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Summary Report

November 2017 to April 2018 Private Well Sampling

FAIRBANKS, ALASKA

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 2018

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November 2017 to April 2018 Private Well Sampling
Fairbanks, Alaska

Summary Report

Shannon & Wilson participated in this project as a consultant to the Fairbanks International Airport (FAI). Our services were authorized under Contract Award Number 2518311, issued by the Alaska Department of Transportation & Public Facilities (ADOT&PF) Northern Region Procurement Office to Shannon & Wilson on November 3, 2017. Contract amendment 2518311-1 was issued on February 16, 2018, amendment 2518311-2 was issued on March 15, 2018. A draft version of this Private Well Sampling Summary Report was submitted to the FAI on June 22, 2018.

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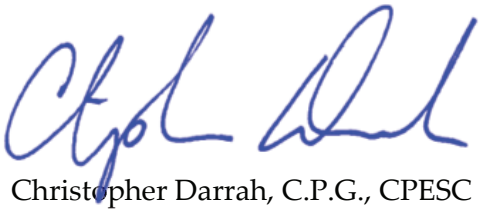

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ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation & Public Facilities
AFFF	aqueous film-forming foam
ARFF	Aircraft Rescue and Fire Fighting
°C	degrees Celsius
cfs	cubic feet per second
COC	chain of custody
CUC	College Utilities Corporation
DGGS	Alaska Division of Geological & Geophysical Surveys
DHSS	Alaska Department of Health and Social Services
DNR	Alaska Department of Natural Resources
EPA	U.S. Environmental Protection Agency
FAI	Fairbanks International Airport
FNSB	Fairbanks North Star Borough
LHA	Lifetime Health Advisory
ng/L	nanograms per liter
PFAS	per- and polyfluoroalkyl substance
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perflurohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFNA	perfluorononanoic acid
ppt	parts per trillion
QA	quality assurance
QC	quality control
TCE	trichloroethylene
TestAmerica	TestAmerica Laboratories, Inc.
UCMR	Unregulated Contaminant Monitoring Rule
USGS	U.S. Geological Survey
WELTS	Well Log Tracking System
WO	work order
YSI	multiprobe water quality meter

1 INTRODUCTION

Shannon & Wilson, Inc. has prepared this report to document our well-search and private well-sampling effort proximal to the Fairbanks International Airport (FAI) in Fairbanks, Alaska. This report covers November 2017 to April 2018 in this ongoing project. The FAI is an active, Alaska Department of Environmental Conservation (ADEC) listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFASs) in groundwater and surface water (File Number 100.38.277, Hazard ID 26816).

This report was prepared for the FAI in accordance with the terms and conditions of our contract with the Alaska Department of Transportation & Public Facilities (ADOT&PF), relevant ADEC guidance documents, and 18 Alaska Administrative Code (AAC) 75.335.

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the potential for human exposure to PFAS-containing water in private water-supply wells. Our objectives were to:

- identify private water-supply wells in neighborhoods near the FAI,
- sample private wells connected to indoor plumbing in these areas, and
- resample private wells meeting the quarterly sampling criteria, primarily in February 2018.

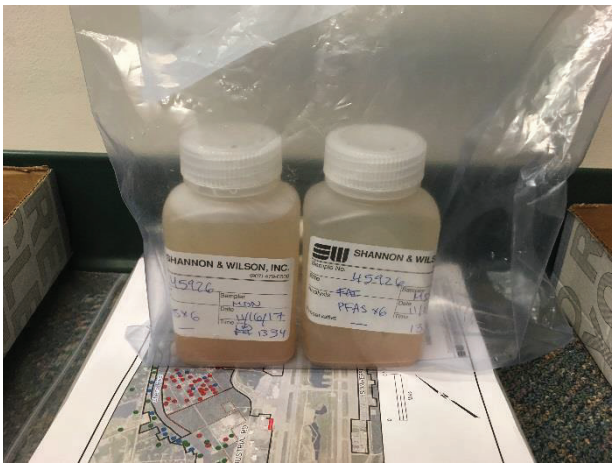

Exhibit 1-1: Photograph of PFAS Water Samples

Areas 1 through 8 are shown in Figure 1, Well Search Extent.

1.2 Background

The FAI terminal is located at 6450 Airport Way in Fairbanks, Alaska. The FAI owns multiple adjacent parcels within Sections 13, 23, 24, 25, and 26 of Township 1 South, Range 2 West, and Sections 17, 18, 19, 20, and 30 of Township 1 South, Range 1 West, Fairbanks Meridian. Figure 2, Seasonal Groundwater Contours, includes FAI property boundaries. The geographic coordinates of the primary FAI runway, 2L-20R, are latitude 64.816034, longitude -147.861289.

The FAI Aircraft Rescue and Firefighting (ARFF) program used aqueous film-forming foam (AFFF) for training, systems testing, and emergency response at the FAI for many years. The existing combustible-liquids pit, or burn pit, was constructed in 1993. Prior to 1993, training with AFFF was conducted at what is now the southwest end of the small aircraft runway and near the Airport Response Center building (Figure 1). The precise timeline of AFFF use at the FAI is unknown.

AFFF contains PFASs, a category of persistent organic compounds considered emerging contaminants. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two PFASs commonly found at sites where AFFFs were used. The U.S. Environmental Protection Agency (EPA) published a Lifetime Health Advisory (LHA) level for PFOS and PFOA in drinking water in May 2016. The ADEC Contaminated Sites Program published groundwater-cleanup levels for two PFASs in November 2016. Prior to the publication of these levels, there were no state-level cleanup levels established for PFASs. The action levels for PFAS are summarized in Section 1.4, Contaminants of Concern and Regulatory Levels. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies.

In May 2017, the FAI requested their consultant collect PFOS and PFOA samples near and within the Don Bennett shooting range, located on the southern portion of FAI property adjacent to the ARFF burn pit and training area. In August, the consultant advanced four temporary well points, one to the west of the shooting range and three within the shooting range berm. The consultant encountered PFOS above the ADEC groundwater-cleanup level in the sample collected near the northeast corner of the Don Bennett shooting range (Figure 1), approximately 500 feet southeast of the edge of the ARFF burn pit.

In August of 2017, the FAI requested their consultants conduct additional PFAS testing on FAI property. In September 2017, the consultant collected PFOS and PFOA samples from six groundwater monitoring wells and five surface-water bodies on FAI property. PFOS or PFOA were encountered above their respective groundwater-cleanup levels in two monitoring wells and one surface-water sample. The monitoring wells with exceedances are located approximately 500 feet northwest and 1,000 feet west of the ARFF building, respectively. The maximum PFOS concentration encountered was 18,000 parts per trillion (ppt; equivalent to nanograms per liter [ng/L]), and the maximum PFOA concentration was 850 ppt. The surface-water body whose sample result exceeded the groundwater-cleanup level is located southeast of the primary runway and approximately 900 feet north of the edge of the existing burn pit (Figure 1).

The FAI received the onsite PFOS and PFOA results on October 27, 2017. On November 3, 2017, we were contracted to begin the private-well search and sampling effort described herein.

1.3 Geology and Hydrology

The FAI sampling area lies at the northern edge of the Tanana Lowlands physiographic province that forms a large, arcuate band of alluvial sediments between the Alaska Range and the Yukon-Tanana Uplands. The Lowlands consist of vegetated floodplains and low benches cut by the Tanana River, and sloughs and oxbow lakes at former channel positions of the Tanana or Chena Rivers. The floodplain generally slopes to the west or northwest by approximately five feet per mile (Nelson, 1978).

The sampling area lies within the Lowlands, up to four miles northeast of the confluence of the Tanana and Chena Rivers. This area is underlain by interbedded alluvial sand and gravel, covered in some locations by silty, organic-rich overbank deposits. These alluvial deposits can be up to several hundred feet in thickness. They are typically unconsolidated or loosely consolidated, and loose to medium dense. The alluvium overlays schist bedrock, often mica or garnet-mica schist. Low bedrock hills flank the sampling area, most notably Chena Ridge to the west and University Hill to the north.

The Tanana River is a large, braided river with a summertime mean monthly discharge of approximately 10,000 to 60,000 cubic feet per second (cfs) since 2000 at a gauge station south of the FAI. The Chena River is a tributary, flowing west and southwest through the FAI sampling area to the Tanana River via wide meanders. The summertime mean monthly discharge of the Chena River is more variable from year to year, ranging from approximately 500 to 4,000 cfs at a downtown Fairbanks gauge station. Both rivers exhibit wide seasonal variation between summer and winter; peak monthly discharge is commonly ten times the wintertime minimum (USGS, 2018).

