010- Project Planning	\$ 14,628.53	\$ 783.94	\$0.00	\$ 14,628.53
Task 1020-File/Document Review	\$ 12,916.94	\$ 1,022.26	\$0.00	\$ 12,916.94
Task 1040 - Procurement	\$ -	\$ -	\$2,300.81	\$ 2,300.81
Task 2070 - Report Prep	\$ 9,609.69	\$ 928.09	\$10,702.00	\$ 20,311.69
Task 2200 - Project Meetings	\$ 2,509.37	\$ 1,591.70	\$0.00	\$ 2,509.37
Task 3000 - Site Survey/Utility Markout	\$ -	\$ -	\$3,357.84	\$ 3,357.84
Task 3011 - Soil Sampling	\$ -	\$ -	\$20,415.70	\$ 20,415.70
Task 3080 - IDW Disposal	\$ -	\$ -	\$1,678.86	\$ 1,678.86
Totals	\$ 41,954.22	\$ 4,613.45	\$ 40,397.19	\$ 82,351.41



**BENNER TOWNSHIP PFAS INVESTIGATION
REQUISITION NUMBER GTAC7-4-106
Change Order 03
WORK PLAN/COST ESTIMATE**

September 2, 2021

The Pennsylvania Department of Environmental Protection (PADEP) has requested that HDR Engineering, Inc. (HDR) assist with determining the source and extent of per- and polyfluoroalkyl substances (PFASs) that were detected in potable wells at properties along High Tech Road in Benner Township during a groundwater investigation completed by the PADEP's Water Supply Program in 2019. The PADEP assigned the Scope of Work (SOW) and the Project Requisition to HDR on June 10 and July 21, 2020, respectively. This Work Plan presents the SOW and Cost Estimate for HDR to complete soil sampling that was recommended by HDR in its June 2021 Due Diligence Summary Report.

PROJECT DESCRIPTION

During the summer of 2019, the PADEP's Bureau of Safe Drinking Water completed a groundwater sampling event for a public supply well and potable wells located at properties along High Tech Road in Benner Township, Pennsylvania (Site). A public water supply well is located at the State of the Art, Inc. (SOTA) property; a potable well is located at the Matreya, LLC property; and, a potable well is located at the Handy Delivery, Inc., property. The SOTA supply well was sampled by the Water Supply Program and the Handy Delivery and Matreya wells were sampled by the PADEP's Environmental Cleanup and Brownfields Program staff. All the wells were sampled for PFAS. The analysis indicated that PFAS was present at a concentration of 114 parts per trillion (ppt) for combined perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in the SOTA well, 138.6 ppt in the Matreya, LLC (Matreya) potable well, and 112.1 ppt in the Handy Delivery well. All three of the samples exceeded the Environmental Protection Agency (EPA) Health Advisory Level (HAL) of 70 ppt for combined PFOS and PFOA. A new potable well located at the Nittany Express was installed in November 2019. The Nittany Express property owner has not responded to several PADEP requests to access the potable well for sampling. The SOTA and Matreya properties have formerly or currently conducted manufacturing activities. Possible manufacturing activities may have occurred or are occurring at other businesses located on High Tech Road.

The University Park Airport (UPA) is managed by two entities: Penn State University (PSU) and the Centre County Airport Authority (CCAA). PSU is the designated sponsor of UPA responsible for overseeing all airside facilities (runways, taxiways, and aprons). PSU is responsible for maintenance of all airfield surface pavements, snow removal, Aircraft Rescue Fire Fighting (ARFF) equipment, oversight of the fuel farm and fueling operations, as well as hanger and tenant leasing and rental negotiations. PSU reported use of aqueous film forming foam (AFFF) at UPA for firefighting testing as mandated by the Federal Aviation Administration (FAA). Upon request from PADEP, PSU initially sampled three monitoring wells in February and March 2020 that are identified as FedEx1 and APT-1, and Haller Farm South). The combined PFOS and PFOA results from all the wells were less than the EPA HAL. In February and March 2020, PSU also sampled

several potable wells that are located on PSU property to the north and east of the airport and High Tech Road. The wells exhibited combined PFOS and PFOA concentrations less than the HAL.

PROJECT BACKGROUND

HDR conducted a due diligence investigation based on the Work Plan submitted to the PADEP in October 2020. The due diligence was performed as an initial effort toward gaining a better understanding of the history and potential use of PFAS materials by properties in the vicinity of High Tech Road and Fox Hill Road in Benner Township, Centre County Pennsylvania. The due diligence included a desktop study, a regulatory database search, site reconnaissance visits, and questions and review of relevant information from regulatory agencies and property owners.

The regulatory database search conducted by Environmental Data Resources (EDR) included fire insurance maps, historical aerial photographs, historical topographic maps, city directory information, and the EDR Radius Report. None of the twenty-one listings within the EDR Radius Report were identified as potential environmental concerns for the Study Area based on factors such as nature of the listing, cleanup/closure status, and distances from the Study Area, hydraulic gradient, or geology.

A draft Due Diligence Summary Report was submitted to the PADEP on February 19, 2021. In March 2021, the PADEP provided HDR with comments to the draft report and a revised draft report was submitted on March 19, 2021. In early May 2021, HDR, the PADEP Project Officer and other representatives from the PADEP discussed their comments to the revised report. PADEP requested HDR to review former on-lot septic systems for several properties at the Site. HDR met with officials from Benner Township to review planning files and conducted a Site visit on May 26, 2021 to review properties along High Tech Road. The final Due Diligence Summary Report was submitted to the PADEP on June 15, 2021 and included recommendations to conduct a soil sampling investigation.

The soil investigation is proposed for the properties along Fox Hill Road, High Tech Road and at the UPA. Soil samples will be collected from soil borings installed by a Geoprobe® unit and submitted to a laboratory for analysis of PFAS. HDR and PADEP discussed the soil sampling investigation during a teleconference on July 15, 2021. During the meeting, PADEP discussed that soil samples proposed on the UPA property, will be collected by PSU and handed to HDR to submit for analysis. The PADEP may also designate a PADEP representative to be onsite to conduct split sample testing with PSU.

Currently, regulatory procedures for conducting a PFAS soil sampling program does not exist for the Commonwealth of Pennsylvania. The PADEP agreed that it was acceptable for HDR to use other resources. This soil sampling investigation was developed using the following guidance documents such as the "Site Characterization Considerations, Sampling Precautions, and Laboratory Analytical Methods for PFAS" (Interstate Technology Regulatory Council) and the "Sampling, Analysis, and Assessment of PFAS" (New York, Department of Environmental Conservation, January 2021). All the soil samples (except from the UPA property), will be collected by HDR and submitted to a Pennsylvania certified laboratory for analysis of perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), Perfluorobutane Sulfonate (PFBS), and perfluorohexanesulfonic acid (PFHxS) via EPA Method 537.

Additional environmental investigations (for example, surface water sampling, and groundwater sampling) may be required based on the results of the soil investigation.

PROPOSED SCOPE OF WORK

HDR has prepared the Work Plan based on the recommendations in the June 2021 Due Diligence Summary Report and the teleconference meeting in July 2021. The purpose of the soil sampling investigation is to characterize potential PFAS contamination originating from AFFF use areas and other potential sources of PFAS contamination within the project area through infiltration into bedrock and through stormwater runoff pathways to groundwater. The list of proposed work for the Work Plan is provided below:

- Procurement of vendors, suppliers, contractors as warranted;
- Preparation of Health and Safety Plan (HASP), Sampling Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP);
- Site survey with HDR, PADEP personnel, and property owners to assess boring locations, place PA One Call mark outs, and review locations for storage of IDW and PPE;
- Soil sampling effort including the characterization of soil cores installed by a Geoprobe® contractor and collection of soil samples for laboratory analysis; and,
- Preparation of Soil Investigation and Sampling Summary Report (Report).

The Work Plan is presented sequentially by the PADEP work breakdown structures (WBS) task numbers that will be utilized to complete the work.

WBS-1000-Project Management

Work for this task includes conducting miscellaneous project management duties such as invoice review, preparation of Daily Activity Reports (DARs), budgeting and general project management, PADEP project communications, small change order efforts, etc.

The current funding for this task is nearly expended. This Work Plan/Change Order requests additional funding to perform project management activities through the duration of the investigation and preparation of the Report.

WBS-1040-Procurement

HDR will procure bids and submit a Subcontract Approval Form (SAF) along with the appropriate back-up documentation to the PADEP for recommended contractors. New funding is being requested for this task for the following contractors:

- Drilling Services - The Geoprobe® contractor will need to demonstrate their equipment and materials are compliant with PFAS sampling guidance.
- Analytical Services - HDR will review the laboratory's analytical procedure and recommend a contract laboratory capable of accommodating the number of PFAS samples anticipated and analyzing for PFOA, PFOS, PFBS, and PFHxS via EPA Method 537.
- Waste Disposal Services - HDR will request bids from a licensed waste disposal contract and the disposal facility information for the removal of investigative derived waste (IDW) and personal protection equipment (PPE).

WBS-2070-Report Preparation

Work performed for this task will include the development of a HASP, SAP, and QAPP. The SAP and the QAPP will be submitted to the PADEP for review and approval prior to the soil sampling investigation. This task also includes the preparation and submittal of monthly Project Status Reports (PSR).

After the sampling investigation is completed, HDR will prepare and submit a Soil Sampling Investigation Report to the PADEP. The Report will include the scope of the investigation, the soil sampling methods, and soil sampling results. The Report will include an update to Conceptual Site Model that was included in the Due Diligence report, description of the soil conditions observed in each boring, and the detections or non-detections of PFAS constituents in the soil samples. Geographic information system (GIS) mapping will be used to update the site map to present the location of the soil borings and the soil chemistry results.

The current funding for this task is nearly expended. This Work Plan/Change Order requests additional funding to perform reporting activities through the duration of the investigation and preparation of the Report.

WBS-3000 Site Survey/Utility Markout

A site survey will be conducted by two HDR personnel to review the locations for the proposed borings and to determine options for the temporary storage for an IDW and PPE container(s). During the site survey, HDR will meet with PADEP personnel and coordinate with other property representatives on High Tech Road that will be accessed during the utility mark out and soil sampling effort. The required PA One Call design/utility mark out will be requested for each boring point except for the borings located on the UPA property since they will be installed by PSU.

WBS-3011 Soil Sampling

The work performed for this task includes costs associated with the installation of soil borings, and, collection and analysis of soil samples. HDR proposes to install a total of ten (10) soil borings which are described below. The proposed soil boring locations are presented in Attachments A and B. An HDR technician will oversee the installation of the borings with the Geoprobe® rig operator. The borings will be completed using Geoprobe® direct push technology to refusal or approximately 10' below ground surface (bgs), whichever is encountered first. Continuous soil cores will be extracted and a HDR technician will document the lithology, soil boring depth, photograph the boring, and record other observations in a field book. A hand-held GPS survey instrument will be used to record the coordinates of each boring. Geoprobe® rods will be rinsed with PFAS-free deionized (DI) water. Decontamination fluids and spent acetate soil liners will be containerized for IDW disposal. The soil cuttings will be placed back into their respective borehole.

HDR proposes to collect up to two (2) soil samples from each boring for PFAS analysis. A surface soil sample will be collected from the 0 to 2' bgs interval and a subsurface soil sample will be collected at refusal or approximately 10' bgs, whichever is encountered first. Quality assurance samples will include duplicate samples collected at a rate of 10% of the number of regular samples (one duplicate for every ten regular samples), and one trip blank.

PFAS Background Soil Samples

HDR proposes to install up to two (2) soil borings and collect up to two (2) soil samples from a background site to compare to PFAS-impacted sites (areas where AFFF was used for firefighting training and other potential source areas related to manufacturing operations). There are three (3) proposed background sites located in Benner Township including a gravel parking lot at 1025 Rock Road (Location 1); an undeveloped area/gravel road near Fulton's Run Road (Location 2); and an undeveloped lot near Far Hills Avenue (Location 3). The proposed locations are presented in Attachment A. Permission to access this area will be needed prior to installing the soil boring and collecting the samples.

PFAS Soil Characterization Samples

HDR proposes to install nine (9) soil borings and collect up to two (2) soil samples per boring to characterize PFAS contamination from historical releases of AFFF or for other potential PFAS sources. The soil-boring locations are located on the following properties located on Fox Hill Road and High Tech Road. The proposed soil boring locations are presented in Attachment B and as follows:

- Six (6) borings at the State of the Art Property located at 2470 Fox Hill Road, State College, PA including:
 - One (1) boring at the former septic tank
 - One (1) boring at the former drain field
 - One (1) boring near the stormwater outflow
 - One (1) boring near the area of the repaired sinkhole
 - One (1) boring near stormwater runoff to the stormwater inlet
 - One (1) boring upgradient of the stormwater inlet
- One (1) boring at Matreya, LLC located at 2178 High Tech Road, State College, PA to characterize the former septic system.
- One (1) boring at Cannon Instruments, Inc. located at 2139 High Tech Road, State College, PA to characterize the former septic system.
- One (1) boring at Enterprise Rental Car located at 2175 High Tech Road, State College, PA to characterize the former septic system.

A total of six (6) soil boring locations are proposed on the UPA property and up to two (2) soil samples per boring. A surface soil sample will be collected from the 0 to 2' bgs interval and a subsurface soil sample will be collected at refusal or approximately 20' bgs, whichever is encountered first. According to the PADEP, PSU will install these borings and collect the soil samples. Three (3) borings are proposed in three (3) areas of known discharge of AFFF (presented in Attachment B) to the ground and described below:

- One (1) boring at ARFF Area 4 (AFFF discharged to pavement and a grass during the 2009 ARFF training event)
- One (1) boring at ARFF Area 3 (AFFF discharged to grass prior to 2006 during ARFF training events)
- One (1) boring at ARFF Area 1 (AFFF discharged to grass prior to 2006 during ARFF training events)

In addition, three (3) borings are proposed on UPA property for sampling to characterize soils impacted from stormwater runoff and potential releases of AFFF to the 50,000 gallon deicing tank and the former on-lot septic system that existed before the airport connected to the public sewer system. The location of three (3) borings is presented Attachment B and described below:

- One (1) boring near the 50,000 gallon deicing tank for the potential overflow of AFFF
- One (1) boring near the former septic drain field
- One (1) boring near the former septic tanks

WBS-3080 IDW Disposal

Work performed under this task shall include facilitating the removal and disposal of the drummed IDW and PPE generated during the soil boring investigation. IDW will include soil core liners generated from the Geoprobe® rig and PPE used during the soil sampling. HDR will seek qualified contractors for disposal of the containers, collect waste characterization samples as required, prepare and submit waste characterization documentation to the disposal contractor recommended by HDR, prepare shipping manifests for signature by a qualified PADEP representative and document the loading and removal of the IDW and PPE. HDR will notify the PADEP if the borings exhibit stained-soil(s), odors, or evidence of contamination to discuss the management of the material.

PROJECT STAFFING/MANAGEMENT

The project will be managed and staffed by HDR employees from the Mechanicsburg and Bethlehem, Pennsylvania offices. Key staff assigned to this project are listed below.

- **Project Oversight, Quality Assurance and Quality Control** - Tom McMonagle, P.G.
- **Project Manager** - Matthew Blanchard
- **Project Geologist** – Vincent Carbone, P. G.
- **Project GIS** – Ben York
- **Scientist/Technician** – Will vary depending on availability, but HDR representatives will be mobilized from HDR's Mechanicsburg or Bethlehem offices.

KEY UNDERSTANDINGS

- PADEP to coordinate Access Agreements for HDR to enter the properties in Benner Township.
- PADEP will coordinate with PSU for any applicable airport training or documentation needed by HDR to access PSU property.
- PADEP will sign as the generator for IDW and PPE.
- Up to two (2) samples are proposed at each soil boring location collected by HDR for a total of twenty (22) samples plus up to four (4) Quality Assurance/Quality Control samples.
- At the conclusion of the soil investigation event, the soil samples will be picked up at the Site by a laboratory courier service. If a courier service is not available, HDR will transport the samples to the laboratory.
- All the borings will be installed at unpaved surfaces.
- Soil borings and samples proposed on the UPA property will be collected by PSU.
- The potential for high concentrations of PFAS should be considered for samples collected where AFFF was discharged.
- The IDW and PPE will be managed as municipal solid waste (non-hazardous).
- Soil boring locations will be off-set approximately 5' from the original location a maximum of two times due to shallow (< 2' bgs) refusal, utilities, or other obstacles.