The aquifer underlying the Lowlands is unconfined. Based on our experience and knowledge of hydrogeology in the Fairbanks area, the horizontal regional gradient in this area is relatively flat, typically averaging two to four feet per mile. Depth to groundwater ranges from 5 feet to 12 feet below ground surface, depending on local topography. Seasonal fluctuation in groundwater levels can range from 0.2 to 9 feet (Glass et. al., 1996). According to a review of existing hydraulic conductivity literature for the Tanana Valley aquifer conducted in 2012, the geometric mean of groundwater velocity for the Fairbanks and Fort Wainwright area is 1.5 feet per day (Geomega Inc., 2012). Hydraulic conductivity can vary by several orders of magnitude over short distances, depending on the type of alluvium and presence of permafrost.

The Fairbanks area is in a subarctic zone underlain by discontinuous permafrost. Permafrost can be encountered near the ground surface and extend for 200 feet or more. Where present, permafrost impedes groundwater movement and can produce a slower, more viscous flow by lowering the temperature of nearby groundwater. A 2011 study of groundwater flow within an approximately one-half-mile-long trichloroethylene (TCE) plume found small-scale (i.e., less than 1,000-foot) resolution groundwater flow near permafrost could differ greatly from regional flow direction. The TCE study area was near the intersection of Peger and Davis Roads in southwest Fairbanks. The study documented channeling and redirection of the TCE plume around permafrost, including an upward vertical gradient in some locations (Carlson and Barnes, 2011).

A 1996 U.S. Geologic Survey (USGS) study measured groundwater elevations in 120 wells in the alluvial plain between the Tanana and Chena Rivers periodically between 1986 and 1988. The authors used this information to produce two-foot water table elevation contours for March to April, July, and October. They found groundwater is generally highest following springtime river ice breakup and lowest in the late summer and fall. Although groundwater and surface water are controlled by the same regional factors, water levels and flow directions commonly vary independently of one another. Figure 2, Seasonal Groundwater Contours, depicts the summer and fall contours (Glass et. al., 1996). We have extended these contours to include areas outside the original USGS study area.

The USGS found groundwater-flow direction fluctuates seasonally and is dependent on the relative levels of the Tanana and Chena Rivers. For much of the year groundwater is recharged by the Tanana River and drained by the Chena River, causing a northwesterly groundwater flow between the two (i.e., Areas 1 through 4, Area 8). Depending on snow melt in the upper Tanana River watershed and other seasonal factors, groundwater may be recharged by both rivers, causing a westerly flow in this area in the late summer and fall (Glass et. al., 1996).

Some USGS groundwater contours curve sharply near the Chena River, indicating groundwater flows towards the river meander zone on the Chena Pump Road side of the river (i.e., Areas 5 through 7, Figure 1). Surface water runoff from Chena Ridge, an area of shallow bedrock, may be a contributing factor. However, limited information is available for the western side of the Chena River and immediately adjacent to its confluence with the Tanana River (i.e., Area 6, Figure 1).

1.4 Contaminants of Concern and Action Levels

During the time period summarized in this report, the primary contaminants of concern were PFOS and PFOA. The ADEC groundwater-cleanup levels for PFOS and PFOA were

promulgated on November 6, 2016. The cleanup level is 400 ppt for PFOS or PFOA. The EPA LHA level for drinking water is 70 ppt for PFOS, PFOA, or the sum of the two. Following ADEC guidance, we consider combined concentrations greater than or equal to 65 ppt to be exceedances of the LHA level. The EPA LHA was the action level for this project during the time period discussed herein.

On August 20, 2018, ADEC published a Technical Memorandum describing a more stringent action level for PFAS in drinking water. The ADEC action level is 70 ppt for the sum of five compounds: PFOS, PFOA, perfluoroheptanoic acid (PFHpA), perflurohexanesulfonic acid (PFHxS), and perfluorononanoic acid (PFNA). The action level for perfluorobutanesulfonic acid (PFBS) in drinking water is 2,000 ppt. Future private well sample results for this project will be compared to the effective ADEC action level of 65 ppt for the sum of these five compounds.

Exhibit 1-2: Applicable Regulatory and Action Levels

Agency	Media	Compound	Level
EPA	Drinking water	PFOS + PFOA	70 ppt
ADEC Contaminated Sites Program	Groundwater	PFOS	400 ppt[1]
ADEC Contaminated Sites Program	Groundwater	PFOA	400 ppt[1]
ADEC Contaminated Sites Program	Drinking water	PFOS + PFOA + PFHpA + PFHxS + PFNA	70 ppt[2]
ADEC Contaminated Sites Program	Drinking water	PFBS	2,000 ppt[2]

Notes:

1 ADEC groundwater-cleanup level is reported in micrograms per liter (ug/L) in Table C in 18 AAC 75.345, Table C.

2 Action levels are reported in ug/L in ADEC Technical Memorandum.

1.5 Scope of Services

Our scope of services summarized in this report includes private well search and sampling efforts in eight geographic search areas (Figure 1, Well Search Extent). Our purpose was to evaluate the potential for human exposure to PFAS-containing water in private wells. The objective was to identify private wells in the sampling area, first by targeting properties reportedly not connected to the College Utilities Corporation (CUC) water system. These properties were more likely to have wells connected to indoor plumbing. Please note this project is ongoing; future work is summarized in Section 4.4.

This report summarizes well search and sampling efforts performed between November 2017 and April 2018. Our well search sought to identify private wells, well use, and well details if available. The initial well search included Areas 1 through 4 (Figure 1). In November and December 2017, we expanded our well search and sample area to include

Area 5, followed by Areas 6 through 8 (Figure 1). This report also describes the first quarterly sampling event of select private wells, conducted in February and March 2018. No private well sampling was performed in April 2018.

This report was prepared for the exclusive use of the FAI and its representatives. This work presents our professional judgment as to the conditions of the site. Information presented here is based on the sampling and analyses we performed. This report should not be used for other purposes without our approval or if any of the following occurs:

- Project details change, or new information becomes available, such as revised regulatory levels or the discovery of additional source areas.
- Conditions change due to natural forces or human activity at, under, or adjacent to the project site.
- Assumptions stated in this report have changed.
- If the site ownership or land use has changed.
- Regulations, laws, or cleanup levels change.
- If the site's regulatory status has changed.

If any of these occur, we should be retained to review the applicability of our recommendations. This report should not be used for other purposes without Shannon & Wilson's review. If a service is not specifically indicated in this report, do not assume it was performed.

2 FIELD ACTIVITIES

This section summarizes activities performed between November 8, 2017 and April 30, 2018. Table 1, Project Timeline, includes dates for the following tasks.

2.1 Well Search

On November 8, 2017, we began coordinating with property owners and occupants in Areas 1 through 4 by phone (Figure 1, Well Search Extent). The private well search began by obtaining a list of parcels and the owners of these properties from the Fairbanks North Star Borough (FNSB) property database. We also referenced the Alaska Department of Natural Resources (DNR) Well Log Tracking System (WELTS) and subsurface water rights files listed on the DNR Water Estate Map.

On behalf of the FAI, we prepared and mailed 239 advisory letters to the FNSB-listed mailing addresses for developed properties in Areas 1 through 4. Developed properties

were defined as those where the FNSB property improvement value is greater than zero. Duplicate addresses, the FAI, and some FAI-tenant addresses were excluded. The U.S. Postal Service returned some letters as undeliverable. The FAI leasing department prepared and mailed a similar letter to FAI tenants.

These letters served as a notification of our private well search and sampling efforts, and included a letter from the FAI, copy of our initial well search extent map, two-page fact sheet published by the Agency for Toxic Substances and Disease Registry (ATSDR), Private Well Inventory Survey Form, and pre-stamped return envelope to Shannon & Wilson. Copies of these items are provided in Appendix A, Public Correspondence.

Prior to contracting our services, the FAI coordinated with CUC to develop a list of properties that may not be connected to the CUC water system. These properties were identified on maps provided to Shannon & Wilson as a screening tool. We verified this information by obtaining per-parcel utility connection records from Fairbanks Sewer and Water, the parent company of CUC.

The door-to-door well search in Area 1 through 4 targeted developed properties reportedly not connected to the CUC water system. We also visited some parcels considered undeveloped per FNSB records to confirm they were vacant. We made a reasonable attempt to contact each owner or occupant in the search areas. If occupants were not present at the time we visit the property, we left a personalized door tag. Where we were unable to make contact in person, we used public telephone and business records, made multiple visits to the property, and/or asked neighbors. Other than by advisory letter, we did not attempt to contact the owners and occupants of properties reportedly connected to the CUC water system.

For the purposes of this project, a private well is defined as a privately-owned water-supply well. Please note this definition of private well does not match the ADEC Drinking Water Program regularity classification of a private water system, “a potable water system serving one single-family residence or duplex” (18 AAC 80, 2014).

We completed a Private Well Inventory Survey Form for each identified private well. A copy of each completed Survey Form is included in Appendix B, Field Notes. We used this information to designate a well category based on use.

- Category 1: wells used for drinking or cooking, as reported by owners or occupants.
- Category 2: wells used for dish washing and other domestic purposes. Homes or businesses where the occupants report they do not drink the water, but where the wells lead to kitchen or bathroom faucets, are considered possible future drinking-water wells.

- Category 3: wells used for vegetable gardening and are not plumbed to indoor faucets or spigots. The well water is not accessed by outdoor plumbing, but the well may be located underneath or inside the structure. These wells are considered non-drinking-water wells.
- Category 4: wells used for outdoor purposes only, such as irrigation or vehicle washing. These wells are considered non-drinking-water wells.
- Category 5: wells currently not in use. Wells that have been abandoned in place, are inoperable, disconnected, or intended for future use, are considered category 5 wells. These wells are considered non-drinking-water-wells.

We requested to sample each category 1 and 2 well identified by our well search. Category 3 and 4 wells are typically inoperable in the wintertime. During sampling we provided additional education materials, including a list of project contacts and five-page drinking water advisory level fact sheet published by the EPA, and Private Well Inventory Survey Form (Appendix A). Properties with removed or decommissioned wells are not considered to have a well. Exceptions are noted in Section 2.8, Deviations.

In coordination with the FAI and ADEC, we expanded the well search and sampling area to include Areas 5 through 8 in November and December 2017. Areas 5, 6, and 7 are located on the Chena Pump Road side of the Chena River. Area 8 is located on the FAI side of the Chena River north of Areas 1 through 3 (Figure 1). We prepared and mailed modified advisory letters to developed properties in the new areas (Appendix A). We visited each parcel in Areas 5 and 6 because the CUC water system does not extend to these areas. Our well search methods were the same, but in Areas 6 through 8 our goal was to sample a subset of identified category 1 and 2 wells to identify whether these areas were impacted.

The results of our November 2017 to April 2018 well search are summarized below. We were unable to contact all the owners and occupants in Areas 1 through 8 during the initial well search. Parcels classified as “unknown – probable well” are those we were unable to reach as part of the initial well search described herein. Some of these parcels appeared unoccupied or abandoned, some were contacted multiple times and are considered passive refusals. Parcels classified as “unknown - possible well” and “unknown - improbable well” will be included in our future well search efforts.

Exhibit 2-1: Well Summary by Parcel

Well present	239
Unknown – probable well	17
Unknown – possible well	97
Unknown – improbable well	157
No well	327
Agency	**837**

2.2 Private Well Sampling

We conducted multiple private-well sampling events between November 10, 2017 and March 20, 2018. Although we began the well search prior to our sampling effort, we collected the first private well samples on November 10. We did not collect any private well samples in April 2018. The following Shannon & Wilson personnel collected analytical water samples for this project. These individuals are State of Alaska Qualified Samplers per 18 AAC 75.333[b] and 18 AAC 78.088[b].

- Amber Masters, Environmental Scientist
- Marcy Nadel, Geologist
- Sheila Hinckley, Environmental Scientist
- Craig Beebe, Geologist
- Morgan Ripp, Environmental Scientist
- Dana Fjare, Environmental Scientist
- Christian Canfield, Environmental Engineer

We collected private-well samples from a location in the plumbing upstream of water-treatment systems or water softeners, where possible. Samples collected downstream of water softeners or other in-home treatment systems are listed in Section 2.8, Deviations. For the purposes of this project we do not consider small (i.e., less than 18 inches in height) particulate filters to be treatment systems.

We purged the systems prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. We measured these parameters using a multiprobe water quality meter (YSI) and recorded pH, temperature, and conductivity approximately once every three minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings: ±0.1 pH, ±0.5 degrees Celsius (°C) temperature, and ±3 percent conductivity.

We discharged purge water to an indoor sink or to the ground surface. In some cases, indoor plumbing leads to the municipal sewer system; in other cases, it leads to a private septic system. Following parameter stabilization, we collected PFAS water samples using laboratory-supplied containers. Copies of the original Private Well Sampling Logs are included in Appendix B, Field Notes.

Exhibit 2-2: Photographs of Private Well Purge and Sample Locations

We are aware of the potential for cross-contamination of PFAS water samples from numerous everyday household items. We took appropriate precautions to prevent cross-contamination, including discontinuing the use of personal protective equipment and field supplies known to contain PFASs, using liner bags, hand washing, and donning a fresh pair of disposable nitrile gloves before sample collection.

2.3 Sample Custody, Storage, and Transport

Immediately after collection, the sample jars for each location were placed in Ziploc bags and stored in a designated sample cooler maintained between 0 °C and 6 °C with ice substitute separated from the sample jars by a liner bag. Shannon & Wilson maintained custody of the samples until submitting them to the laboratory for analysis. For shipping we packaged analytical samples and chain-of-custody (COC) forms in a hard-plastic cooler with an adequate quantity of frozen-ice substitute and packing material as necessary to prevent bottle breakage. We applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

We shipped sample coolers to TestAmerica Laboratories, Inc. (TestAmerica) in West Sacramento, California using Alaska Air Cargo priority overnight service, also known as

Goldstreak. Beginning November 13, 2017, private well samples were submitted to the analytical laboratory twice per week. In mid-December we began submitting samples less frequently, depending on the pace of our well search and sampling efforts. This allowed sufficient time for the laboratory to analyze the samples within holding-time requirements of the analytical method. We requested an expedited, five-business-day turnaround time for most work orders. TestAmerica laboratory reports are included in Appendix C.

2.4 Notification of Results

Following our review of the analytical data, we prepared analytical data tables for the project team. We then called property owners and occupants to notify them of the results of PFAS water testing. Beginning on December 19, 2017, FAI began notifying those with concentrations above the LHA level.

We also prepared letters for owners and occupants informing them of the results for the sample collected from their well. These letters were tailored to each property and analytical sample, and included the following information:

- sample name;
- analytical result for PFOS and PFOA;
- comparison of analytical results to the LHA level;
- description of the project; and
- pages of the TestAmerica laboratory report that apply to the owner or occupant's water-well sample, including other PFAS results.

In some cases, results letters were combined with a public meeting invitation or other supporting information as part of the FAI's public-outreach efforts. Where requested, we e-mailed results letters to owners or occupants.

2.5 Quarterly Sampling

In February 2018 we resampled active, private wells whose combined PFOS and PFOA concentration fell between 35 ppt and 65 ppt during their first sampling event in November or December 2017.

The following six properties were resampled between February 13 and 28, 2018. These wells are shown in light blue in Figure 3, Quarterly and Annual Well Monitoring Network.

- [redacted] (sample *174271*)
- [redacted] (sample *407348*)
- [redacted] (sample *176044*)

- [redacted] (sample *153338*)
- [redacted] (sample *174254*)
- [redacted] (sample *521809*)

In addition, we resampled the following well on March 30, 2018, due to its inconsistent results with other wells in the area.

- [redacted] (sample *121401*)

We did not sample the following well that met the above criteria, because the owner declined sampling.

- [redacted] (sample *176397*)

2.6 Alternative Water Sources

We offered one-gallon jugs of bottled water and ongoing water deliveries to the occupants of properties with category 1 and 2 wells. We typically offered water while sampling; where requested, we supplied water prior to sampling a given well. The FAI Airport Response Center at 5195 Brumbaugh Boulevard also serves as a water distribution depot for affected properties. The Airport Response Center is open 24 hours a day, seven days a week.

The FAI contracted with water-delivery company Vision Construction to provide bottled water deliveries to property owners and occupants. Beginning November 17, 2017, Vision Construction has provided a combination of water dispensers and five-gallon jugs, flats of half-liter water bottles, and one-gallon jugs of bottled water depending on resident preferences. Five-gallon jugs and water dispensers were provided by Spring Alaska between November 9 and 17, 2017.

Beginning February 20, 2018, water deliveries were discontinued for most households in outlying Areas 5 through 8. We prepared and mailed notification letters to affected owners and occupants. The affected area is outlined below:

- Area 1, Crown Road
- Area 5, entire area including Chena Pump Road, Crown Road, and Charlton Circle
- Area 6, Heldiver Street, some properties on Tall Spruce Road
- Area 7, entire area including Chena Pump Road, Chena Small Tracks Road, Cosgrave Drive, Perch Drive, and Killen Lane
- Area 8, entire area including Hoselton Road, Cranberry Street, and Rosebud Lane

Table 2, Water Delivery Recipients as of April 30, 2018, lists properties that have received bottled water deliveries. Unless otherwise noted, water deliveries are ongoing.

The FAI is preparing to connect most properties with category 1 and 2 wells that exceed the effective LHA to the CUC water system as a long-term alternate water source. Connections are being offered to property owners based on the LHA combined concentration for each private well. Some of these properties are excluded from Table 2 because they declined water deliveries.

2.7 Public Information

The FAI hosts a webpage describing the PFAS water testing project. The webpage includes a project summary, list of contacts, simplified regional results map, and links to additional resources. The map is updated periodically following the receipt of analytical data; Appendix A includes an example from March 29, 2018.