PROJECT REPORTING

Deliverables for this Work Plan will consist of the following:

- A Health and Safety Plan
- A Sampling Analysis Plan
- A Quality Assurance Project Plan

- Daily Field Activity Reports
- Soil Sampling Analytical Reports
- Soil Investigation and Sampling Summary Report with accompanying GIS figures
- Monthly Project Status Reports
- Meeting Minutes (as necessary)

HEALTH AND SAFETY PLAN

All fieldwork will be conducted in accordance with the Site-Specific HASP which will be prepared and provided upon approval of this Work Plan. Tailgate safety briefings will be performed daily, and all employees will have stop-work authority. PFAS guidance documents will be reviewed regarding clothing and materials that are permitted for the collection of the soil samples

SAMPLE ANALYSIS

All soil samples will be submitted to a subcontracted laboratory for analysis. HDR will ensure all samples are couriered under proper chain of custody to the selected laboratory. HDR will obtain the required sample containers for soil samples. HDR will coordinate with the laboratory so that the samples are processed within the standard holding times.

COST ESTIMATE

The cost for the work detailed within this Work Plan is presented in the attached summary table and is summarized by the PADEP WBS Tasks.

SCHEDULE

At this time, HDR estimates beginning the field work within two to three weeks of the Work Plan approval. However, the start of the soil investigation will be dependent upon Site access to the properties, coordination with PSU, and contractor availability. It is estimated that this Work Plan will take a total of 16 weeks to complete.

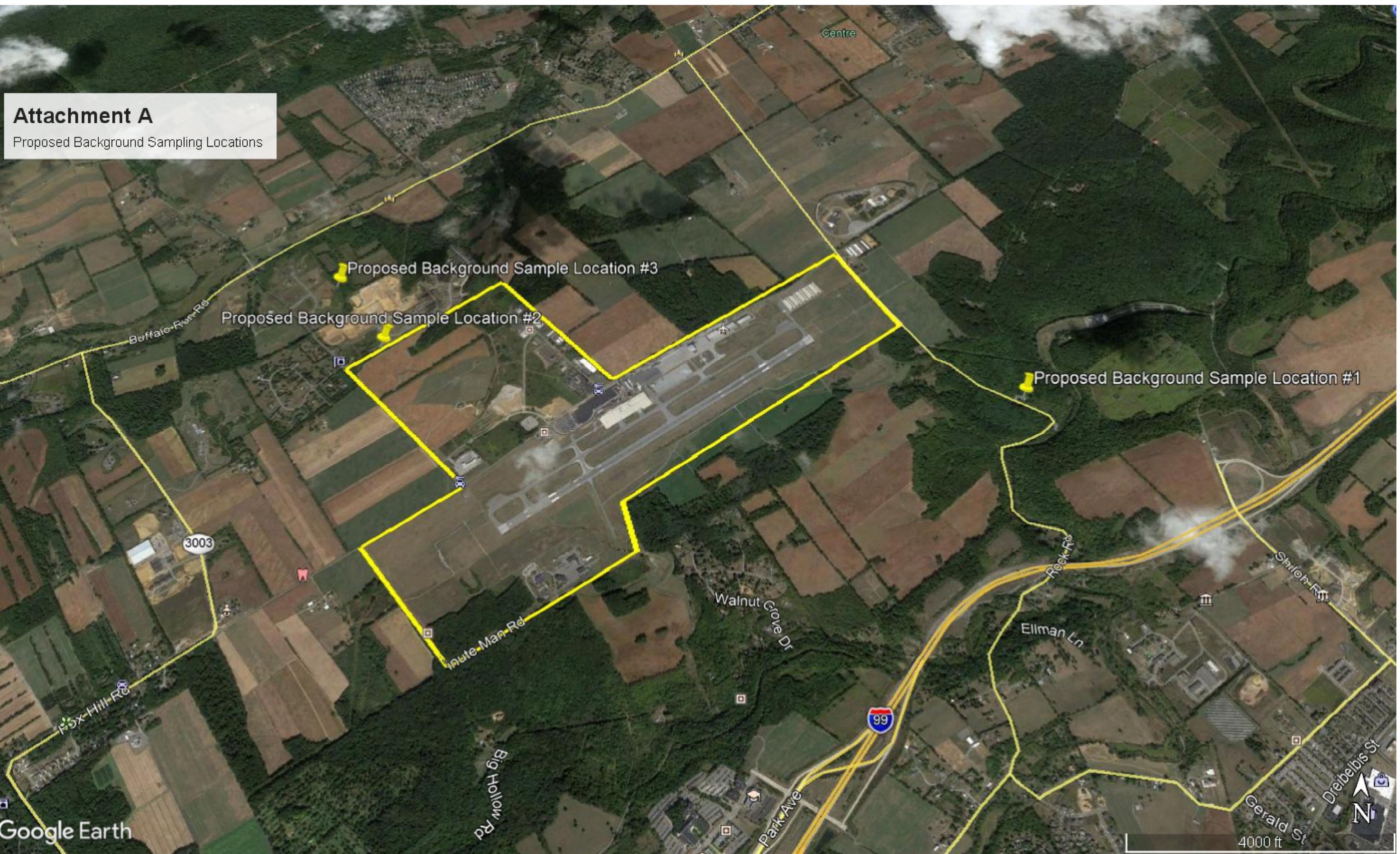
ATTACHMENTS

- A – Proposed Background PFAS Sample Locations
- B – Proposed Soil Boring Locations in the June 2021 Benner Township Due Diligence Summary Report

COST ESTIMATE

Work Plan/Change Order No.03 Task Summary Benner Township Project Requisition Number GTAC7-4-106 September 2, 2021							
WBS	Description	Classification	Hours / Quantity	Unit Rate	Cost Estimate	Comments	
1000	Project Management				\$1,941.98		
1000.01						Project management, accounting and coordination with DEP, invoice reviews for HDR and subs.	
Matthew Blanchard	Sr. Project Manager	12	\$129.25	\$1,551.00	3 hours per month for 4 months		
Tom McMonagle	Sr. Program Manager	2	\$195.49	\$390.98	QC of Project Management activities		
1040	Procurement				\$2,300.81		
1040						Procurement of bids for Geoprobe Contractor for sampling effort, Laboratory for sample analysis, and IDW	
Matthew Blanchard	Sr. Project Manager	5	\$129.25	\$646.25	QC SAF forms, review bid requests, submittal to DEP contract manager, and response/revisions.		
Katherine Markowitz	Risk Assessor/Envi Scientist	18	\$91.92	\$1,654.56	Cost estimates, request for bids, and contracts for the Geoprobe contractor, laboratory, IDW		
2070	Report Preparation				\$10,702.00		
2070.01						Prior to sampling effort: Prepare Health and Safety Plan (HASP), Sampling Analysis Plan (SAP), Quality Assurance Project Plan (QAPP). After sampling effort: Soil Investigation and Sampling Summary Report, GIS Figures, Recommendations	
Matthew Blanchard	Sr. Project Manager	27	\$129.25	\$3,489.75	Prep PSP (4 hrs), QC HASP, SAP and QAPP (5 hrs), report writing and review, edits with PADEP (18 hrs)		
Tom McMonagle	Sr. Program Manager	2	\$195.49	\$390.98	QC review of soil investigation and sampling summary report		
Vinny Carbone	Senior Geologist	5	\$187.41	\$937.05	QC soil boring logs, geology, CSM review		
Katherine Markowitz	Environmental Scientist	50	\$91.92	\$4,596.00	Prep HASP, JHAS, SAP, QAPP (16 hrs), and prep, analytical tables, photo logs, GIS assistance, prep soil boring report text (34 hrs)		
Ben York	Sr. GIS Analyst	10	\$95.19	\$951.90	Graphics for maps and figures for report		
Connie Eskin	Administrative Assistant	4	\$84.08	\$336.32	Formatting and prep of Soil Investigation and Sampling Summary Report		
3000	Site Survey/Utility Markout				\$3,357.84		
3000						Site Survey for utility and boring markouts, meeting with PADEP, PSU personnel and property owners at the site. Place PA one Call	
Matthew Blanchard	Sr. Project Manager	10	\$129.25	\$1,292.50	Site survey visit including travel and time on site (8 hrs), correspondence with PSU and property owners (2)		
Katherine Markowitz	Risk Assessor/Envi Scientist	16	\$91.92	\$1,470.72	Site survey visit including travel and time on site (8 hrs), review of GIS figures, conduct PA One Call ticket (8 hrs)		
Ben York	Personal vehicle	4	\$95.19	\$380.76	uploading mapping to GPS, downloading GPS coordinates after visit		
Personal vehicle		1	\$125.00	\$125.00			
Markout Material (Flagging, Paint, Stakes, etc)		1	\$25.00	\$25.00			
Sub-Meter GPS Unit	A-39 (daily rate)	1	\$63.86	\$63.86	Daily equipment rate		
3011	Soil Sampling				\$20,415.70		
3011							
Katherine Markowitz	Risk Assessor/Envi Scientist	52	\$91.92	\$4,779.84	Coordination with contractor (lab and driller), Prep for field work, oversee driller, collect soil samples (field work - 11 hr/day for 2 days, travel time, daily field activity reports (DAR). Accept samples from PSU. + 1 day contingency (10 hrs)		
Matthew Blanchard	Sr. Project Manager	24	\$129.25	\$3,102.00	Field work and contractor coordination, communication, DAR review, review sample data, support PADEP with access agreements		
Truck	C-3 (daily rate)	2	\$80.00	\$160.00	Daily truck rate for sampling effort		
Personal vehicle		1	\$125.00	\$125.00	Pickup soil samples from PSU		
Lodging	Estimated	1	\$150.00	\$150.00	Lodging per night, 1 night + 1 day contingency		
Meal Expenses	Based on per diem	1	\$135.00	\$135.00	Meal expenses - 2 days - partial per diem rate + 1 day contingency		
Contractor - Geoprobe	Estimated	3	\$2,000.00	\$6,000.00	Estimated rate of Geoprobe contractor (To be put out to bid). Est 2 days + 1 day contingency		
Analytical Costs	Estimated	25	\$230.00	\$5,750.00	PFOA/PFOS, Method 537 (To be put out to bid). Includes fee for waste management for samples		
Misc Sampling Equipment (Gloves, decon supplies, PPE)	Estimated	1	\$125.00	\$125.00	PPE for Sampling		
PFAS-free DI Water	Estimated	1	\$25.00	\$25.00			
Sub-Meter GPS Unit	A-39 (daily rate)	1	\$63.86	\$63.86	Daily equipment rate		
3080	IDW Disposal				\$1,678.86		
3080							
Matthew Blanchard	Sr. Project Manager	2	\$129.25	\$258.50	Coordination for Removal of IDW		
Katherine Markowitz	Risk Assessor/Envi Scientist	8	\$91.92	\$735.36	Site Oversight for Subcontractor including travel		
IDW Container Rental	Estimated	1	\$60.00	\$60.00	To be put out to bid		
Removal - Contractor Fee	Estimated	1	\$500.00	\$500.00	To be put out to bid (non haz municipal waste)		
Personal vehicle		1	\$125.00	\$125.00	mileage for IDW removal oversight		
				Total	\$40,397.19		