On December 18, 2017, the FAI hosted a public meeting at the La Quinta Inn and Suites at 4920 Dale Road, within Area 2. We prepared and mailed or emailed meeting invitations to developed properties in Areas 1 through 4. Where contact information was known, we sent meeting invitations to both landlords and tenants. The FAI leasing department prepared and mailed invitations to FAI tenants.

Representatives from the FAI, ADEC, and Alaska Department of Health and Social Services (DHSS) Section of Epidemiology gave presentations. The DHSS prepared a health fact sheet describing the health effects associated with exposure to PFOS and PFOA. A copy of the public meeting invitation and health fact sheet are included in Appendix A. ATSDR representatives also attended the meeting to answer health-related questions.

On March 13, 2018, the FAI hosted a second public meeting and open house at the La Quinta Inn and Suites. We sent invitations to the owners and occupants of developed properties in Areas 1 through 8, and individuals whose wells we sampled outside our well search areas.

Representatives from the FAI, PDC Engineers, and R&M Consultants, Inc. gave brief presentations. PDC Engineers described the CUC water line design and R&M Consultants discussed their site characterization efforts. The presentations were followed by an open house where various groups were available to answer questions one-on-one. The groups present were the FAI, ADEC, DHSS, Shannon & Wilson, PDC Engineers, R&M Consultants, CUC, and State of Alaska Division of Risk Management.

2.8 Deviations

In general, we conducted our services in accordance with our scope of services dated December 7, 2017. The following are the deviations from this document.

- The following samples were or may have been collected from a location downstream of the property's water softener or other in-home treatment system during one or more sampling events: *174742*, *510220.2*, *367770* and duplicate *367870*, *120197*, *117188*, *176052* and duplicate *176152*, *174939*, *174050* and duplicate *174150*, and *462641*.
- Our scope of services called for sampling only active, category 1 and 2 wells. Upon request by property owners and the FAI, we collected samples *569721* and *120090* from category 5 wells and samples *391247* and *174751* from category 3 wells.

Exhibit 2-3: Photograph of Unused Private Well Sample Location

- Upon request by the FAI and ADEC, we collected five water samples from private wells outside Area 1 through 8: *482919*, *116980*, *573868*, *509451*, and *174840*.

3 ANALYTICAL RESULTS

We submitted analytical water samples to TestAmerica for determination of six PFASs using Method WS-LC-0025, the laboratory's in-house method. This method analyzes for the PFASs listed in the EPA Unregulated Contaminant Monitoring Rule (UCMR): PFOS, PFOA, PFHpA, PFNA, PFBS, and PFHxS.

The TestAmerica laboratory reports and ADEC Laboratory Data Review Checklists for each work order (WO) are listed in chronological order in Appendix C (WOs 33294, 33369, 33497, 33636, 33637, 33768, 33898, 34001, 34174, 34285, 34503, 34744, 34935, 35084, 35281, 35502, 35778, 36087, 36092, 36310, 36749, 36750, 37135, and 37396).

3.1 Initial Private Well Samples

Table 3 summarizes the concentrations of PFASs in first-time private well samples collected between November 2017 and March 2018. Figure 4, PFOS and PFOA Sample and Section Locations, depicts the combined PFOS and PFOA concentrations for each private well. The

highest results were 1,000 ppt PFOS and 140 ppt PFOA in sample *176052* or field-duplicate sample *176152*, from the well at [redacted]. The highest PFHpA result, 190 ppt, and highest PFHxS result, 400 ppt, were also found in this well. The highest PFNA result was 190 ppt in sample *176061*, from [redacted]. The highest PFBS result was 150 ppt in sample *542539*, from [redacted].

3.2 Quarterly Samples

Table 4 summarizes the concentrations of PFASs in wells sampled a second time in February or March 2018. The first sample results for each location are included for comparison. The largest percent change in combined PFOS, PFOA, or LHA combined concentration was in sample *121401*, from the well at [redacted]. The LHA combined concentration for this well decreased from 26 ppt to 9.6 ppt between December 2017 and March 2018. Five of the seven LHA combined concentrations increased between the first and second sampling event.

Two locations became new exceedances of the LHA level. The LHA combined concentration for sample *407348*, from the well at [redacted] increased from 47 ppt to 65 ppt between December 2017 and February 2018. The result for sample *153338*, from 5120 [redacted] increased from 63 ppt to 67 ppt between November 2017 and February 2018. These locations are depicted as exceedances in Figure 4.

3.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results for laboratory QC samples and conducted our own QA assessment for this project. We reviewed the COC records and laboratory-receipt forms to check custody was not breached, sample holding-times were met, and the samples were properly handled from the point of collection through analysis by the laboratory. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

The laboratory applies the letter 'J' to a detection less than the limit of quantitation but greater than the detection limit; this "flagged" datum is considered an estimated concentration. We reviewed the data using the current ADEC Laboratory Data Review Checklist and applied a standardized set of flags to data brought into question during the review. During our QC review we applied flags indicating estimated data or analytical bias as applicable. Our QC review encountered the following QA/QC errors resulting in flags.

The following analytical data was considered estimated and flagged 'J' in the analytical table due to isotope dilution analyte (IDA) recovery failures:

- the PFHpA results for samples *120341, 121631, 121649, 172821, 172847, 172871, 172901,* and *172952*;
- the PFOA results for samples *172821* and *172871*;
- the PFNA results for samples *120341, 121631, 121649, 172821, 172847, 172871, 172901,* and *172952*;
- the PFBS results for samples *120341, 172821, 172901*, and *172952*; and
- the PFHxS results for samples *120341, 172821, 172901*, and *172952*.

The following analytical data was considered estimated, biased high, and flagged 'JH' in the analytical data table due to matrix interference:

- the PFNA results for samples *120197, 120201*, and *407364*.

We reviewed analytical sample results (TestAmerica WOs 33294, 33369, 33497, 33636, 33637, 33768, 33898, 34001, 34174, 34285, 34503, 34744, 34935, 35084, 35281, 35502, 35778, 36087, 36092, 36310, 36749, 36750, 37135, and 37396) for this project. The laboratory reports, including case narratives describing laboratory QA results, along with completed ADEC data-review, are included in Appendix C. Laboratory QC procedures included evaluating surrogate recovery, performing continuing calibration checks, analyzing method blanks, and checking laboratory control samples to assess accuracy. Please refer to Appendix C for details regarding the results of our QA review for these 24 WOs.

By working in general accordance with our proposed scope of services, we consider the samples we collected for this project to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures. In general, the quality of the analytical data for this project does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

4 DISCUSSION AND RECOMMENDATIONS

We present here our discussion relevant to PFASs in groundwater at the FAI property and vicinity.

4.1 Comparison to Action Levels

Of the 158 private-well samples collected through April 2018, there are 61 category 1 and 2 wells with LHA combined concentrations exceeding the effective LHA level of 65 ppt. Of these, 53 are category 1 wells and eight are category 2 wells. One category 5 well, temporarily out of service pending a property transaction, also exceeded the LHA.

Most private well exceedances are located on and near Dale Road in Area 2, followed by Areas 1 and 3 (Figure 1). One private well exceedance is located in Area 6, across the Chena River from the FAI (Figure 4). These wells are shown in red in Figure 4, and summarized in Tables 3 and 4. There are no properties with private well exceedances in Areas 4, 5, 7, or 8.

For the purposes of project planning, we propose a working definition of the PFOS and PFOA plume-impacted area based on the LHA combined results for private wells. We define the PFOS and PFOA impacted area as the portions of Areas 1 through 3 on the FAI side of the Chena River, and Area 6 properties on Tall Spruce Road. This area is shown in Figure 3 with a red, dotted line. The boundaries are based on our interpretation of private well samples collected from November 2017 to March 2018, and should not be construed as a precise plume boundary.

There were 21 private wells within the impacted area that exceeded the ADEC groundwater-cleanup level for PFOS, in addition to the LHA level. These locations are depicted with dark red halos in Figure 4. They are located in Area 2 and the northern portion of Area 1.

PFOS was most frequently the highest detected PFAS in private wells tested to date. The wells with the highest PFOS concentrations are geographically closer to the Airport Response Center and center of the primary FAI runway than to the existing burn pit or former fire training area (Figures 1 and 4).

4.2 Concentrations with Depth

As part of our well search we collected data on well depth and presence or absence of permafrost, where known. We categorized well depths into three categories: confident (i.e., measured, from well log or well driller); reported by owner, occupant, or developer; and estimated. Well depth is considered confident or reported for approximately 60 percent of wells tested. Permafrost information is known for less than 5 percent of these wells. We have prepared two cross-sections depicting LHA combined concentration with depth; please note the sections include estimated depths.

Figure 5, Section A-A', extends approximately one mile from west to east across the Chena River, parallel to the nearest USGS October groundwater flow contour in Figure 2 (Glass et. al., 1996). The end points are the Roland Road Gravel Pit and near the intersection of Western Avenue and Airport Way. Section A-A' includes private wells within a search radius of 1,000 feet from the section line, as shown in Figure 4.

Of the wells displayed in Section A-A', most wells in Area 2 had concentrations above the LHA level regardless of depth. The cross-section includes several sub-permafrost wells where PFOS exceeded the ADEC groundwater-cleanup level. Well depths in this area are generally 85 feet or less; one 100-foot well (sample *151203*) had a lower LHA combined concentration than the shallower wells.

On the Chena Pump Road side of the Chena River, Section A-A' shows LHA combined concentrations less than 50 percent of the LHA. These wells range from 19 and 160 feet deep, and are generally less than 700 feet from wells with higher PFOS and PFOA concentrations. Sample locations are projected onto the cross-section by right angle, therefore some appear to plot within the topographic depression of the river. Of note are sample *174815*, a 50-foot well with no detected PFOS or PFOA, and sample *120537.1*, a nearby 40-foot well with PFOS above the ADEC groundwater-cleanup level.

Figure 6, Section B-B', extends approximately 1.5 miles parallel to the Chena River and includes a search radius of 500 feet. The end points are Tall Spruce Road and near the intersection of Dale Road and Mail Trail Road. On the FAI side of the Chena River, we observe high variability in concentrations between nearby wells of reportedly similar depths.

On Tall Spruce Road, it appears deeper wells were less likely to contain PFOS and PFOA at or near the LHA level. The local groundwater flow direction may vary from regional groundwater contours depicted in Figure 2 due to the proximity of the Tanana River, a major regional drainage. More information is needed to determine why the LHA combined results for Tall Spruce Road differ from other locations in Areas 5 through 7.

4.3 Well Monitoring Network

The purpose of the well monitoring network is to evaluate the potential for human exposure to PFAS-containing water at different times of the year. Analytical data from the first quarterly sampling event, conducted in February 2018, demonstrated some seasonal variation in PFAS concentrations. Future quarterly sampling is planned for private wells that meet the quarterly sampling criteria, discussed below.

4.4 Future Work

Shannon & Wilson is conducting a secondary well search to target properties reportedly connected to the CUC water system. The outcomes of our ongoing well and sampling efforts will be reported separately. The secondary well search will target primarily those parcels categorized as "unknown – improbably well" in Exhibit 2-1, Well Summary by Parcel.

Additional quarterly sampling took place in May and August 2018, and is planned for November 2018. The results of ongoing quarterly sampling will be reported separately. We will evaluate seasonal and temporal trends after we have sampled these wells for four quarters.

In coordination with the FAI, we amended the well monitoring network criteria prior to the May 2018 sampling event. Wells are included in the network if:

- they are active category 1 and 2 wells whose maximum combined PFOS and PFOA concentration was greater than or equal to 35 ppt; or
- they are active category 1 and 2 wells within 1,500 lateral feet of and on the same side of the Chena River as any private well (i.e., categories 1 through 5) whose combined PFOS and PFOA concentration was greater than or equal to 35 ppt; and
- connection to the College Utilities water system is not planned for 2018.

Lateral distance was measured from parcel center to parcel center. On lots with more than one well, we tested only those wells with LHA combined concentrations exceeding 35 ppt. As of April 30, there are 24 wells that meet these concentration- and location-based criteria. Quarterly well monitoring locations are shown in light and dark blue in Figure 3.

4.5 Recommendations

Based on our private well search and sampling effort completed between November 2017 and April 2018, we recommend the FAI continue to:

- attempt to identify wells at properties where well status is unknown, per Exhibit 2-1: Well Summary by Parcel as of May 30, 2018;
- sample wells in the quarterly well monitoring network in accordance with established criteria for one year, as discussed in Section 4.4, Future Work;
- work with the ADEC and DHSS to educate the public regarding the potential health effects of exposure to PFAS-containing water; and
- refrain from discharging PFOS- and PFOA-containing AFFF to the groundwater from ARFF training, equipment testing, or emergency response.

We recommend annual resampling of active wells (i.e., categories 1 through 4) within the above-defined impacted area with a detected PFOS or PFOA concentration above 2.0 ppt. There are four locations that meet this criterion as of the results included in this report. Annual monitoring locations are shown in purple in Figure 3. The FAI has not determined if wells at properties receiving connections to the CUC water system will be decommissioned. If these wells remain in use following connection to CUC water, they may meet the criterion for annual resampling. We further recommend that the FAI assess the lateral and vertical extent of the PFOS and PFOA groundwater plume.

Our recommendations are based on:

- Offsite groundwater conditions inferred through private well analytical water samples collected from November 10, 2017 through March 20, 2018.
- The results of testing performed on water samples we collected from the private wells on, near, and downgradient from the FAI.
- Our previous experience at and near the FAI.
- Well construction details reported by owners and occupants, and well logs obtained from the DNR WELTS beginning in November 2017.
- Publicly available literature and data including Glass et. al., 1996; Nelson, 1978; Geomega Inc., 2012; and USGS, 2018.
- Our understanding of the project and information provided by the FAI, ARFF, and other members of the project team.
- The limitations of our approved scope, schedule, and budget described in our approved Scope of Services dated December 7, 2017.

The information included in this report is based on limited sampling and should be considered representative of the times and locations at which the sampling occurred. Regulatory agencies may reach different conclusions than Shannon & Wilson. We have prepared and included in the Appendix D, "Important Information about your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of this report.

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TABLE 1
PROJECT TIMELINE

Date	Event	Description
November 3, 2017	Contract Shannon & Wilson	FAI contracts Shannon & Wilson for initial well search and private well sampling effort, Areas 1 through 4.
November 8, 2017	Initial PFAS Press Release	FAI issues press release notifying public of PFAS private well testing. Shannon & Wilson begins coordinating with property owners and occupants.
November 9, 2017	Advisory Letter	Shannon & Wilson mails advisory letter to developed properties in Areas 1 through 4.
November 9, 2017	Contract Spring Alaska	FAI contracts Spring Alaska for water deliveries.
November 10, 2017	First Private Well Samples	Shannon & Wilson begins collecting water samples from private wells in Areas 1 through 4.
November 14, 2017	Receive Municipal Water Connection Records	Shannon & Wilson receives CUC water connection records for Areas 1 through 4.
November 17, 2017	Contract Vision Construction	FAI contracts Vision Construction for water deliveries.
November 28, 2017	Expand Well Search	Shannon & Wilson expands private well search to include Area 5, Chena Pump Road side of the Chena River.
December 4, 2017	Advisory Letter	Shannon & Wilson mails advisory letter to developed properties in Area 5.
December 18, 2017	Public Meeting	First public meeting. Presentations by FAI, ADEC, and DHSS.
December 20, 2017	Expand Well Search	Shannon & Wilson expands private well search to include Areas 6 through 8. Plan to begin field effort in January 2018.
December 28, 2017	Receive Municipal Water Connection Records	Shannon & Wilson receives CUC water connection records for Areas 7 and 8. Areas 5 and 6 are not served by CUC.
January 10, 2018	Advisory Letter	Shannon & Wilson mails advisory letter to developed properties in Areas 6 through 8.
February 20, 2018	Discontinue Some Water Deliveries	Vision Construction begins to discontinue water deliveries for most households in Areas 5 through 8.
March 13, 2018	Public Meeting and Open House	Second public meeting and open house. Presentations by FAI, PDC Engineers, and R&M Consultants, Inc.

This table contains personal information. Content has been removed for confidentiality.

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
116947	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
116980		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
116998		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117005		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117021		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117048		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117102		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117129		<2.0	1.2 J	<2.0	<2.0	1.8 J	<2.0	1.2 J‡
117153		<2.0	3.1	2.0	<2.0	1.7 J	3.1	6.2
117161		1.2 J	<2.0	<2.0	<2.0	2.5	5.8	5.8 ‡
117170		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117270		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117188		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
117196		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
119849		4.7	4.6	<2.0	5.8	26	**140**	**145**
119881		4.0	5.2	0.73 J	4.5	24	**160**	**165**
119938		15	14	2.2	15	89	**540**	**554**
119946		15	14	1.9 J	17	93	**620**	**634**
120046		15	14	1.7 J	19	93	**630**	**644**
119954		9.7	8.8	1.5 J	11	57	**360**	**369**
120054		9.5	8.6	1.5 J	11	55	**360**	**369**
119971		8.0	9.4	1.3 J	10	52	**400**	**409**
119989		9.1	9.4	1.4 J	12	56	**350**	**359**
120089		9.1	9.3	<2.0	12	56	**370**	**379**
119997		7.9	8.9	1.1 J	10	51	**340**	**349**
120014		5.4	6.1	0.73 J	6.7	33	**250**	**256**
120057		3.5	3.5	<2.0	3.6	18	**100**	**104**
120103		19	20	2.3	27	130	**800**	**820**