ATTACHMENT A



ATTACHMENT B

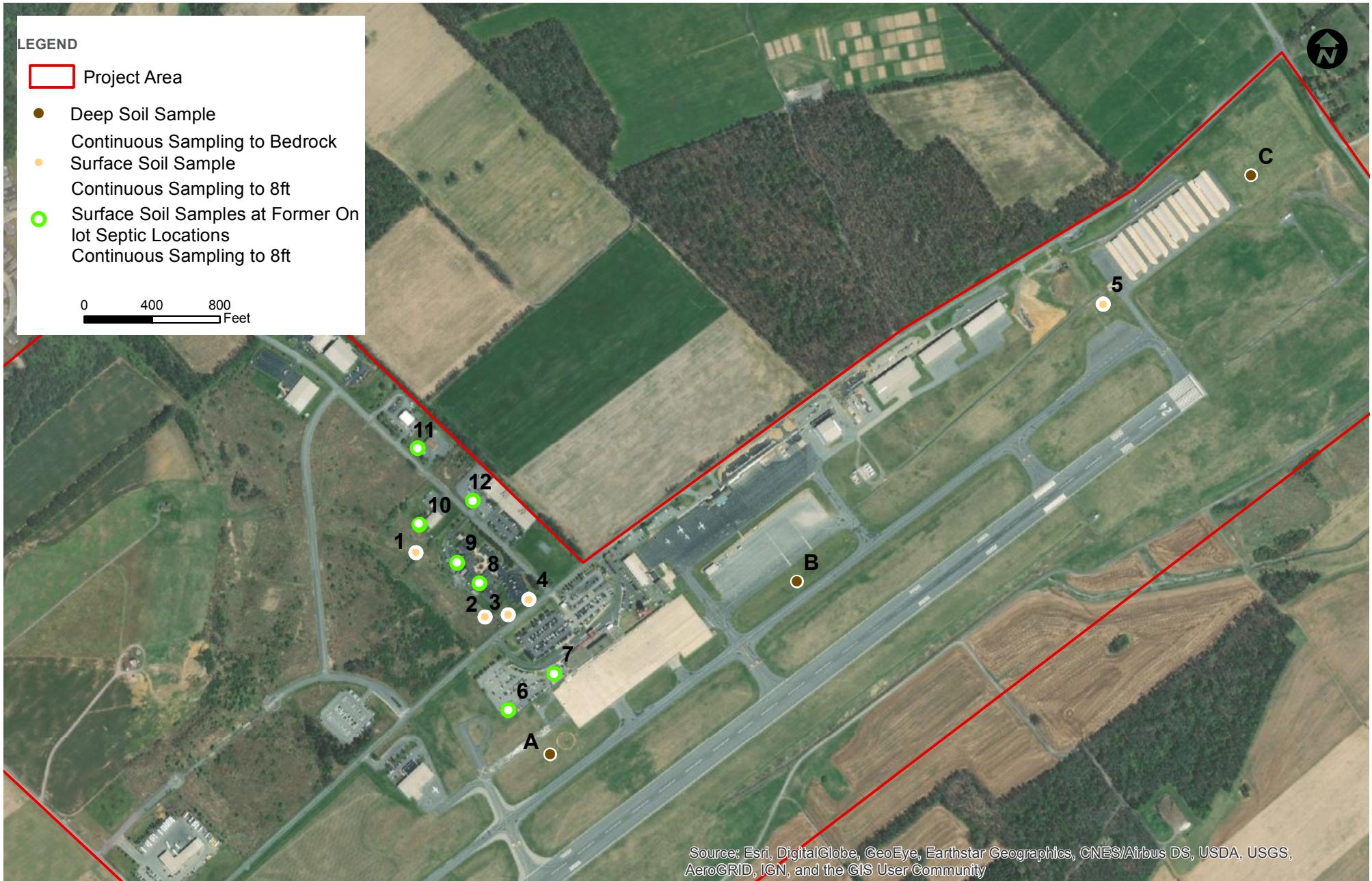
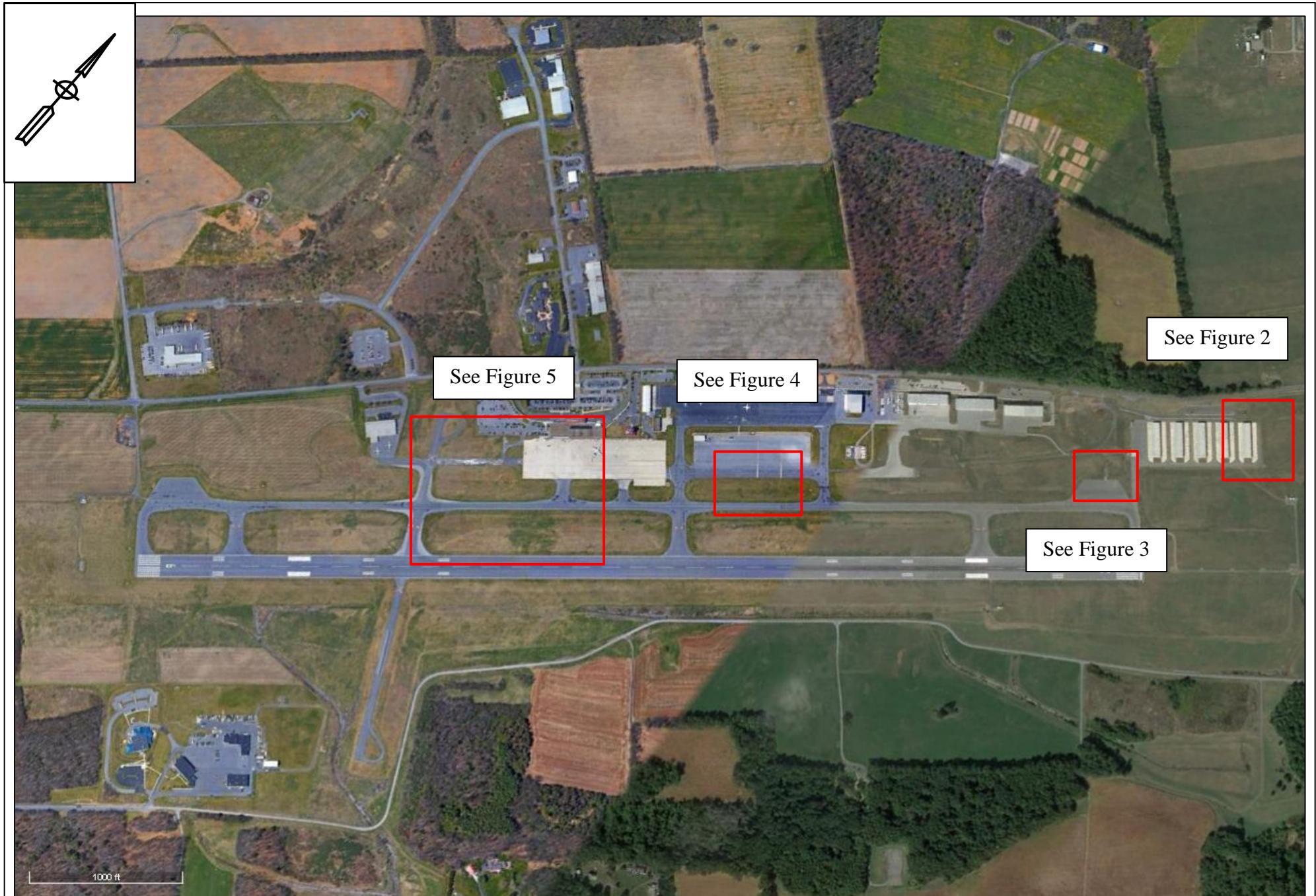
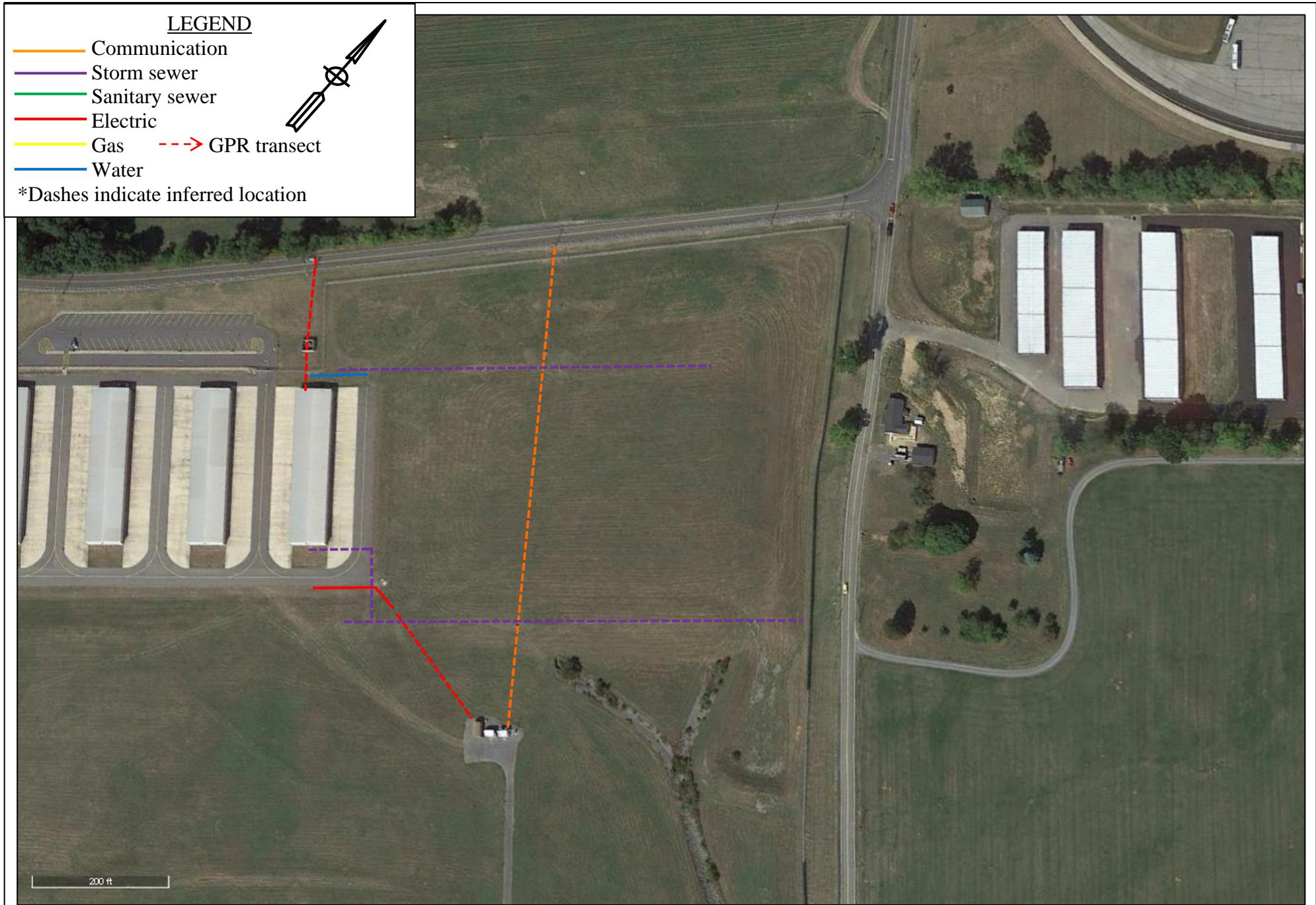


FIGURE 10
PROPOSED SOIL SAMPLE LOCATIONS
BENNER TWP PFAS SITE

APPENDIX C

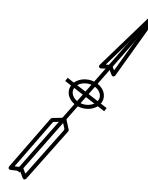
TPI Environmental, Inc. Geophysical Survey Maps



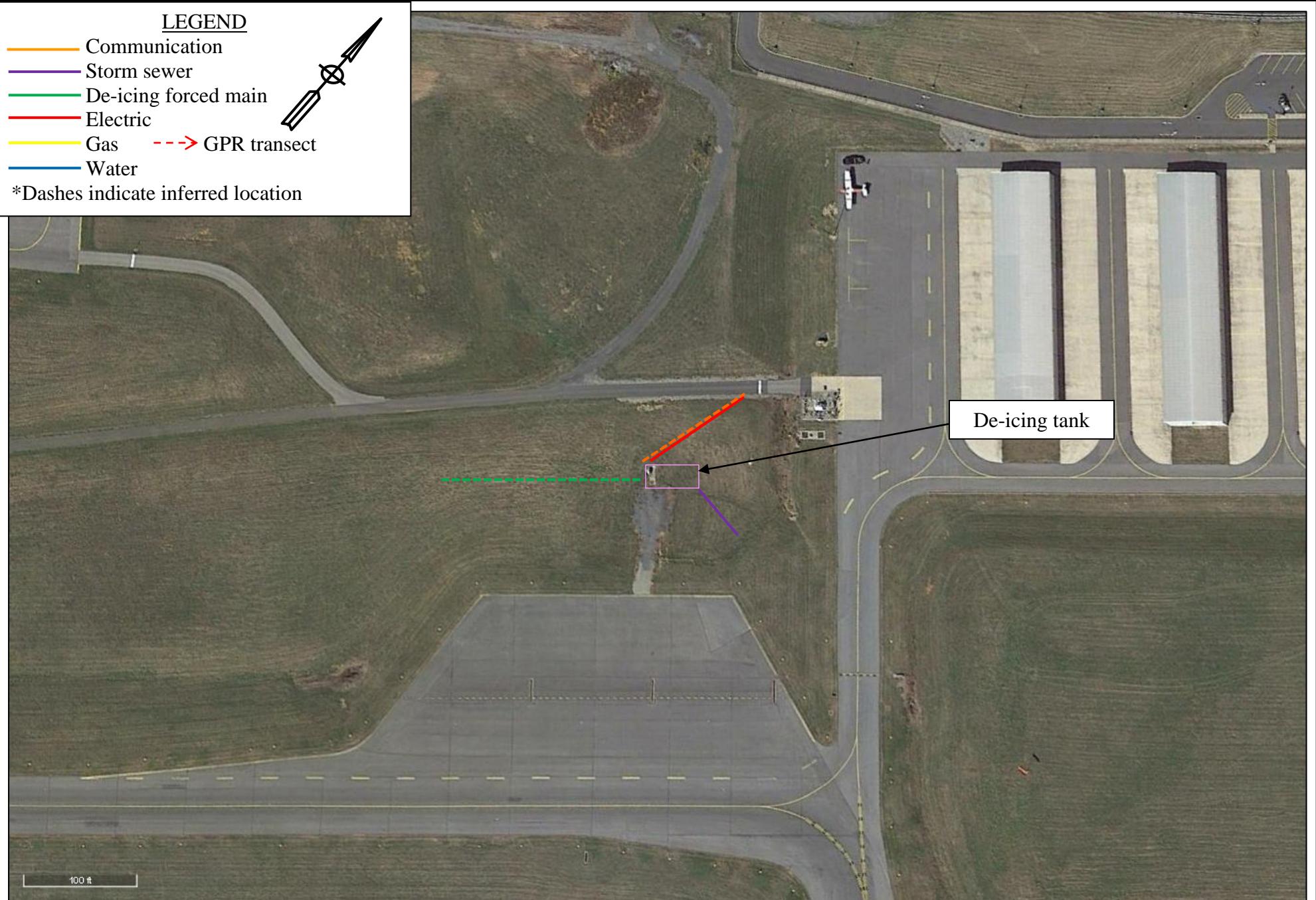


LEGEND

- Communication
- Storm sewer
- De-icing forced main
- Electric
- Gas
- Water

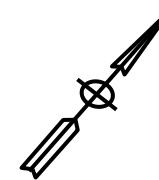


*Dashes indicate inferred location

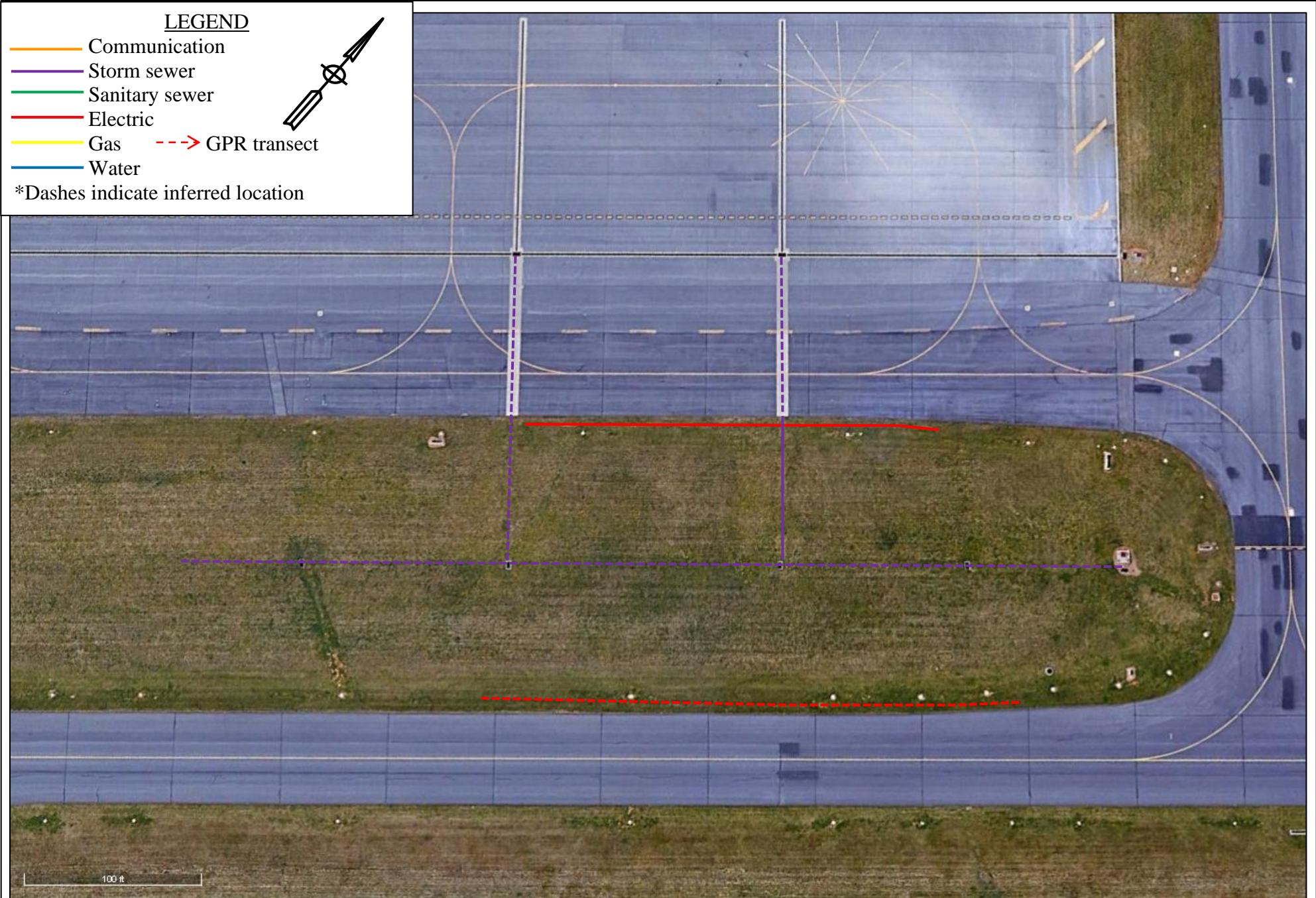


LEGEND

- Communication
- Storm sewer
- Sanitary sewer
- Electric
- Gas
- Water



*Dashes indicate inferred location



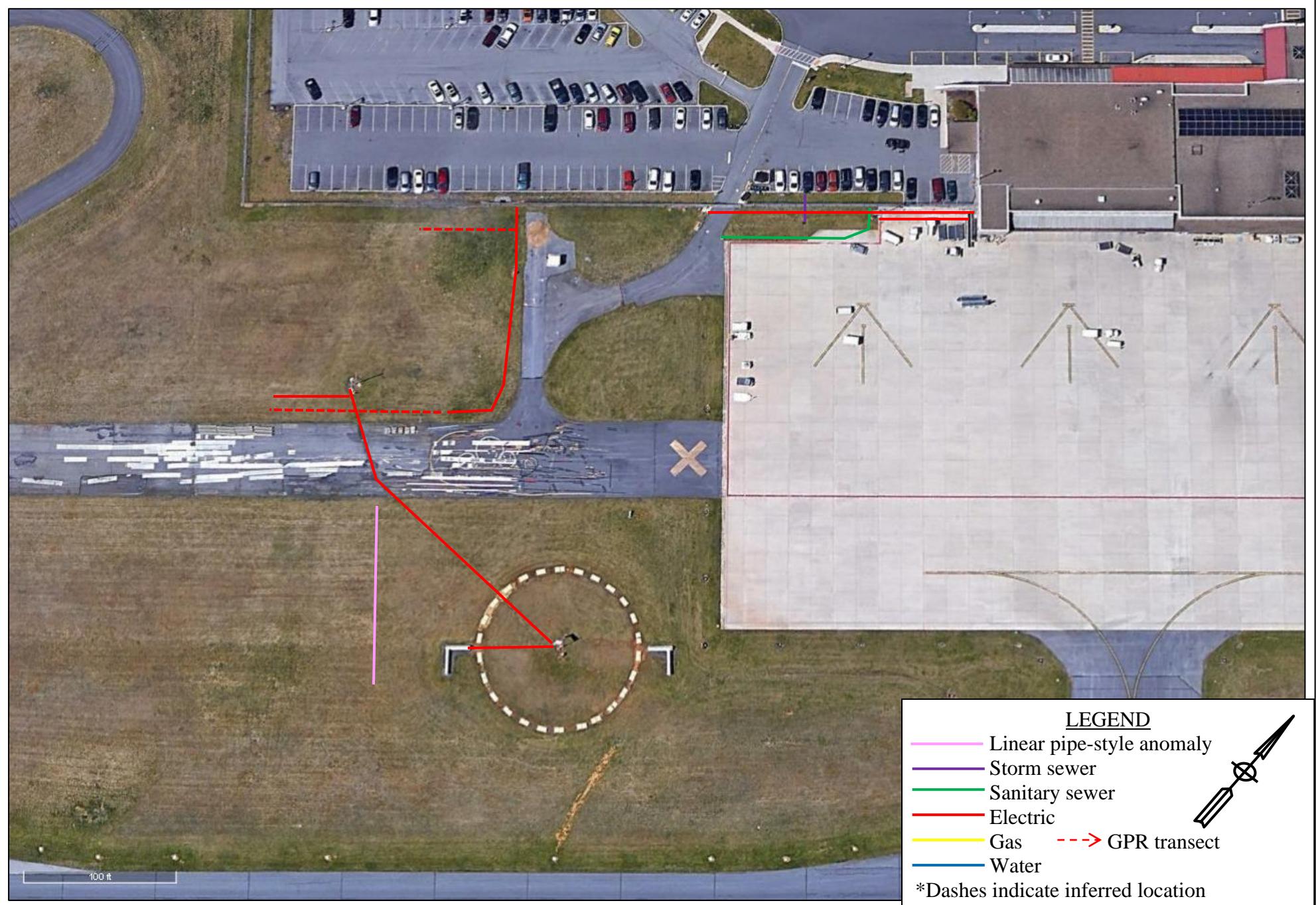
University Park Airport, State College, PA

Figure 4

Client: TRC

Date: 12/20/21

Geophysical Survey Results



APPENDIX D

Soil Boring Logs

 Environmental Corporation 1801 Market Street - Suite 1380 Philadelphia, PA 19103					SOIL BORING LOG	BORING NUMBER UPA-SB1
PROJECT NAME: Penn State Uni. Park Airport PROJECT NO.: 469418			LOCATION: Benner Twp., PA COORDINATES: X:1940333 Y:248889			
SAMPLER TYPE/DIA.: Macrocore/2"			DEPTH TO WATER: Not Encountered			
BORING METHOD: Direct Push			TOTAL DEPTH DRILLED: 20'			
DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS	
0		4.0'	UPA-SB1 (0'-2')		(0.0'-0.25') Topsoil and organics, moist	
1					(0.25'-1.0') Light brown silty clay, trace gravel, moist	
2					(1.0'-19.75') Tan CLAY, trace Gravel, stiff and dry	
3						
4		4.0'	UPA-SB1 (18'-20')			
5						
6						
7						
8		4.0'	UPA-SB1 (18'-20')			
9						
10						
11						
12		4.0'	UPA-SB1 (18'-20')			
13						
14						
15						
16		4.0'	UPA-SB1 (18'-20')			
17						
18						
19						
20					(19.75'-20.0') Orange and white/light gray medium-fine SAND, some clay, dry	
					20' End of Boring	

 Environmental Corporation 1801 Market Street - Suite 1380 Philadelphia, PA 19103					SOIL BORING LOG	BORING NUMBER UPA-SB2
PROJECT NAME: Penn State Uni. Park Airport PROJECT NO.: 469418					LOCATION: Benner Twp., PA	DATE DRILLED: 12/21/22 DRILLER: TPI Env. LOGGED BY: KC
SAMPLER TYPE/DIA.: Macrocore/2" BORING METHOD: Direct Push					COORDINATES: X:1941927 Y:249995 DEPTH TO WATER: Not Encountered TOTAL DEPTH DRILLED: 20'	
DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS	
0		4.0'	UPA-SB2 (0'-2')		(0.0'-0.25') Topsoil and organics, moist	
1					(0.25'-1.0') Light brown/red silty clay, trace gravel, moist	
2					(1.0'-20.0') Reddish brown to tan CLAY, trace Gravel, stiff and dry	
3						
4		4.0'	UPA-SB2 (8.0'-8.5')		(8.0'-8.5') Clay softens, sticky, trace medium-fine sand	
5						
6						
7						
8		4.0'	UPA-SB2 (18'-20')			
9						
10						
11						
12		4.0'	UPA-SB2 (18'-20')			
13						
14						
15						
16		4.0'	UPA-SB2 (18'-20')			
17						
18						
19						
20					20' End of Boring	

**Environmental Corporation**1801 Market Street - Suite 1380
Philadelphia, PA 19103**SOIL BORING LOG****BORING NUMBER****UPA-SB3****PROJECT NAME:** Penn State Uni. Park
Airport**LOCATION:** Benner Twp., PA**PROJECT NO.:** 469418**COORDINATES:** X:1944410 Y:252120**SAMPLER TYPE/DIA.:** Macrocore/2"**DEPTH TO WATER:** Not Encountered**BORING METHOD:** Direct Push**TOTAL DEPTH DRILLED:** 18.5'**DATE DRILLED:** 12/21/22**DRILLER:** TPI Env.**LOGGED BY:** KC

DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS
0					(0.0'-0.25') Topsoil and organics, wet
1			UPA-SB3 (0'-2')		(0.25'-1.0') Brown to tan silty CLAY, moist
2					(1.0'-16.75') Red to tan CLAY, trace silt, trace gravel, dry and stiff
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17			UPA-SB3 (16.5'-18.5')		(16.75'-18.5') Banded gray and reddish brown medium-fine SAND, trace silt, dry
18					
19					
20					

 Environmental Corporation 1801 Market Street - Suite 1380 Philadelphia, PA 19103				SOIL BORING LOG		BORING NUMBER UPA-SB4
PROJECT NAME: Penn State Uni. Park Airport PROJECT NO.: 469418				LOCATION: Benner Twp., PA COORDINATES: X:1943644 Y:251439		DATE DRILLED: 12/21/22 DRILLER: TPI Env. LOGGED BY: KC
SAMPLER TYPE/DIA.: Macrocore/2" BORING METHOD: Direct Push				DEPTH TO WATER: Not Encountered TOTAL DEPTH DRILLED: 20.0'		
DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS	
0		4.0'	UPA-SB4 (0'-2')		(0.0'-0.25') Topsoil and organics, moist	
1					(0.25'-1.0') Light brown silty CLAY, trace gravel	
2					(1.0'- 19.75') Tan CLAY, trace gravel, dry and stiff	
3						
4		4.0'	UPA-SB4 (0'-2')			
5						
6						
7						
8		4.0'	UPA-SB4 (0'-2')			
9						
10						
11						
12		4.0'	UPA-SB4 (0'-2')			
13						
14						
15						
16		4.0'	UPA-SB4 (18'-20')			
17						
18						
19						
20					(19.75'-20.0') Dark red CLAY, crumbly, dry and very stiff (weathered)	
					20' End of Boring	

 Environmental Corporation 1801 Market Street - Suite 1380 Philadelphia, PA 19103				SOIL BORING LOG		BORING NUMBER UPA-SB5
PROJECT NAME: Penn State Uni. Park Airport PROJECT NO.: 469418				LOCATION: Benner Twp., PA COORDINATES: X:1940369 Y:249214		DATE DRILLED: 12/21/22 DRILLER: TPI Env. LOGGED BY: KC
SAMPLER TYPE/DIA.: Macrocore/2" BORING METHOD: Direct Push				DEPTH TO WATER: Not Encountered TOTAL DEPTH DRILLED: 20.0'		
DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS	
0		4.0'	UPA-SB5 (0'-2')		(0.0'-0.25') Topsoil and organics, moist	
1					(0.25'-0.75' Light brown silty CLAY, trace gravel, moist	
2					(0.75'-20.0') Tan CLAY, trace gravel, dry and stiff	
3						
4		4.0'	UPA-SB5 (0'-2')			
5						
6						
7						
8		4.0'	UPA-SB5 (0'-2')			
9						
10						
11						
12		4.0'	UPA-SB5 (0'-2')			
13						
14						
15						
16		4.0'	UPA-SB5 (18'-20')			
17						
18						
19						
20					20' End of Boring	

 Environmental Corporation 1801 Market Street - Suite 1380 Philadelphia, PA 19103					SOIL BORING LOG	BORING NUMBER
					UPA-SB6	
PROJECT NAME: Penn State Uni. Park Airport		LOCATION: Benner Twp., PA				
PROJECT NO.: 469418		COORDINATES: X:1940235 Y:249074			DATE DRILLED: 12/22/22	
SAMPLER TYPE/DIA.: Macrocore/2"		DEPTH TO WATER: Not Encountered			DRILLER: TPI Env.	
BORING METHOD: Direct Push		TOTAL DEPTH DRILLED: 20.0'			LOGGED BY: KC	
DEPTH FROM SURFACE (FEET)	BLOW COUNT PER 6 IN.	RECOVERY (Feet)	SAMPLE DESIGNATION	UNIFIED	LITHOLOGIC CLASSIFICATION AND COMMENTS	
0		4.0'	UPA-SB6 (0'-2')		(0.0'-0.25') Topsoil and organics, moist	
1					(0.25'-1.5') Light brown silty CLAY, trace gravel, moist	
2					(1.5'-5.5.0') Light red to tan CLAY, trace gravel, stiff and dry	
3		3.5'			(5.5'-7.5') Concrete	
4					(7.5'-8.0') No recovery	
5					(8.0'-12.0') Light red to tan CLAY, trace gravel, stiff and dry	
6		4.0'			(12.0'-15.0') Light red to tan CLAY softens, slightly sticky	
7					(15.0'-16.0') Reddish tan medium-fine SAND and clay, dry	
8					(16.0'-20.0') Reddish tan to brown CLAY, trace medium-fine sand, trace gravel, dry and stiff	
9		4.0'	UPA-SB6 (18'-20')			
10						
11						
12		4.0'				
13						
14						
15		4.0'				
16						
17						
18		4.0'				
19						
20						
20' End of Boring						

APPENDIX E

Analytical Data Report



ANALYTICAL REPORT

Eurofins Lancaster Laboratories Env, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-67976-1

Client Project/Site: Penn State Uni Airport

For:

TRC Solutions, Inc.
1801 Market St
Suite 1380
Philadelphia, Pennsylvania 19103

Attn: Michael Edelman

Mariissa Williams

Authorized for release by:

1/4/2022 12:22:34 AM

Mariissa Williams, Project Manager
(717)556-7246
Mariissa.Williams@eurofinset.com

LINKS

Review your project
results through

TotalAccess

Have a Question?

Ask
The
Expert

Visit us at:

www.eurofinsus.com/Env

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.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.



Marrissa Williams
Project Manager
1/4/2022 12:22:34 AM

Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	8
Isotope Dilution Summary	14
QC Sample Results	15
QC Association Summary	19
Lab Chronicle	22
Certification Summary	27
Method Summary	28
Sample Summary	29
Chain of Custody	30
Receipt Checklists	32

Definitions/Glossary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

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.
cn	Refer to Case Narrative for further detail
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
!	Laboratory is not accredited for this parameter.

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
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
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

Case Narrative

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Job ID: 410-67976-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

Narrative

Job Narrative 410-67976-1

Receipt

The samples were received on 12/22/2021 4:10 PM. 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 time was 1.0°C

PFAS

Method PFC_IDA: Reporting limits were raised for the following sample: Decon. Water (410-67976-14) due to interference from the sample matrix.

Method PFC_IDA: The recovery for the labeled isotope(s) in the following sample: UPA-SB1(18'-20') (410-67976-2), UPA-SB3(16.5'-18.5') (410-67976-7) and UPA-SB5(18'-20') (410-67976-11) is outside the QC acceptance limits. The following action was taken: This sample was re-extracted within the required holding time and the recovery for the labeled isotope(s) is again outside the QC acceptance limits.

Method PFC_IDA: The recovery for the labeled isotope(s) in the following sample: UPA-SB5(0'-2') (410-67976-10) is outside the QC acceptance limits. The following action was taken: This sample was re-extracted within the required holding time and the recovery for the labeled isotope(s) is within the QC acceptance limits but now the recovery for the laboratory control spike sample associated with the following sample: UPA-SB5(0'-2') (410-67976-10) is outside the QC acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB1(0'-2')

Lab Sample ID: 410-67976-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	58		0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.57	J	0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB1(18'-20')

Lab Sample ID: 410-67976-2

No Detections.

Client Sample ID: UPA-SB2(0'-2')

Lab Sample ID: 410-67976-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.70		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	40		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.33	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB2(0'-2')-Dup.

Lab Sample ID: 410-67976-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.3		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	80		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.42	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB2(18'-20')

Lab Sample ID: 410-67976-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.66	J	0.78	0.26	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4		0.78	0.26	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB3(0'-2')

Lab Sample ID: 410-67976-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.49	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.32	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB3(16.5'-18.5')

Lab Sample ID: 410-67976-7

No Detections.

Client Sample ID: UPA-SB4(0'-2')

Lab Sample ID: 410-67976-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	3.5		0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	68		0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.58	J	0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB4(18'-20')

Lab Sample ID: 410-67976-9

No Detections.

Client Sample ID: UPA-SB5(0'-2')

Lab Sample ID: 410-67976-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.44	J cn	0.73	0.24	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	cn	0.73	0.24	ng/g	1	⊗	537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB5(18'-20')

Lab Sample ID: 410-67976-11

No Detections.