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
120189	[redacted]	9.2	12	1.2 J	14	68	**450**	**462**
120197	[redacted]	15	23	1.2 JH*	29	120	**500**	**523**
120201	[redacted]	12	19	1.5 JH*	23	110	**630**	**649**
120219	[redacted]	14	19	1.1 J	28	120	**580**	**599**
120319	[redacted]	15	19	1.3 J	27	120	**650**	**669**
120235	[redacted]	3.5	4.5	<2.0	4.1	21	**170**	**175**
120286	[redacted]	19	18	2.0	21	120	**630**	**648**
120316	[redacted]	13	15	0.90 J	30	130	**480**	**495**
120324	[redacted]	9.1	11	1.1 J	12	62	**440**	**451**
120341	[redacted]	1.2 J*	2.1	<2.0 J*	1.9 J*	9.5 J*	59	61
120441	[redacted]	1.6 J	2.4	<2.0	2.5	12	**76**	**78**
120359	[redacted]	12	17	1.1 J	25	99	**400**	**417**
120405	[redacted]	22	22	2.1	28	150	**740**	**762**
120529	[redacted]	12	16	1.1 J	27	110	**490**	**506**
120537.1	[redacted]	13	18	1.1 J	27	120	**560**	**578**
120537.2	[redacted]	9.1	11	1.1 J	15	68	**450**	**461**
120774	[redacted]	<2.0	2.1	<2.0	1.2 J	5.4	2.7	4.8
120874	[redacted]	<2.0	2.0	<2.0	1.2 J	5.4	2.8	4.8
121401	[redacted]	<2.0	0.81 J	<2.0	<2.0	3.5	25	26 J
121410	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	1.7 J	1.7 J‡
121592	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
121614	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
121622	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	1.3 J	1.3 J‡
121631	[redacted]	<2.0 J*	<2.0	<2.0 J*	<2.0	<2.0	<2.0	N/A
121649	[redacted]	2.3 J*	2.9	<2.0 J*	3.3	3.0	<2.0	2.9 ‡
121657	[redacted]	1.1 J	2.5	<2.0	4.8	1.9 J	<2.0	2.5 ‡
121665	[redacted]	<2.0	<2.0	<2.0	<2.0	1.7 J	<2.0	N/A
121673	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
121681	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
123226	[redacted]	<2.0	<2.0	<2.0	2.3	<2.0	<2.0	N/A
123234		<2.0	<2.0	<2.0	1.3 J	<2.0	<2.0	N/A
136891		4.0	2.7	<2.0	20	51	7.0	9.7
150843		3.1	2.9	<2.0	5.8	18	**68**	**71**
151131		10	14	4.1	15	58	**230**	**244**
151203		2.0	3.8	1.6 J	4.8	12	40	44
151303		2.1	3.6	1.6 J	4.8	12	41	45
151530		4.2	6.3	0.70 J	7.7	21	63	**69**
151637		<2.0	0.76 J	<2.0	1.5 J	3.0	5.6	6.4 J
152773		6.7	7.8	0.92 J	19	41	**100**	**108**
153338		11	12	<2.0	31	51	51	63
153575		8.5	8.7	1.0 J	26	58	**80**	**89**
153648		15	15	1.2 J	45	42	51	**66**
153699		4.4	2.5	<2.0	34	32	5.1	7.6
172812		1.7 J	2.4	<2.0	2.5	5.5	2.3	4.7
172821		0.91 J*	0.94 J*	<2.0 J*	2.2 J*	3.9 J*	<2.0	0.94 J*‡
172847		1.6 J*	3.2	<2.0 J*	5.3	4.0	1.3 J	4.5 J
172863		1.7 J	3.4	<2.0	6.9	11	2.5	5.9
172871		<2.0 J*	<2.0 J*	<2.0 J*	1.1 J	2.4	<2.0	N/A
172880		<2.0	<2.0	<2.0	2.3	3.4	<2.0	N/A
172901		0.93 J*	1.7 J	<2.0 J*	2.4 J*	4.1 J*	<2.0	1.7 J‡
172952		<2.0 J*	<2.0	<2.0 J*	1.2 J*	2.5 J*	<2.0	N/A
173002		1.1 J	1.4 J	<2.0	2.5	12	3.7	5.1 J
173363		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
173541		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
173762		<2.0	<2.0	<2.0	<2.0	0.94 J	<2.0	N/A
173860		4.7	2.7	<2.0	41	31	6.2	8.9
173908		14	7.3	<2.0	45	170	6.7	14

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
173916	[redacted]	<2.0	<2.0	<2.0	<2.0	2.0	1.7 J	1.7 J‡
173975	[redacted]	<2.0	<2.0	<2.0	<2.0	2.0	2.0	2.0 ‡
174050	[redacted]	0.95 J	1.7 J	<2.0	1.7 J	15	5.3	7.0 J
174150	[redacted]	0.98 J	1.8 J	<2.0	1.7 J	16	5.6	7.4 J
174254	[redacted]	5.2	8.6	<2.0	8.9	23	46	55
174271	[redacted]	4.9	8.0	0.67 J	11	23	50	58
174297	[redacted]	5.6	9.0	0.70 J	12	27	**89**	**98**
174467	[redacted]	3.7	6.7	0.73 J	7.8	20	**95**	**102**
174567	[redacted]	3.9	6.3	0.78 J	7.4	19	**92**	**98**
174483	[redacted]	5.2	8.5	1.1 J	9.5	26	**120**	**129**
174491	[redacted]	5.5	8.6	1.0 J	9.7	27	**120**	**129**
174556	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
174670	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
174688	[redacted]	4.7	6.8	4.0	8.5	33	**150**	**157**
174788	[redacted]	4.6	7.0	3.5	8.6	32	**150**	**157**
174696	[redacted]	9.9	13	1.1 J	21	80	**370**	**383**
174718	[redacted]	7.1	9.8	<2.0	16	46	**240**	**250**
174742	[redacted]	7.8	9.9	4.7	14	52	**300**	**310**
174751	[redacted]	9.8	13	6.9	18	76	**390**	**403**
174769	[redacted]	8.8	12	0.76 J	16	72	**280**	**292**
174777	[redacted]	10	14	7.9	21	93	**270**	**284**
174785	[redacted]	6.5	8.3	<2.0	11	50	**240**	**248**
174793	[redacted]	6.5	8.1	<2.0	12	49	**230**	**238**
174815	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
174840	[redacted]	1.3 J	2.7	<2.0	6.3	8.3	<2.0	2.7 ‡
174939	[redacted]	1.1 J	1.8 J	<2.0	1.1 J	2.3	6.0	7.8 J
174963	[redacted]	8.9	12	0.70 J	17	75	**340**	**352**
174971	[redacted]	11	16	<2.0	22	98	**370**	**386**

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
174998	[redacted]	8.0	10	<2.0	19	61	**240**	**250**
175005	[redacted]	7.5	9.2	0.89 J	14	56	**320**	**329**
176010	[redacted]	<2.0	<2.0	<2.0	<2.0	2.3	7.9	7.9 ‡
176044	[redacted]	8.9	10	<2.0	2.9	20	25	35
176044.1	[redacted]	120	**110**	<2.0	45	360	**490**	**600**
176052	[redacted]	190	**140**	<2.0	67	390	**1,000**	**1,140**
176152	[redacted]	180	**130**	<2.0	69	400	**1,000**	**1,130**
176061	[redacted]	81	**75**	190	30	210	**480**	**555**
176095	[redacted]	1.8 J	3.6	<2.0	1.2 J	5.7	3.5	7.1
176176	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	2.3 ‡
176222	[redacted]	2.5	4.9	<2.0	1.4 J	9.3	5.3	10
176265	[redacted]	110	**100**	<2.0	36	290	**500**	**600**
176397	[redacted]	57	32	40	10	88	26	58
176435	[redacted]	2.6	3.5	<2.0	9.8	41	7.3	11
365670	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
367770	[redacted]	5.9	5.5	0.76 J	6.4	33	**200**	**206**
367870	[redacted]	5.6	5.2	0.74 J	5.9	31	**190**	**195**
367788	[redacted]	2.3	3.7	<2.0	2.3	11	66	**70**
391247	[redacted]	0.95 J	1.2 J	<2.0	2.0	9.2	3.5	4.7 J
407348	[redacted]	12	37	<2.0	5.9	45	9.6	47
407364	[redacted]	3.9	9.8	5.8 JH*	1.8 J	13	5.0	15
407372	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
462641	[redacted]	<2.0	<2.0	<2.0	2.8	1.9 J	<2.0	N/A
465356	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
466808	[redacted]	0.93 J	1.4 J	<2.0	1.6 J	1.9 J	7.5	8.9 J
473481	[redacted]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
473499	[redacted]	<2.0	<2.0	<2.0	<2.0	0.88 J	<2.0	N/A
482919	[redacted]	<2.0	2.1	<2.0	<2.0	1.2 J	<2.0	2.1 ‡
483532	[redacted]	<2.0	<2.0	<2.0	1.4 J	1.9 J	1.4 J	1.4 J‡