Client Sample ID: UPA-SB6(0'-2')

Lab Sample ID: 410-67976-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.6		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	75		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.91		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB6(18'-20')

Lab Sample ID: 410-67976-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.36	J	0.74	0.25	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.7		0.74	0.25	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: Decon. Water

Lab Sample ID: 410-67976-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	17	J cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	130	cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	630	cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	21	cn	20	5.0	ng/L	1		537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB1(0'-2')

Date Collected: 12/22/21 10:20
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-1

Matrix: Solid
Percent Solids: 83.5

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.47		2.3	0.47	ng/g	☀	12/27/21 08:44	12/27/21 20:34	1
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.70	0.23	ng/g	☀	12/27/21 08:44	12/27/21 20:34	1
Perfluorooctanesulfonic acid (PFOS)	58		0.70	0.23	ng/g	☀	12/27/21 08:44	12/27/21 20:34	1
Perfluorooctanoic acid (PFOA)	0.57	J	0.70	0.23	ng/g	☀	12/27/21 08:44	12/27/21 20:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	76		23 - 130				12/27/21 08:44	12/27/21 20:34	1
13C8 PFOA	39		21 - 133				12/27/21 08:44	12/27/21 20:34	1
13C8 PFOS	86		31 - 130				12/27/21 08:44	12/27/21 20:34	1
13C3 PFHxS	75		24 - 136				12/27/21 08:44	12/27/21 20:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.5	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB1(18'-20')

Date Collected: 12/22/21 11:15
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-2

Matrix: Solid
Percent Solids: 79.4

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	☀	12/27/21 08:44	12/27/21 20:46	1
Perfluorohexanesulfonic acid (PFHxS)	<0.24	cn	0.72	0.24	ng/g	☀	12/27/21 08:44	12/27/21 20:46	1
Perfluorooctanesulfonic acid (PFOS)	<0.24	cn	0.72	0.24	ng/g	☀	12/27/21 08:44	12/27/21 20:46	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.72	0.24	ng/g	☀	12/27/21 08:44	12/27/21 20:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	25	cn	23 - 130				12/27/21 08:44	12/27/21 20:46	1
13C8 PFOA	9	*5- cn	21 - 133				12/27/21 08:44	12/27/21 20:46	1
13C8 PFOS	33	cn	31 - 130				12/27/21 08:44	12/27/21 20:46	1
13C3 PFHxS	26	cn	24 - 136				12/27/21 08:44	12/27/21 20:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.6	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB2(0'-2')

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-3

Matrix: Solid
Percent Solids: 84.7

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	☀	12/28/21 07:55	12/29/21 19:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.70		0.67	0.22	ng/g	☀	12/28/21 07:55	12/29/21 19:31	1
Perfluorooctanesulfonic acid (PFOS)	40		0.67	0.22	ng/g	☀	12/28/21 07:55	12/29/21 19:31	1
Perfluorooctanoic acid (PFOA)	0.33	J	0.67	0.22	ng/g	☀	12/28/21 07:55	12/29/21 19:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	83		23 - 130				12/28/21 07:55	12/29/21 19:31	1
13C8 PFOA	58		21 - 133				12/28/21 07:55	12/29/21 19:31	1

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB2(0'-2')

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-3

Matrix: Solid

Percent Solids: 84.7

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOS	87		31 - 130	12/28/21 07:55	12/29/21 19:31	1
13C3 PFHxS	85		24 - 136	12/28/21 07:55	12/29/21 19:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.3	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB2(0'-2')-Dup.

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-4

Matrix: Solid

Percent Solids: 87.4

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorohexanesulfonic acid (PFHxS)	1.3		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorooctanesulfonic acid (PFOS)	80		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorooctanoic acid (PFOA)	0.42	J	0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130	12/27/21 08:44	12/27/21 20:57	1
13C8 PFOA	68		21 - 133	12/27/21 08:44	12/27/21 20:57	1
13C8 PFOS	90		31 - 130	12/27/21 08:44	12/27/21 20:57	1
13C3 PFHxS	91		24 - 136	12/27/21 08:44	12/27/21 20:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.6	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB2(18'-20')

Date Collected: 12/21/21 15:00
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-5

Matrix: Solid

Percent Solids: 76.8

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.52		2.6	0.52	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.66	J	0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorooctanesulfonic acid (PFOS)	1.4		0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorooctanoic acid (PFOA)	<0.26		0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130	12/27/21 08:44	12/27/21 21:08	1
13C8 PFOA	49		21 - 133	12/27/21 08:44	12/27/21 21:08	1
13C8 PFOS	91		31 - 130	12/27/21 08:44	12/27/21 21:08	1
13C3 PFHxS	82		24 - 136	12/27/21 08:44	12/27/21 21:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	23.2	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB3(0'-2')

Date Collected: 12/21/21 09:45
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-6
Matrix: Solid
Percent Solids: 85.1

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluorohexanesulfonic acid (PFHxS)	1.1		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluorooctanesulfonic acid (PFOS)	0.49 J		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluorooctanoic acid (PFOA)	0.32 J		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	91		23 - 130				12/27/21 08:44	12/27/21 21:20	1
13C8 PFOA	81		21 - 133				12/27/21 08:44	12/27/21 21:20	1
13C8 PFOS	104		31 - 130				12/27/21 08:44	12/27/21 21:20	1
13C3 PFHxS	95		24 - 136				12/27/21 08:44	12/27/21 21:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.9 !		1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB3(16.5'-18.5')

Date Collected: 12/21/21 10:50
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-7
Matrix: Solid
Percent Solids: 91.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.42	*5- cn	2.1	0.42	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluorohexanesulfonic acid (PFHxS)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluorooctanesulfonic acid (PFOS)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluorooctanoic acid (PFOA)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	19	*5- cn	23 - 130				12/27/21 08:44	12/27/21 21:42	1
13C8 PFOA	6	*5- cn	21 - 133				12/27/21 08:44	12/27/21 21:42	1
13C8 PFOS	23	*5- cn	31 - 130				12/27/21 08:44	12/27/21 21:42	1
13C3 PFHxS	21	*5- cn	24 - 136				12/27/21 08:44	12/27/21 21:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.0 !		1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB4(0'-2')

Date Collected: 12/21/21 11:55
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-8
Matrix: Solid
Percent Solids: 86.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.42		2.1	0.42	ng/g	⊗	12/27/21 08:44	12/27/21 21:54	1
Perfluorohexanesulfonic acid (PFHxS)	3.5		0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:54	1
Perfluorooctanesulfonic acid (PFOS)	68		0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:54	1
Perfluorooctanoic acid (PFOA)	0.58 J		0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130				12/27/21 08:44	12/27/21 21:54	1
13C8 PFOA	69		21 - 133				12/27/21 08:44	12/27/21 21:54	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB4(0'-2')

Lab Sample ID: 410-67976-8

Matrix: Solid

Percent Solids: 86.0

Date Collected: 12/21/21 11:55
Date Received: 12/22/21 16:10

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOS	89		31 - 130	12/27/21 08:44	12/27/21 21:54	1
13C3 PFHxS	84		24 - 136	12/27/21 08:44	12/27/21 21:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.0	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB4(18'-20')

Lab Sample ID: 410-67976-9

Matrix: Solid

Percent Solids: 73.3

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.51		2.5	0.51	ng/g	⊗	12/27/21 08:44	12/27/21 22:05	1
Perfluorohexanesulfonic acid (PFHxS)	<0.25		0.76	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:05	1
Perfluorooctanesulfonic acid (PFOS)	<0.25		0.76	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:05	1
Perfluorooctanoic acid (PFOA)	<0.25		0.76	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	43		23 - 130	12/27/21 08:44	12/27/21 22:05	1
13C8 PFOA	21		21 - 133	12/27/21 08:44	12/27/21 22:05	1
13C8 PFOS	54		31 - 130	12/27/21 08:44	12/27/21 22:05	1
13C3 PFHxS	45		24 - 136	12/27/21 08:44	12/27/21 22:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	26.7	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB5(0'-2')

Lab Sample ID: 410-67976-10

Matrix: Solid

Percent Solids: 77.8

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	⊗	12/27/21 08:44	12/27/21 22:16	1
Perfluorohexanesulfonic acid (PFHxS)	0.44	J cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:16	1
Perfluorooctanesulfonic acid (PFOS)	1.2	cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:16	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	36	cn	23 - 130	12/27/21 08:44	12/27/21 22:16	1
13C8 PFOA	15	*5- cn	21 - 133	12/27/21 08:44	12/27/21 22:16	1
13C8 PFOS	46	cn	31 - 130	12/27/21 08:44	12/27/21 22:16	1
13C3 PFHxS	38	cn	24 - 136	12/27/21 08:44	12/27/21 22:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	22.2	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB5(18'-20')

Lab Sample ID: 410-67976-11

Matrix: Solid

Percent Solids: 75.0

Date Collected: 12/21/21 16:35
Date Received: 12/22/21 16:10

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	⊗	12/27/21 08:44	12/27/21 22:28	1
Perfluorohexanesulfonic acid (PFHxS)	<0.24	cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:28	1
Perfluorooctanesulfonic acid (PFOS)	<0.24	cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:28	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.73	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 22:28	1
<i>Isotope Dilution</i>		%Recovery	Qualifier	<i>Limits</i>			Prepared	Analyzed	Dil Fac
13C3 PFBS	26	cn	23 - 130				12/27/21 08:44	12/27/21 22:28	1
13C8 PFOA	10	*5- cn	21 - 133				12/27/21 08:44	12/27/21 22:28	1
13C8 PFOS	34	cn	31 - 130				12/27/21 08:44	12/27/21 22:28	1
13C3 PFHxS	28	cn	24 - 136				12/27/21 08:44	12/27/21 22:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.0	!		1.0	1.0 %			12/23/21 10:20	1

Client Sample ID: UPA-SB6(0'-2')

Lab Sample ID: 410-67976-12

Matrix: Solid

Percent Solids: 80.6

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.46		2.3	0.46	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorohexanesulfonic acid (PFHxS)	1.6		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorooctanesulfonic acid (PFOS)	75		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorooctanoic acid (PFOA)	0.91		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
<i>Isotope Dilution</i>		%Recovery	Qualifier	<i>Limits</i>			Prepared	Analyzed	Dil Fac
13C3 PFBS	98		23 - 130				12/27/21 08:44	12/27/21 22:39	1
13C8 PFOA	88		21 - 133				12/27/21 08:44	12/27/21 22:39	1
13C8 PFOS	103		31 - 130				12/27/21 08:44	12/27/21 22:39	1
13C3 PFHxS	97		24 - 136				12/27/21 08:44	12/27/21 22:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.4	!		1.0	1.0 %			12/23/21 10:20	1

Client Sample ID: UPA-SB6(18'-20')

Lab Sample ID: 410-67976-13

Matrix: Solid

Percent Solids: 81.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.49		2.5	0.49	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
Perfluorohexanesulfonic acid (PFHxS)	0.36	J	0.74	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
Perfluorooctanesulfonic acid (PFOS)	9.7		0.74	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
Perfluorooctanoic acid (PFOA)	<0.25		0.74	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
<i>Isotope Dilution</i>		%Recovery	Qualifier	<i>Limits</i>			Prepared	Analyzed	Dil Fac
13C3 PFBS	84		23 - 130				12/27/21 08:44	12/27/21 22:50	1
13C8 PFOA	75		21 - 133				12/27/21 08:44	12/27/21 22:50	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB6(18'-20')

Date Collected: 12/22/21 09:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-13

Matrix: Solid
Percent Solids: 81.0

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOS	100		31 - 130	12/27/21 08:44	12/27/21 22:50	1
13C3 PFHxS	93		24 - 136	12/27/21 08:44	12/27/21 22:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.0	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: Decon. Water

Date Collected: 12/22/21 12:15
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-14

Matrix: Water

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	17	J cn	20	5.0	ng/L		12/23/21 16:22	12/27/21 11:52	1
Perfluorohexanesulfonic acid (PFHxS)	130	cn	20	5.0	ng/L		12/23/21 16:22	12/27/21 11:52	1
Perfluorooctanesulfonic acid (PFOS)	630	cn	20	5.0	ng/L		12/23/21 16:22	12/27/21 11:52	1
Perfluorooctanoic acid (PFOA)	21	cn	20	5.0	ng/L		12/23/21 16:22	12/27/21 11:52	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	94	cn	19 - 178	12/23/21 16:22	12/27/21 11:52	1
13C8 PFOA	80	cn	49 - 127	12/23/21 16:22	12/27/21 11:52	1
13C8 PFOS	82	cn	49 - 126	12/23/21 16:22	12/27/21 11:52	1
13C3 PFHxS	67	cn	32 - 145	12/23/21 16:22	12/27/21 11:52	1

Isotope Dilution Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)			
		C3PFBS (23-130)	C8PFOA (21-133)	C8PFOS (31-130)	C3PFHS (24-136)
410-67976-1	UPA-SB1(0'-2')	76	39	86	75
410-67976-2	UPA-SB1(18'-20')	25 cn	9 *5- cn	33 cn	26 cn
410-67976-2 MS	UPA-SB1(18'-20')	43	15 *5-	48	45
410-67976-2 MSD	UPA-SB1(18'-20')	44	16 *5-	49	49
410-67976-3	UPA-SB2(0'-2')	83	58	87	85
410-67976-4	UPA-SB2(0'-2')-Dup.	80	68	90	91
410-67976-5	UPA-SB2(18'-20')	80	49	91	82
410-67976-6	UPA-SB3(0'-2')	91	81	104	95
410-67976-7	UPA-SB3(16.5'-18.5')	19 *5- cn	6 *5- cn	23 *5- cn	21 *5- cn
410-67976-8	UPA-SB4(0'-2')	80	69	89	84
410-67976-9	UPA-SB4(18'-20')	43	21	54	45
410-67976-10	UPA-SB5(0'-2')	36 cn	15 *5- cn	46 cn	38 cn
410-67976-11	UPA-SB5(18'-20')	26 cn	10 *5- cn	34 cn	28 cn
410-67976-12	UPA-SB6(0'-2')	98	88	103	97
410-67976-13	UPA-SB6(18'-20')	84	75	100	93
LCS 410-209124/3-B	Lab Control Sample	102	103	110	107
LCS 410-209532/3-B	Lab Control Sample	107	107	106	112
LCS 410-210311/2-B	Lab Control Sample	129	131	136 *5+	136
LCSD 410-209532/4-B	Lab Control Sample Dup	99	98	102	103
MB 410-209124/1-B	Method Blank	112	124	115	129
MB 410-209532/1-B	Method Blank	94	99	101	99
MB 410-210311/1-B	Method Blank	114	109	117	119

Surrogate Legend

C3PFBS = 13C3 PFBS
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
C3PFHS = 13C3 PFHxS

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)			
		C3PFBS (19-178)	C8PFOA (49-127)	C8PFOS (49-126)	C3PFHS (32-145)
410-67976-14	Decon. Water	94 cn	80 cn	82 cn	67 cn
LCS 410-208963/2-A	Lab Control Sample	95	90	94	89
LCSD 410-208963/3-A	Lab Control Sample Dup	101	92	93	90
MB 410-208963/1-A	Method Blank	97	85	94	89

Surrogate Legend

C3PFBS = 13C3 PFBS
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
C3PFHS = 13C3 PFHxS

QC Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-208963/1-A

Matrix: Water

Analysis Batch: 209123

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 208963

Analyte	MB	MB	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier									
Perfluorobutanesulfonic acid (PFBS)	<0.50		2.0		0.50	ng/L		12/23/21 16:22	12/27/21 11:19		1
Perfluorohexanesulfonic acid (PFHxS)	<0.50		2.0		0.50	ng/L		12/23/21 16:22	12/27/21 11:19		1
Perfluorooctanesulfonic acid (PFOS)	<0.50		2.0		0.50	ng/L		12/23/21 16:22	12/27/21 11:19		1
Perfluorooctanoic acid (PFOA)	<0.50		2.0		0.50	ng/L		12/23/21 16:22	12/27/21 11:19		1
Isotope Dilution	MB	MB	%Recovery	Qualifier	Limits			D	Prepared	Analyzed	Dil Fac
	Result	Qualifier									
13C3 PFBS	97		19 - 178						12/23/21 16:22	12/27/21 11:19	1
13C8 PFOA	85		49 - 127						12/23/21 16:22	12/27/21 11:19	1
13C8 PFOS	94		49 - 126						12/23/21 16:22	12/27/21 11:19	1
13C3 PFHxS	89		32 - 145						12/23/21 16:22	12/27/21 11:19	1

Lab Sample ID: LCS 410-208963/2-A

Matrix: Water

Analysis Batch: 209123

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 208963

Analyte	Spike	LCS	LCS	Result	Qualifier	Unit	D	%Rec	Limits		
	Added	Result	Qualifier								
Perfluorobutanesulfonic acid (PFBS)	22.7	24.4		ng/L				108	65 - 132		
Perfluorohexanesulfonic acid (PFHxS)	23.3	25.1		ng/L				107	60 - 128		
Perfluorooctanesulfonic acid (PFOS)	23.7	25.1		ng/L				106	51 - 126		
Perfluorooctanoic acid (PFOA)	25.6	27.5		ng/L				107	65 - 136		
Isotope Dilution	LCS	LCS	%Recovery	Qualifier	Limits						
	Result	Qualifier									
13C3 PFBS	95	19 - 178									
13C8 PFOA	90	49 - 127									
13C8 PFOS	94	49 - 126									
13C3 PFHxS	89	32 - 145									

Lab Sample ID: LCSD 410-208963/3-A

Matrix: Water

Analysis Batch: 209123

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 208963

Analyte	Spike	LCSD	LCSD	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier								
Perfluorobutanesulfonic acid (PFBS)	22.7	25.3		ng/L				112	65 - 132	4	30
Perfluorohexanesulfonic acid (PFHxS)	23.3	24.8		ng/L				106	60 - 128	1	30
Perfluorooctanesulfonic acid (PFOS)	23.7	26.4		ng/L				111	51 - 126	5	30
Perfluorooctanoic acid (PFOA)	25.6	27.8		ng/L				109	65 - 136	1	30
Isotope Dilution	LCSD	LCSD	%Recovery	Qualifier	Limits						
	Result	Qualifier									
13C3 PFBS	101	19 - 178									
13C8 PFOA	92	49 - 127									
13C8 PFOS	93	49 - 126									
13C3 PFHxS	90	32 - 145									

QC Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-209124/1-B

Matrix: Solid

Analysis Batch: 209714

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 209124

Analyte	MB	MB	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	<0.40		2.0	0.40	ng/g	1
Perfluorohexanesulfonic acid (PFHxS)	<0.20		0.60	0.20	ng/g	1
Perfluorooctanesulfonic acid (PFOS)	<0.20		0.60	0.20	ng/g	1
Perfluorooctanoic acid (PFOA)	<0.20		0.60	0.20	ng/g	1
Isotope Dilution	MB	MB	D	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C3 PFBS	112		23 - 130	12/27/21 08:44	12/28/21 16:12	1
13C8 PFOA	124		21 - 133	12/27/21 08:44	12/28/21 16:12	1
13C8 PFOS	115		31 - 130	12/27/21 08:44	12/28/21 16:12	1
13C3 PFHxS	129		24 - 136	12/27/21 08:44	12/28/21 16:12	1

Lab Sample ID: LCS 410-209124/3-B

Matrix: Solid

Analysis Batch: 209714

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 209124

Analyte	Spike	LCS	LCS	D	%Rec	Limits	%Rec.
	Added	Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	22.1	18.1		ng/g	82	62 - 137	
Perfluorohexanesulfonic acid (PFHxS)	22.8	18.6		ng/g	81	57 - 135	
Perfluorooctanesulfonic acid (PFOS)	23.1	19.1		ng/g	83	48 - 134	
Perfluorooctanoic acid (PFOA)	25.0	21.5		ng/g	86	62 - 144	
Isotope Dilution	LCS	LCS	D	%Rec	Limits	%Rec.	
	%Recovery	Qualifier					
13C3 PFBS	102		23 - 130				
13C8 PFOA	103		21 - 133				
13C8 PFOS	110		31 - 130				
13C3 PFHxS	107		24 - 136				

Lab Sample ID: MB 410-209532/1-B

Matrix: Solid

Analysis Batch: 209916

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 209532

Analyte	MB	MB	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	<0.40		2.0	0.40	ng/g	1
Perfluorohexanesulfonic acid (PFHxS)	<0.20		0.60	0.20	ng/g	1
Perfluorooctanesulfonic acid (PFOS)	<0.20		0.60	0.20	ng/g	1
Perfluorooctanoic acid (PFOA)	<0.20		0.60	0.20	ng/g	1
Isotope Dilution	MB	MB	D	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C3 PFBS	94		23 - 130	12/28/21 07:55	12/29/21 18:58	1
13C8 PFOA	99		21 - 133	12/28/21 07:55	12/29/21 18:58	1
13C8 PFOS	101		31 - 130	12/28/21 07:55	12/29/21 18:58	1
13C3 PFHxS	99		24 - 136	12/28/21 07:55	12/29/21 18:58	1

QC Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-209532/3-B

Matrix: Solid

Analysis Batch: 209916

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 209532

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
Perfluorobutanesulfonic acid (PFBS)	22.1	15.3		ng/g		69	62 - 137
Isotope Dilution		LCS %Recovery	LCS Qualifier	Limits			
13C3 PFBS	107			23 - 130			
13C8 PFOA	107			21 - 133			
13C8 PFOS	106			31 - 130			
13C3 PFHxS	112			24 - 136			

Lab Sample ID: LCSD 410-209532/4-B

Matrix: Solid

Analysis Batch: 209916

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 209532

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	Limit	
Perfluorobutanesulfonic acid (PFBS)	22.1	16.4		ng/g		74	62 - 137	7	30
Isotope Dilution		LCSD %Recovery	LCSD Qualifier	Limits					
13C3 PFBS	99			23 - 130					
13C8 PFOA	98			21 - 133					
13C8 PFOS	102			31 - 130					
13C3 PFHxS	103			24 - 136					

Lab Sample ID: MB 410-210311/1-B

Matrix: Solid

Analysis Batch: 210477

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 210311

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.40		2.0	0.40	ng/g		12/29/21 18:41	12/31/21 05:18	1
Isotope Dilution		%Recovery	Qualifier	Limits				Prepared	Analyzed
13C3 PFBS	114			23 - 130				12/29/21 18:41	12/31/21 05:18
13C8 PFOA	109			21 - 133				12/29/21 18:41	12/31/21 05:18
13C8 PFOS	117			31 - 130				12/29/21 18:41	12/31/21 05:18
13C3 PFHxS	119			24 - 136				12/29/21 18:41	12/31/21 05:18

QC Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-210311/2-B

Matrix: Solid

Analysis Batch: 210477

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 210311

Analyte	Spike Added	LCS		Unit	D	%Rec.	%Limits
		Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	22.1	18.1		ng/g		82	62 - 137
Perfluorohexanesulfonic acid (PFHxS)	22.8	18.0		ng/g		79	57 - 135
Perfluorooctanesulfonic acid (PFOS)	23.1	18.5 *5+		ng/g		80	48 - 134
Perfluorooctanoic acid (PFOA)	25.0	20.7		ng/g		83	62 - 144
Isotope Dilution		LCS	LCS	Limits			
		%Recovery	Qualifier				
13C3 PFBS		129		23 - 130			
13C8 PFOA		131		21 - 133			
13C8 PFOS		136 *5+		31 - 130			
13C3 PFHxS		136		24 - 136			

Lab Sample ID: 410-67976-2 MS

Matrix: Solid

Analysis Batch: 210477

Client Sample ID: UPA-SB1(18'-20')

Prep Type: Total/NA

Prep Batch: 210311

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec.	%Limits
	Result	Qualifier	Added	Result	Qualifier				
Perfluorobutanesulfonic acid (PFBS)	<0.47		27.3	22.5		ng/g	⊗	82	62 - 137
Perfluorohexanesulfonic acid (PFHxS)	<0.23		28.2	22.8		ng/g	⊗	81	57 - 135
Perfluorooctanesulfonic acid (PFOS)	<0.23		28.6	23.0		ng/g	⊗	81	48 - 134
Perfluorooctanoic acid (PFOA)	0.62	J 1 *5-	30.9	26.3 *5-		ng/g	⊗	83	62 - 144
Isotope Dilution		MS	MS	Limits					
		%Recovery	Qualifier						
13C3 PFBS		43		23 - 130					
13C8 PFOA		15 *5-		21 - 133					
13C8 PFOS		48		31 - 130					
13C3 PFHxS		45		24 - 136					

Lab Sample ID: 410-67976-2 MSD

Matrix: Solid

Analysis Batch: 210477

Client Sample ID: UPA-SB1(18'-20')

Prep Type: Total/NA

Prep Batch: 210311

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Perfluorobutanesulfonic acid (PFBS)	<0.47		25.8	21.4		ng/g	⊗	83	62 - 137	5	30
Perfluorohexanesulfonic acid (PFHxS)	<0.23		26.6	21.8		ng/g	⊗	82	57 - 135	4	30
Perfluorooctanesulfonic acid (PFOS)	<0.23		27.0	22.0		ng/g	⊗	82	48 - 134	5	30
Perfluorooctanoic acid (PFOA)	0.62	J 1 *5-	29.2	26.4 *5-		ng/g	⊗	88	62 - 144	0	30
Isotope Dilution		MSD	MSD	Limits							
		%Recovery	Qualifier								
13C3 PFBS		44		23 - 130							
13C8 PFOA		16 *5-		21 - 133							
13C8 PFOS		49		31 - 130							
13C3 PFHxS		49		24 - 136							

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

LCMS

Prep Batch: 208963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-14	Decon. Water	Total/NA	Water	537 IDA	
MB 410-208963/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-208963/2-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-208963/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

Analysis Batch: 209123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-14	Decon. Water	Total/NA	Water	537 IDA	208963
MB 410-208963/1-A	Method Blank	Total/NA	Water	537 IDA	208963
LCS 410-208963/2-A	Lab Control Sample	Total/NA	Water	537 IDA	208963
LCSD 410-208963/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	208963

Prep Batch: 209124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-1	UPA-SB1(0'-2')	Total/NA	Solid	SHAKE	
410-67976-2	UPA-SB1(18'-20')	Total/NA	Solid	SHAKE	
410-67976-4	UPA-SB2(0'-2')-Dup.	Total/NA	Solid	SHAKE	
410-67976-5	UPA-SB2(18'-20')	Total/NA	Solid	SHAKE	
410-67976-6	UPA-SB3(0'-2')	Total/NA	Solid	SHAKE	
410-67976-7	UPA-SB3(16.5'-18.5')	Total/NA	Solid	SHAKE	
410-67976-8	UPA-SB4(0'-2')	Total/NA	Solid	SHAKE	
410-67976-9	UPA-SB4(18'-20')	Total/NA	Solid	SHAKE	
410-67976-10	UPA-SB5(0'-2')	Total/NA	Solid	SHAKE	
410-67976-11	UPA-SB5(18'-20')	Total/NA	Solid	SHAKE	
410-67976-12	UPA-SB6(0'-2')	Total/NA	Solid	SHAKE	
410-67976-13	UPA-SB6(18'-20')	Total/NA	Solid	SHAKE	
MB 410-209124/1-B	Method Blank	Total/NA	Solid	SHAKE	
LCS 410-209124/3-B	Lab Control Sample	Total/NA	Solid	SHAKE	

Cleanup Batch: 209293

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-1	UPA-SB1(0'-2')	Total/NA	Solid	Extract Aliquot	209124
410-67976-2	UPA-SB1(18'-20')	Total/NA	Solid	Extract Aliquot	209124
410-67976-4	UPA-SB2(0'-2')-Dup.	Total/NA	Solid	Extract Aliquot	209124
410-67976-5	UPA-SB2(18'-20')	Total/NA	Solid	Extract Aliquot	209124
410-67976-6	UPA-SB3(0'-2')	Total/NA	Solid	Extract Aliquot	209124
410-67976-7	UPA-SB3(16.5'-18.5')	Total/NA	Solid	Extract Aliquot	209124
410-67976-8	UPA-SB4(0'-2')	Total/NA	Solid	Extract Aliquot	209124
410-67976-9	UPA-SB4(18'-20')	Total/NA	Solid	Extract Aliquot	209124
410-67976-10	UPA-SB5(0'-2')	Total/NA	Solid	Extract Aliquot	209124
410-67976-11	UPA-SB5(18'-20')	Total/NA	Solid	Extract Aliquot	209124
410-67976-12	UPA-SB6(0'-2')	Total/NA	Solid	Extract Aliquot	209124
410-67976-13	UPA-SB6(18'-20')	Total/NA	Solid	Extract Aliquot	209124
MB 410-209124/1-B	Method Blank	Total/NA	Solid	Extract Aliquot	209124
LCS 410-209124/3-B	Lab Control Sample	Total/NA	Solid	Extract Aliquot	209124

Analysis Batch: 209318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-1	UPA-SB1(0'-2')	Total/NA	Solid	537 IDA	209293
410-67976-2	UPA-SB1(18'-20')	Total/NA	Solid	537 IDA	209293
410-67976-4	UPA-SB2(0'-2')-Dup.	Total/NA	Solid	537 IDA	209293

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

LCMS (Continued)

Analysis Batch: 209318 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-5	UPA-SB2(18'-20')	Total/NA	Solid	537 IDA	209293
410-67976-6	UPA-SB3(0'-2')	Total/NA	Solid	537 IDA	209293
410-67976-7	UPA-SB3(16.5'-18.5')	Total/NA	Solid	537 IDA	209293
410-67976-8	UPA-SB4(0'-2')	Total/NA	Solid	537 IDA	209293
410-67976-9	UPA-SB4(18'-20')	Total/NA	Solid	537 IDA	209293
410-67976-10	UPA-SB5(0'-2')	Total/NA	Solid	537 IDA	209293
410-67976-11	UPA-SB5(18'-20')	Total/NA	Solid	537 IDA	209293
410-67976-12	UPA-SB6(0'-2')	Total/NA	Solid	537 IDA	209293
410-67976-13	UPA-SB6(18'-20')	Total/NA	Solid	537 IDA	209293

Prep Batch: 209532

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-3	UPA-SB2(0'-2')	Total/NA	Solid	SHAKE	10
MB 410-209532/1-B	Method Blank	Total/NA	Solid	SHAKE	11
LCS 410-209532/3-B	Lab Control Sample	Total/NA	Solid	SHAKE	12
LCSD 410-209532/4-B	Lab Control Sample Dup	Total/NA	Solid	SHAKE	13

Cleanup Batch: 209692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-3	UPA-SB2(0'-2')	Total/NA	Solid	Extract Aliquot	209532
MB 410-209532/1-B	Method Blank	Total/NA	Solid	Extract Aliquot	209532
LCS 410-209532/3-B	Lab Control Sample	Total/NA	Solid	Extract Aliquot	209532
LCSD 410-209532/4-B	Lab Control Sample Dup	Total/NA	Solid	Extract Aliquot	209532

Analysis Batch: 209714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 410-209124/1-B	Method Blank	Total/NA	Solid	537 IDA	209293
LCS 410-209124/3-B	Lab Control Sample	Total/NA	Solid	537 IDA	209293

Analysis Batch: 209916

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-3	UPA-SB2(0'-2')	Total/NA	Solid	537 IDA	209692
MB 410-209532/1-B	Method Blank	Total/NA	Solid	537 IDA	209692
LCS 410-209532/3-B	Lab Control Sample	Total/NA	Solid	537 IDA	209692
LCSD 410-209532/4-B	Lab Control Sample Dup	Total/NA	Solid	537 IDA	209692

Prep Batch: 210311

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-2 - RE	UPA-SB1(18'-20')	Total/NA	Solid	SHAKE	
410-67976-7 - RE	UPA-SB3(16.5'-18.5')	Total/NA	Solid	SHAKE	
410-67976-10 - RE	UPA-SB5(0'-2')	Total/NA	Solid	SHAKE	
410-67976-11 - RE	UPA-SB5(18'-20')	Total/NA	Solid	SHAKE	
MB 410-210311/1-B	Method Blank	Total/NA	Solid	SHAKE	
LCS 410-210311/2-B	Lab Control Sample	Total/NA	Solid	SHAKE	
410-67976-2 MS	UPA-SB1(18'-20')	Total/NA	Solid	SHAKE	
410-67976-2 MSD	UPA-SB1(18'-20')	Total/NA	Solid	SHAKE	

Cleanup Batch: 210388

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-2 - RE	UPA-SB1(18'-20')	Total/NA	Solid	Extract Aliquot	210311
410-67976-7 - RE	UPA-SB3(16.5'-18.5')	Total/NA	Solid	Extract Aliquot	210311

Eurofins Lancaster Laboratories Env, LLC

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

LCMS (Continued)

Cleanup Batch: 210388 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-10 - RE	UPA-SB5(0'-2')	Total/NA	Solid	Extract Aliquot	210311
410-67976-11 - RE	UPA-SB5(18'-20')	Total/NA	Solid	Extract Aliquot	210311
MB 410-210311/1-B	Method Blank	Total/NA	Solid	Extract Aliquot	210311
LCS 410-210311/2-B	Lab Control Sample	Total/NA	Solid	Extract Aliquot	210311
410-67976-2 MS	UPA-SB1(18'-20')	Total/NA	Solid	Extract Aliquot	210311
410-67976-2 MSD	UPA-SB1(18'-20')	Total/NA	Solid	Extract Aliquot	210311