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	Address	ppt	ppt	ppt	ppt	ppt	ppt	ppt
483541	[redacted]	7.7	4.3	<2.0	26	92	4.2	8.5
506770		<2.0	<2.0	<2.0	<2.0	1.7 J	9.2	9.2 ‡
509451		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
510220.1		20	56	<2.0	38	160	**120**	**176**
510320.1		19	55	<2.0	39	160	**120**	**175**
510220.2		26	**74**	<2.0	48	210	**160**	**234**
521809		9.9	17	<2.0	4.2	27	23	40
542512		22	9.8	<2.0	89	240	6.0	16
542539		62	**77**	0.65 J	150	260	5.2	**82**
550116		4.5	4.7	<2.0	8.2	33	12	17
550124		15	17	50	4.8	28	16	33
550132		<2.0	2.7	<2.0	2.4	12	8.5	11
550232		<2.0	2.7	<2.0	2.4	11	8.7	11
557676		1.1 J	<2.0	<2.0	3.1	4.8	<2.0	N/A
561711		<2.0	1.0 J	<2.0	<2.0	0.90 J	<2.0	1.0 J‡
569712		11	5.8	1.3 J	39	130	6.0	12
569721		26	12	<2.0	110	300	7.5	20
573752		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
573841		<2.0	<2.0	<2.0	<2.0	0.94 J	6.6	6.6 ‡
573868		<2.0	<2.0	<2.0	<2.0	0.89 J	4.5	4.5 ‡
579645		8.5	4.7	<2.0	20	110	5.4	10
669097		10	9.1	0.73 J	45	62	**79**	**88**
669197		9.7	8.6	<2.0	45	61	**78**	**87**
120090		17	18	13	19	110	**630**	**648**
174238		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
646790		<2.0	<2.0	<2.0	1.3 J	3.5	<2.0	N/A
120553		4.2	7.2	9.4	4.7	24	**150**	**157**
175013		5.6	6.7	3.7	8.5	35	**210**	**217**

TABLE 3
NOVEMBER 2017 TO MARCH 2018 PRIVATE WELL ANALYTICAL RESULTS

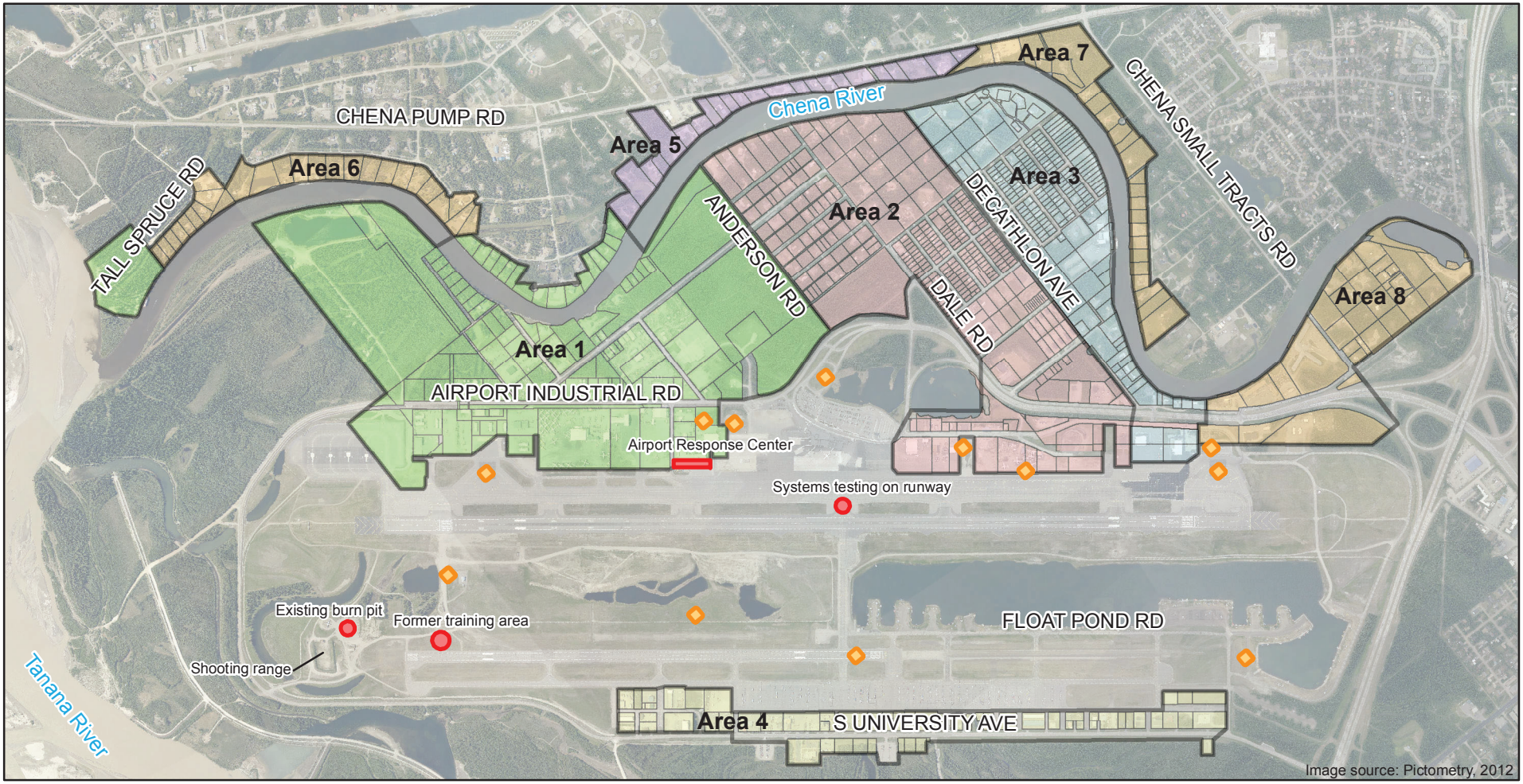
Analyte		Perfluoro-heptanoic acid (PFHpA)	Perfluoro-octanoic acid (PFOA)	Perfluoro-nonanoic acid (PFNA)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
EPA LHA Level		—	70†	—	—	—	70†	70†
Sample Name	**Address**	ppt	ppt	ppt	ppt	ppt	ppt	ppt
407313	[redacted]	1.4 J	9.8	<2.0	<2.0	1.4 J	12	22
407330	[redacted]	8.0	26	17	4.3	34	9.7	36
542547	[redacted]	30	34	1.9 J	80	97	1.8 J	36

† EPA LHA level is 70 ppt for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ppt.
— EPA LHA level not established
DUP Field-duplicate sample
Bold Concentration exceeds EPA LHA level.
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J* Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc.
JH* Estimated concentration, biased high, due to quality control failures. Flag applied by Shannon & Wilson, Inc.
‡ Minimum concentration, the LHA Combined includes one result that is not detected greater than the MDL.
N/A Not applicable. PFOS and PFOA were not detected in the project sample. The LHA Combined could not be calculated.

TABLE 4
COMPARISON OF QUARTERLY ANALYTICAL RESULTS

Analyte			Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perluorobutane sulfonic acid (PFBS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)	Percent Change LHA Combined	Exceed LHA Level?†
EPA LHA Level			—	70†	—	—	—	70†	70†	—	—
Sample Name	**Address**	**Sample Date**	ppt	ppt	ppt	ppt	ppt	ppt	ppt	—	—
153338	[redacted]	11/14/2017	11	12	<2.0	31	51	51	63	6%	NO to **YES**
153338		2/20/2018	9.7	12	2.9	31	51	55	**67**		
174271		11/28/2017	4.9	8.0	0.67 J	11	23	50	58	10%	NO
174271		2/20/2018	4.5	8.4	3.0	9.1	24	56	64		
176044		11/18/2017	8.9	10	<2.0	2.9	20	25	35	29%	NO
176044		2/13/2018	10	13	26	3.4	25	32	45		
407348		12/22/2017	12	37	<2.0	5.9	45	9.6	47	38%	NO to **YES**
407348		2/14/2018	16	51	29	7.6	62	14	**65**		
521809		11/17/2017	9.9	17	<2.0	4.2	27	23	40	10%	NO
521809		2/13/2018	9.8	19	35	4.5	28	25	44		
174254		11/21/2017	5.2	8.6	<2.0	8.9	23	46	55	0%	NO
174254		2/28/2018	4.5	8.6	2.1	8.1	23	46	55		
121401		12/13/2017	<2.0	0.81 J	<2.0	<2.0	3.5	25	26	-63%	NO
121401		3/20/2018	<2.0	<2.0	<2.0	<2.0	<2.0	9.6	9.6 ‡		

ppt parts per trillion, equivalent to nanograms per liter
EPA Environmental Protection Agency
LHA Lifetime Health Advisory
RE Resample result
† EPA LHA level is 70 ppt for PFOS and PFOA combined; following ADEC guidance results are compared to 65 ppt.
— EPA LHA level not established
Bold Concentration exceeds EPA LHA level.
‡ Minimum concentration, the LHA Combined includes one result that is not detected greater than the MDL.
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.