Analysis Batch: 210477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-2 - RE	UPA-SB1(18'-20')	Total/NA	Solid	537 IDA	210388
410-67976-7 - RE	UPA-SB3(16.5'-18.5')	Total/NA	Solid	537 IDA	210388
410-67976-10 - RE	UPA-SB5(0'-2')	Total/NA	Solid	537 IDA	210388
410-67976-11 - RE	UPA-SB5(18'-20')	Total/NA	Solid	537 IDA	210388
MB 410-210311/1-B	Method Blank	Total/NA	Solid	537 IDA	210388
LCS 410-210311/2-B	Lab Control Sample	Total/NA	Solid	537 IDA	210388
410-67976-2 MS	UPA-SB1(18'-20')	Total/NA	Solid	537 IDA	210388
410-67976-2 MSD	UPA-SB1(18'-20')	Total/NA	Solid	537 IDA	210388

General Chemistry

Analysis Batch: 208875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-67976-1	UPA-SB1(0'-2')	Total/NA	Solid	Moisture	
410-67976-2	UPA-SB1(18'-20')	Total/NA	Solid	Moisture	
410-67976-3	UPA-SB2(0'-2')	Total/NA	Solid	Moisture	
410-67976-4	UPA-SB2(0'-2')-Dup.	Total/NA	Solid	Moisture	
410-67976-5	UPA-SB2(18'-20')	Total/NA	Solid	Moisture	
410-67976-6	UPA-SB3(0'-2')	Total/NA	Solid	Moisture	
410-67976-7	UPA-SB3(16.5'-18.5')	Total/NA	Solid	Moisture	
410-67976-8	UPA-SB4(0'-2')	Total/NA	Solid	Moisture	
410-67976-9	UPA-SB4(18'-20')	Total/NA	Solid	Moisture	
410-67976-10	UPA-SB5(0'-2')	Total/NA	Solid	Moisture	
410-67976-11	UPA-SB5(18'-20')	Total/NA	Solid	Moisture	
410-67976-12	UPA-SB6(0'-2')	Total/NA	Solid	Moisture	
410-67976-13	UPA-SB6(18'-20')	Total/NA	Solid	Moisture	

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB1(0'-2')

Lab Sample ID: 410-67976-1

Matrix: Solid

Date Collected: 12/22/21 10:20
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB1(0'-2')

Lab Sample ID: 410-67976-1

Matrix: Solid

Date Collected: 12/22/21 10:20
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 20:34	I5JH	ELLE

Client Sample ID: UPA-SB1(18'-20')

Lab Sample ID: 410-67976-2

Matrix: Solid

Date Collected: 12/22/21 11:15
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB1(18'-20')

Lab Sample ID: 410-67976-2

Matrix: Solid

Date Collected: 12/22/21 11:15
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE	RE		210311	12/29/21 18:41	QLP7	ELLE
Total/NA	Cleanup	Extract Aliquot	RE		210388	12/30/21 00:40	QLP7	ELLE
Total/NA	Analysis	537 IDA	RE	1	210477	12/31/21 05:41	ZG8V	ELLE
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 20:46	I5JH	ELLE

Client Sample ID: UPA-SB2(0'-2')

Lab Sample ID: 410-67976-3

Matrix: Solid

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB2(0'-2')

Lab Sample ID: 410-67976-3

Matrix: Solid

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209532	12/28/21 07:55	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209692	12/28/21 13:09	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209916	12/29/21 19:31	OLN7	ELLE

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB2(0'-2')-Dup.

Lab Sample ID: 410-67976-4

Matrix: Solid

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB2(0'-2')-Dup.

Lab Sample ID: 410-67976-4

Matrix: Solid

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 20:57	I5JH	ELLE

Client Sample ID: UPA-SB2(18'-20')

Lab Sample ID: 410-67976-5

Matrix: Solid

Date Collected: 12/21/21 15:00
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB2(18'-20')

Lab Sample ID: 410-67976-5

Matrix: Solid

Percent Solids: 76.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 21:08	I5JH	ELLE

Client Sample ID: UPA-SB3(0'-2')

Lab Sample ID: 410-67976-6

Matrix: Solid

Date Collected: 12/21/21 09:45
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB3(0'-2')

Lab Sample ID: 410-67976-6

Matrix: Solid

Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 21:20	I5JH	ELLE

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB3(16.5'-18.5')

Lab Sample ID: 410-67976-7

Matrix: Solid

Date Collected: 12/21/21 10:50
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB3(16.5'-18.5')

Lab Sample ID: 410-67976-7

Matrix: Solid

Date Collected: 12/21/21 10:50
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE	RE		210311	12/29/21 18:41	QLP7	ELLE
Total/NA	Cleanup	Extract Aliquot	RE		210388	12/30/21 00:40	QLP7	ELLE
Total/NA	Analysis	537 IDA	RE	1	210477	12/31/21 06:14	ZG8V	ELLE
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 21:42	I5JH	ELLE

Client Sample ID: UPA-SB4(0'-2')

Lab Sample ID: 410-67976-8

Matrix: Solid

Date Collected: 12/21/21 11:55
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB4(0'-2')

Lab Sample ID: 410-67976-8

Matrix: Solid

Date Collected: 12/21/21 11:55
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 21:54	I5JH	ELLE

Client Sample ID: UPA-SB4(18'-20')

Lab Sample ID: 410-67976-9

Matrix: Solid

Date Collected: 12/21/21 12:50
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB4(18'-20')

Lab Sample ID: 410-67976-9

Matrix: Solid

Date Collected: 12/21/21 12:50
Date Received: 12/22/21 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 22:05	I5JH	ELLE

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB5(0'-2')

Date Collected: 12/21/21 15:40
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB5(0'-2')

Date Collected: 12/21/21 15:40
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-10

Matrix: Solid
Percent Solids: 77.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE	RE		210311	12/29/21 18:41	QLP7	ELLE
Total/NA	Cleanup	Extract Aliquot	RE		210388	12/30/21 00:40	QLP7	ELLE
Total/NA	Analysis	537 IDA	RE	1	210477	12/31/21 06:25	ZG8V	ELLE
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 22:16	I5JH	ELLE

Client Sample ID: UPA-SB5(18'-20')

Date Collected: 12/21/21 16:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-11

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB5(18'-20')

Date Collected: 12/21/21 16:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-11

Matrix: Solid
Percent Solids: 75.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE	RE		210311	12/29/21 18:41	QLP7	ELLE
Total/NA	Cleanup	Extract Aliquot	RE		210388	12/30/21 00:40	QLP7	ELLE
Total/NA	Analysis	537 IDA	RE	1	210477	12/31/21 06:36	ZG8V	ELLE
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 22:28	I5JH	ELLE

Client Sample ID: UPA-SB6(0'-2')

Date Collected: 12/22/21 08:55
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB6(0'-2')

Date Collected: 12/22/21 08:55

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-12

Matrix: Solid

Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 22:39	I5JH	ELLE

Client Sample ID: UPA-SB6(18'-20')

Date Collected: 12/22/21 09:35

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-13

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	208875	12/23/21 10:20	UVJN	ELLE

Client Sample ID: UPA-SB6(18'-20')

Date Collected: 12/22/21 09:35

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-13

Matrix: Solid

Percent Solids: 81.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			209124	12/27/21 08:44	RC3V	ELLE
Total/NA	Cleanup	Extract Aliquot			209293	12/27/21 14:00	RC3V	ELLE
Total/NA	Analysis	537 IDA		1	209318	12/27/21 22:50	I5JH	ELLE

Client Sample ID: Decon. Water

Date Collected: 12/22/21 12:15

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-14

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537 IDA			208963	12/23/21 16:22	ZWK6	ELLE
Total/NA	Analysis	537 IDA		1	209123	12/27/21 11:52	PY4D	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Laboratory: Eurofins Lancaster Laboratories Env, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Pennsylvania	NELAP	36-00037	01-31-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Method	Method Description	Protocol	Laboratory
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
Moisture	Percent Moisture	EPA	ELLE
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
Extract Aliquot	Preparation, Extract Aliquot	None	ELLE
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	ELLE

Protocol References:

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-67976-1	UPA-SB1(0'-2')	Solid	12/22/21 10:20	12/22/21 16:10
410-67976-2	UPA-SB1(18'-20')	Solid	12/22/21 11:15	12/22/21 16:10
410-67976-3	UPA-SB2(0'-2')	Solid	12/21/21 14:10	12/22/21 16:10
410-67976-4	UPA-SB2(0'-2')-Dup.	Solid	12/21/21 14:10	12/22/21 16:10
410-67976-5	UPA-SB2(18'-20')	Solid	12/21/21 15:00	12/22/21 16:10
410-67976-6	UPA-SB3(0'-2')	Solid	12/21/21 09:45	12/22/21 16:10
410-67976-7	UPA-SB3(16.5'-18.5')	Solid	12/21/21 10:50	12/22/21 16:10
410-67976-8	UPA-SB4(0'-2')	Solid	12/21/21 11:55	12/22/21 16:10
410-67976-9	UPA-SB4(18'-20')	Solid	12/21/21 12:50	12/22/21 16:10
410-67976-10	UPA-SB5(0'-2')	Solid	12/21/21 15:40	12/22/21 16:10
410-67976-11	UPA-SB5(18'-20')	Solid	12/21/21 16:35	12/22/21 16:10
410-67976-12	UPA-SB6(0'-2')	Solid	12/22/21 08:55	12/22/21 16:10
410-67976-13	UPA-SB6(18'-20')	Solid	12/22/21 09:35	12/22/21 16:10
410-67976-14	Decon. Water	Water	12/22/21 12:15	12/22/21 16:10

Chain of Custody Record



Chain of Custody Record

Client Information		Sampler <i>Kyle Carlson</i>	Lab PM Williams, Marissa C	Carrier Tracking No(s)	COC No 410-41921-12860.2
Client Contact Michael Edelman		Phone <i>404-682-3049</i>	E-Mail Marissa.Williams@eurofinset.com	State of Origin <i>Pennsylvania</i>	Page Page 2 of 2
Company TRC Solutions, Inc.		PWSID	Analysis Requested		
Address 1801 Market St Suite 1380		Due Date Requested: <i>01/02/21</i>			
City Philadelphia		TAT Requested (days) <i>75 Day TAT</i>			
State, Zip: PA, 19103		Compliance Project: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Phone: 215-563-2122(Tel)		PO # <i>464418</i>			
Email medelman@trccompanies.com		WO #			
Project Name TRC PFAS Soils		Project # 41008940			
Site <i>Penn State Uni. Airport</i>		SSOW#			
Sample Identification		Sample Date <i>12/21/21</i>	Sample Time <i>0855</i>	Sample Type (C=Comp, G=grab) <i>C</i>	Matrix (W=water, S=solid, O=oil, T=tissue, A=air) <i>Solid</i>
		Field Filtered Sample No <i>85</i>	Perform MSM <input checked="" type="checkbox"/>	PFC_IDA - PFOA, PFOS, PFBS and PFHxS <input checked="" type="checkbox"/>	PFC_IDA - (M)PFOA, PFOS, PFBS and PFHxS <input checked="" type="checkbox"/>
		Overall Number of controls			
Special Instructions/Note: <i>12/22/21 - Sample date</i> <i>12/22/21 - Sample date</i> <i>Z-Trizma</i>					
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify) <i>level II</i>					
Empty Kit Relinquished by: <i>Kyle Carlson</i>		Date: <i>12/22/21</i>	Time: <i>16:10</i>	Method of Shipment:	
Relinquished by <i>Kyle Carlson</i>	Date/Time <i>12/22/21</i>	Company <i>TRC</i>	Received by <i>ED E</i>	Date/Time <i>12/22/21</i>	Company
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by	Date/Time	Company	Received by <i>ED E</i>	Date/Time <i>12/22/21</i>	Company <i>ELC</i>
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.: <i>127150</i>			Cooler Temperature(s) °C and Other Remarks: <i>1.0 °C</i>	

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 410-67976-1

Login Number: 67976

List Source: Eurofins Lancaster Laboratories Env, LLC

List Number: 1

Creator: Renner, Melissa

Question	Answer	Comment
The cooler's custody seal is intact.	True	
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 (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	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	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	True	
Sample custody seals are intact.	N/A	

APPENDIX E-1

Analytical Data Summary Report with RE values for isotopic surrogate re-analysis

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB1(0'-2')

Lab Sample ID: 410-67976-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	58		0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.57	J	0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB1(18'-20')

Lab Sample ID: 410-67976-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA) - RE	0.62	J I *5-	0.70	0.23	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB2(0'-2')

Lab Sample ID: 410-67976-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.70		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	40		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.33	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB2(0'-2')-Dup.

Lab Sample ID: 410-67976-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.3		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	80		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.42	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB2(18'-20')

Lab Sample ID: 410-67976-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.66	J	0.78	0.26	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4		0.78	0.26	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB3(0'-2')

Lab Sample ID: 410-67976-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1		0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.49	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.32	J	0.67	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB3(16.5'-18.5')

Lab Sample ID: 410-67976-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA) - RE	1.1	I *5-	0.65	0.22	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB4(0'-2')

Lab Sample ID: 410-67976-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	3.5		0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	68		0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.58	J	0.63	0.21	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB4(18'-20')

Lab Sample ID: 410-67976-9

No Detections.

Client Sample ID: UPA-SB5(0'-2')

Lab Sample ID: 410-67976-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.44	J cn	0.73	0.24	ng/g	1	⊗	537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Detection Summary

Client: TRC Solutions, Inc.

Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB5(0'-2') (Continued)

Lab Sample ID: 410-67976-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	1.2	cn	0.73	0.24	ng/g	1	⊗	537 IDA	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	0.44	J	0.75	0.25	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	1.3		0.75	0.25	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB5(18'-20')

Lab Sample ID: 410-67976-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA) - RE	0.39	J *5-	0.75	0.25	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB6(0'-2')

Lab Sample ID: 410-67976-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.6		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	75		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	0.91		0.69	0.23	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: UPA-SB6(18'-20')

Lab Sample ID: 410-67976-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.36	J	0.74	0.25	ng/g	1	⊗	537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.7		0.74	0.25	ng/g	1	⊗	537 IDA	Total/NA

Client Sample ID: Decon. Water

Lab Sample ID: 410-67976-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	17	J cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	130	cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid (PFOS)	630	cn	20	5.0	ng/L	1		537 IDA	Total/NA
Perfluorooctanoic acid (PFOA)	21	cn	20	5.0	ng/L	1		537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB1(0'-2')

Date Collected: 12/22/21 10:20

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-1

Matrix: Solid

Percent Solids: 83.5

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.47		2.3	0.47	ng/g	⊗	12/27/21 08:44	12/27/21 20:34	1
Perfluorohexanesulfonic acid (PFHxS)	2.4		0.70	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 20:34	1
Perfluorooctanesulfonic acid (PFOS)	58		0.70	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 20:34	1
Perfluorooctanoic acid (PFOA)	0.57	J	0.70	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 20:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	76		23 - 130				12/27/21 08:44	12/27/21 20:34	1
13C8 PFOA	39		21 - 133				12/27/21 08:44	12/27/21 20:34	1
13C8 PFOS	86		31 - 130				12/27/21 08:44	12/27/21 20:34	1
13C3 PFHxS	75		24 - 136				12/27/21 08:44	12/27/21 20:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.5	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB1(18'-20')

Date Collected: 12/22/21 11:15

Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-2

Matrix: Solid

Percent Solids: 79.4

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	⊗	12/27/21 08:44	12/27/21 20:46	1
Perfluorohexanesulfonic acid (PFHxS)	<0.24	cn	0.72	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 20:46	1
Perfluorooctanesulfonic acid (PFOS)	<0.24	cn	0.72	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 20:46	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.72	0.24	ng/g	⊗	12/27/21 08:44	12/27/21 20:46	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	25	cn	23 - 130				12/27/21 08:44	12/27/21 20:46	1
13C8 PFOA	9	*5- cn	21 - 133				12/27/21 08:44	12/27/21 20:46	1
13C8 PFOS	33	cn	31 - 130				12/27/21 08:44	12/27/21 20:46	1
13C3 PFHxS	26	cn	24 - 136				12/27/21 08:44	12/27/21 20:46	1

Method: 537 IDA - EPA 537 Isotope Dilution - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.47		2.3	0.47	ng/g	⊗	12/29/21 18:41	12/31/21 05:41	1
Perfluorohexanesulfonic acid (PFHxS)	<0.23		0.70	0.23	ng/g	⊗	12/29/21 18:41	12/31/21 05:41	1
Perfluorooctanesulfonic acid (PFOS)	<0.23		0.70	0.23	ng/g	⊗	12/29/21 18:41	12/31/21 05:41	1
Perfluorooctanoic acid (PFOA)	0.62	J 1 *5-	0.70	0.23	ng/g	⊗	12/29/21 18:41	12/31/21 05:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	34		23 - 130				12/29/21 18:41	12/31/21 05:41	1
13C8 PFOA	12	*5-	21 - 133				12/29/21 18:41	12/31/21 05:41	1
13C8 PFOS	38		31 - 130				12/29/21 18:41	12/31/21 05:41	1
13C3 PFHxS	36		24 - 136				12/29/21 18:41	12/31/21 05:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.6	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB2(0'-2')

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-3

Matrix: Solid
Percent Solids: 84.7

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	⊗	12/28/21 07:55	12/29/21 19:31	1
Perfluorohexanesulfonic acid (PFHxS)	0.70		0.67	0.22	ng/g	⊗	12/28/21 07:55	12/29/21 19:31	1
Perfluorooctanesulfonic acid (PFOS)	40		0.67	0.22	ng/g	⊗	12/28/21 07:55	12/29/21 19:31	1
Perfluorooctanoic acid (PFOA)	0.33	J	0.67	0.22	ng/g	⊗	12/28/21 07:55	12/29/21 19:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	83		23 - 130				12/28/21 07:55	12/29/21 19:31	1
13C8 PFOA	58		21 - 133				12/28/21 07:55	12/29/21 19:31	1
13C8 PFOS	87		31 - 130				12/28/21 07:55	12/29/21 19:31	1
13C3 PFHxS	85		24 - 136				12/28/21 07:55	12/29/21 19:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.3	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB2(0'-2')-Dup.

Date Collected: 12/21/21 14:10
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-4

Matrix: Solid
Percent Solids: 87.4

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorohexanesulfonic acid (PFHxS)	1.3		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorooctanesulfonic acid (PFOS)	80		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Perfluorooctanoic acid (PFOA)	0.42	J	0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 20:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130				12/27/21 08:44	12/27/21 20:57	1
13C8 PFOA	68		21 - 133				12/27/21 08:44	12/27/21 20:57	1
13C8 PFOS	90		31 - 130				12/27/21 08:44	12/27/21 20:57	1
13C3 PFHxS	91		24 - 136				12/27/21 08:44	12/27/21 20:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.6	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB2(18'-20')

Date Collected: 12/21/21 15:00
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-5

Matrix: Solid
Percent Solids: 76.8

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.52		2.6	0.52	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorohexanesulfonic acid (PFHxS)	0.66	J	0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorooctanesulfonic acid (PFOS)	1.4		0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Perfluorooctanoic acid (PFOA)	<0.26		0.78	0.26	ng/g	⊗	12/27/21 08:44	12/27/21 21:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130				12/27/21 08:44	12/27/21 21:08	1

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB2(18'-20')

Date Collected: 12/21/21 15:00
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-5

Matrix: Solid

Percent Solids: 76.8

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	49		21 - 133	12/27/21 08:44	12/27/21 21:08	1
13C8 PFOS	91		31 - 130	12/27/21 08:44	12/27/21 21:08	1
13C3 PFHxS	82		24 - 136	12/27/21 08:44	12/27/21 21:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	23.2	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB3(0'-2')

Date Collected: 12/21/21 09:45
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-6

Matrix: Solid

Percent Solids: 85.1

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.45		2.2	0.45	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluorohexanesulfonic acid (PFHxS)	1.1		0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluoroctanesulfonic acid (PFOS)	0.49	J	0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Perfluorooctanoic acid (PFOA)	0.32	J	0.67	0.22	ng/g	⊗	12/27/21 08:44	12/27/21 21:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	91		23 - 130				12/27/21 08:44	12/27/21 21:20	1
13C8 PFOA	81		21 - 133				12/27/21 08:44	12/27/21 21:20	1
13C8 PFOS	104		31 - 130				12/27/21 08:44	12/27/21 21:20	1
13C3 PFHxS	95		24 - 136				12/27/21 08:44	12/27/21 21:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.9	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB3(16.5'-18.5')

Date Collected: 12/21/21 10:50
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-7

Matrix: Solid

Percent Solids: 91.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.42	*5- cn	2.1	0.42	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluorohexanesulfonic acid (PFHxS)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluoroctanesulfonic acid (PFOS)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Perfluorooctanoic acid (PFOA)	<0.21	*5- cn	0.63	0.21	ng/g	⊗	12/27/21 08:44	12/27/21 21:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	19	*5- cn	23 - 130				12/27/21 08:44	12/27/21 21:42	1
13C8 PFOA	6	*5- cn	21 - 133				12/27/21 08:44	12/27/21 21:42	1
13C8 PFOS	23	*5- cn	31 - 130				12/27/21 08:44	12/27/21 21:42	1
13C3 PFHxS	21	*5- cn	24 - 136				12/27/21 08:44	12/27/21 21:42	1

Method: 537 IDA - EPA 537 Isotope Dilution - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.44		2.2	0.44	ng/g	⊗	12/29/21 18:41	12/31/21 06:14	1
Perfluorohexanesulfonic acid (PFHxS)	<0.22		0.65	0.22	ng/g	⊗	12/29/21 18:41	12/31/21 06:14	1
Perfluoroctanesulfonic acid (PFOS)	<0.22	*5-	0.65	0.22	ng/g	⊗	12/29/21 18:41	12/31/21 06:14	1

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB3(16.5'-18.5')

Date Collected: 12/21/21 10:50
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-7

Matrix: Solid

Percent Solids: 91.0

Method: 537 IDA - EPA 537 Isotope Dilution - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.1	I *5-	0.65	0.22	ng/g	⌚	12/29/21 18:41	12/31/21 06:14	1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	23		23 - 130			⌚	12/29/21 18:41	12/31/21 06:14	1
13C8 PFOA	7	*5-	21 - 133			⌚	12/29/21 18:41	12/31/21 06:14	1
13C8 PFOS	25	*5-	31 - 130			⌚	12/29/21 18:41	12/31/21 06:14	1
13C3 PFHxS	24		24 - 136			⌚	12/29/21 18:41	12/31/21 06:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.0	!		1.0	1.0 %			12/23/21 10:20	1

Client Sample ID: UPA-SB4(0'-2')

Date Collected: 12/21/21 11:55
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-8

Matrix: Solid

Percent Solids: 86.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.42		2.1	0.42	ng/g	⌚	12/27/21 08:44	12/27/21 21:54	1
Perfluorohexanesulfonic acid (PFHxS)	3.5		0.63	0.21	ng/g	⌚	12/27/21 08:44	12/27/21 21:54	1
Perfluorooctanesulfonic acid (PFOS)	68		0.63	0.21	ng/g	⌚	12/27/21 08:44	12/27/21 21:54	1
Perfluorooctanoic acid (PFOA)	0.58	J	0.63	0.21	ng/g	⌚	12/27/21 08:44	12/27/21 21:54	1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	80		23 - 130			⌚	12/27/21 08:44	12/27/21 21:54	1
13C8 PFOA	69		21 - 133			⌚	12/27/21 08:44	12/27/21 21:54	1
13C8 PFOS	89		31 - 130			⌚	12/27/21 08:44	12/27/21 21:54	1
13C3 PFHxS	84		24 - 136			⌚	12/27/21 08:44	12/27/21 21:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.0	!		1.0	1.0 %			12/23/21 10:20	1

Client Sample ID: UPA-SB4(18'-20')

Date Collected: 12/21/21 12:50
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-9

Matrix: Solid

Percent Solids: 73.3

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.51		2.5	0.51	ng/g	⌚	12/27/21 08:44	12/27/21 22:05	1
Perfluorohexanesulfonic acid (PFHxS)	<0.25		0.76	0.25	ng/g	⌚	12/27/21 08:44	12/27/21 22:05	1
Perfluorooctanesulfonic acid (PFOS)	<0.25		0.76	0.25	ng/g	⌚	12/27/21 08:44	12/27/21 22:05	1
Perfluorooctanoic acid (PFOA)	<0.25		0.76	0.25	ng/g	⌚	12/27/21 08:44	12/27/21 22:05	1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	43		23 - 130			⌚	12/27/21 08:44	12/27/21 22:05	1
13C8 PFOA	21		21 - 133			⌚	12/27/21 08:44	12/27/21 22:05	1
13C8 PFOS	54		31 - 130			⌚	12/27/21 08:44	12/27/21 22:05	1
13C3 PFHxS	45		24 - 136			⌚	12/27/21 08:44	12/27/21 22:05	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB4(18'-20')

Date Collected: 12/21/21 12:50
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-9

Matrix: Solid

Percent Solids: 73.3

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	26.7	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB5(0'-2')

Date Collected: 12/21/21 15:40
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-10

Matrix: Solid

Percent Solids: 77.8

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	✉	12/27/21 08:44	12/27/21 22:16	1
Perfluorohexanesulfonic acid (PFHxS)	0.44	J cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:16	1
Perfluorooctanesulfonic acid (PFOS)	1.2	cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:16	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	36	cn	23 - 130				12/27/21 08:44	12/27/21 22:16	1
13C8 PFOA	15	*5- cn	21 - 133				12/27/21 08:44	12/27/21 22:16	1
13C8 PFOS	46	cn	31 - 130				12/27/21 08:44	12/27/21 22:16	1
13C3 PFHxS	38	cn	24 - 136				12/27/21 08:44	12/27/21 22:16	1

Method: 537 IDA - EPA 537 Isotope Dilution - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.50		2.5	0.50	ng/g	✉	12/29/21 18:41	12/31/21 06:25	1
Perfluorohexanesulfonic acid (PFHxS)	0.44	J	0.75	0.25	ng/g	✉	12/29/21 18:41	12/31/21 06:25	1
Perfluorooctanesulfonic acid (PFOS)	1.3		0.75	0.25	ng/g	✉	12/29/21 18:41	12/31/21 06:25	1
Perfluorooctanoic acid (PFOA)	<0.25		0.75	0.25	ng/g	✉	12/29/21 18:41	12/31/21 06:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	49		23 - 130				12/29/21 18:41	12/31/21 06:25	1
13C8 PFOA	22		21 - 133				12/29/21 18:41	12/31/21 06:25	1
13C8 PFOS	56		31 - 130				12/29/21 18:41	12/31/21 06:25	1
13C3 PFHxS	51		24 - 136				12/29/21 18:41	12/31/21 06:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	22.2	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB5(18'-20')

Date Collected: 12/21/21 16:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-11

Matrix: Solid

Percent Solids: 75.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.48	cn	2.4	0.48	ng/g	✉	12/27/21 08:44	12/27/21 22:28	1
Perfluorohexanesulfonic acid (PFHxS)	<0.24	cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:28	1
Perfluorooctanesulfonic acid (PFOS)	<0.24	cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:28	1
Perfluorooctanoic acid (PFOA)	<0.24	*5- cn	0.73	0.24	ng/g	✉	12/27/21 08:44	12/27/21 22:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	26	cn	23 - 130				12/27/21 08:44	12/27/21 22:28	1
13C8 PFOA	10	*5- cn	21 - 133				12/27/21 08:44	12/27/21 22:28	1

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB5(18'-20')

Date Collected: 12/21/21 16:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-11

Matrix: Solid

Percent Solids: 75.0

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOS	34	cn	31 - 130	12/27/21 08:44	12/27/21 22:28	1
13C3 PFHxS	28	cn	24 - 136	12/27/21 08:44	12/27/21 22:28	1

Method: 537 IDA - EPA 537 Isotope Dilution - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.50		2.5	0.50	ng/g	⊗	12/29/21 18:41	12/31/21 06:36	1
Perfluorohexanesulfonic acid (PFHxS)	<0.25		0.75	0.25	ng/g	⊗	12/29/21 18:41	12/31/21 06:36	1
Perfluorooctanesulfonic acid (PFOS)	<0.25		0.75	0.25	ng/g	⊗	12/29/21 18:41	12/31/21 06:36	1
Perfluorooctanoic acid (PFOA)	0.39	J *5-	0.75	0.25	ng/g	⊗	12/29/21 18:41	12/31/21 06:36	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	32		23 - 130	12/29/21 18:41	12/31/21 06:36	1
13C8 PFOA	12	*5-	21 - 133	12/29/21 18:41	12/31/21 06:36	1
13C8 PFOS	39		31 - 130	12/29/21 18:41	12/31/21 06:36	1
13C3 PFHxS	34		24 - 136	12/29/21 18:41	12/31/21 06:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.0	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB6(0'-2')

Date Collected: 12/22/21 08:55
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-12

Matrix: Solid

Percent Solids: 80.6

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.46		2.3	0.46	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorohexanesulfonic acid (PFHxS)	1.6		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorooctanesulfonic acid (PFOS)	75		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1
Perfluorooctanoic acid (PFOA)	0.91		0.69	0.23	ng/g	⊗	12/27/21 08:44	12/27/21 22:39	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFBS	98		23 - 130	12/27/21 08:44	12/27/21 22:39	1
13C8 PFOA	88		21 - 133	12/27/21 08:44	12/27/21 22:39	1
13C8 PFOS	103		31 - 130	12/27/21 08:44	12/27/21 22:39	1
13C3 PFHxS	97		24 - 136	12/27/21 08:44	12/27/21 22:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.4	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: UPA-SB6(18'-20')

Date Collected: 12/22/21 09:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-13

Matrix: Solid

Percent Solids: 81.0

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	<0.49		2.5	0.49	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
Perfluorohexanesulfonic acid (PFHxS)	0.36	J	0.74	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1
Perfluorooctanesulfonic acid (PFOS)	9.7		0.74	0.25	ng/g	⊗	12/27/21 08:44	12/27/21 22:50	1

Eurofins Lancaster Laboratories Env, LLC

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Penn State Uni Airport

Job ID: 410-67976-1

Client Sample ID: UPA-SB6(18'-20')

Date Collected: 12/22/21 09:35
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-13

Matrix: Solid

Percent Solids: 81.0

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	<0.25		0.74	0.25	ng/g	12/27/21 08:44	12/27/21 22:50		1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	84		23 - 130			12/27/21 08:44	12/27/21 22:50		1
13C8 PFOA	75		21 - 133			12/27/21 08:44	12/27/21 22:50		1
13C8 PFOS	100		31 - 130			12/27/21 08:44	12/27/21 22:50		1
13C3 PFHxS	93		24 - 136			12/27/21 08:44	12/27/21 22:50		1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.0	!	1.0	1.0	%			12/23/21 10:20	1

Client Sample ID: Decon. Water

Date Collected: 12/22/21 12:15
Date Received: 12/22/21 16:10

Lab Sample ID: 410-67976-14

Matrix: Water

Method: 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	17	J cn	20	5.0	ng/L	12/23/21 16:22	12/27/21 11:52		1
Perfluorohexanesulfonic acid (PFHxS)	130	cn	20	5.0	ng/L	12/23/21 16:22	12/27/21 11:52		1
Perfluorooctanesulfonic acid (PFOS)	630	cn	20	5.0	ng/L	12/23/21 16:22	12/27/21 11:52		1
Perfluorooctanoic acid (PFOA)	21	cn	20	5.0	ng/L	12/23/21 16:22	12/27/21 11:52		1
Isotope Dilution									
	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C3 PFBS	94	cn	19 - 178			12/23/21 16:22	12/27/21 11:52		1
13C8 PFOA	80	cn	49 - 127			12/23/21 16:22	12/27/21 11:52		1
13C8 PFOS	82	cn	49 - 126			12/23/21 16:22	12/27/21 11:52		1
13C3 PFHxS	67	cn	32 - 145			12/23/21 16:22	12/27/21 11:52		1

APPENDIX F

Analytical Data Report (CD)