LEGEND

- Area 1 Parcels
- Area 2 Parcels
- Area 3 Parcels
- Area 4 Parcels
- Area 5 Parcels
- Areas 6, 7, and 8 Parcels
- Well Search Areas
- Aircraft Rescue and Firefighting (ARFF) Training Sites
- ARFF Emergency Response Sites

0 0.5

Miles

N

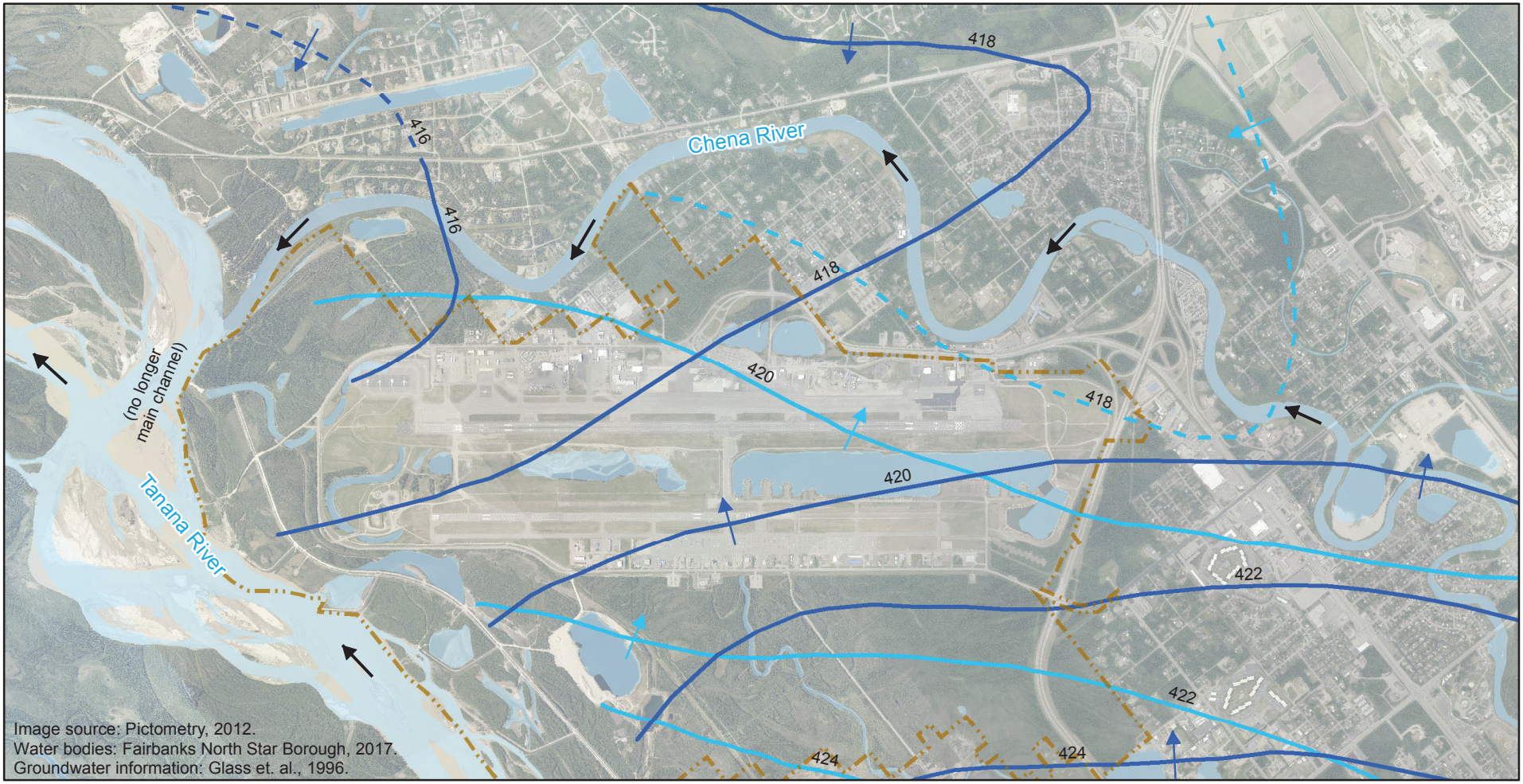
Fairbanks International Airport
Fairbanks, Alaska

WELL SEARCH EXTENT

September 2018 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



LEGEND

- FAI Boundary
- Water
- October Groundwater Contour
- Inferred Contour
- July Contour
- 416 — Groundwater elevation above sea level (feet)
- Groundwater flow direction
- River flow direction

0 1
Miles

N

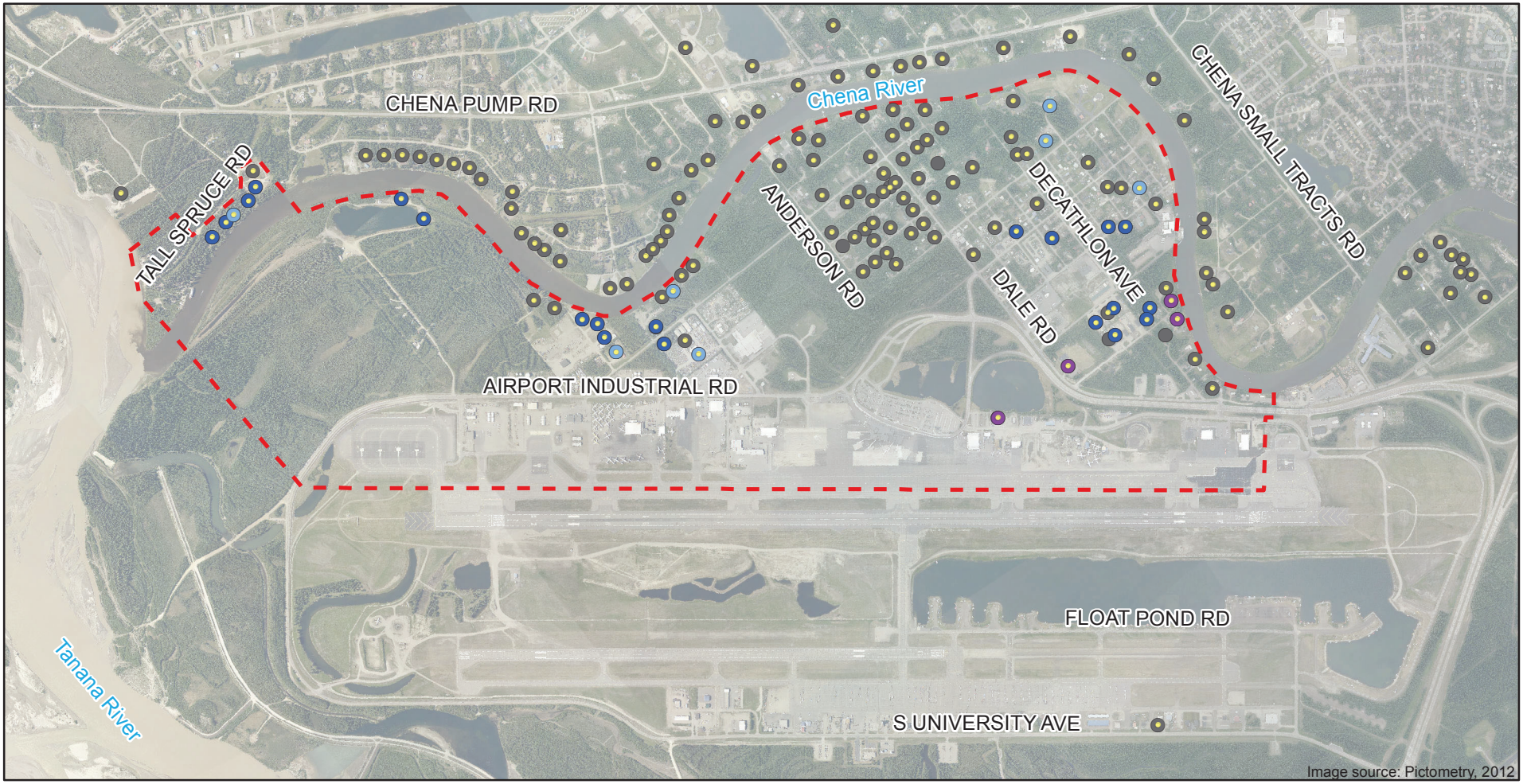
Fairbanks International Airport
Fairbanks, Alaska

SEASONAL GROUNDWATER CONTOURS

September 2018 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2



LEGEND

Well monitoring network:

- Quarterly (Feburary)
- Quarterly (May or future)
- Annual monitoring proposed
- Not included

- Impacted Area
- Category 1 or 2 well

0 0.5

Miles

N

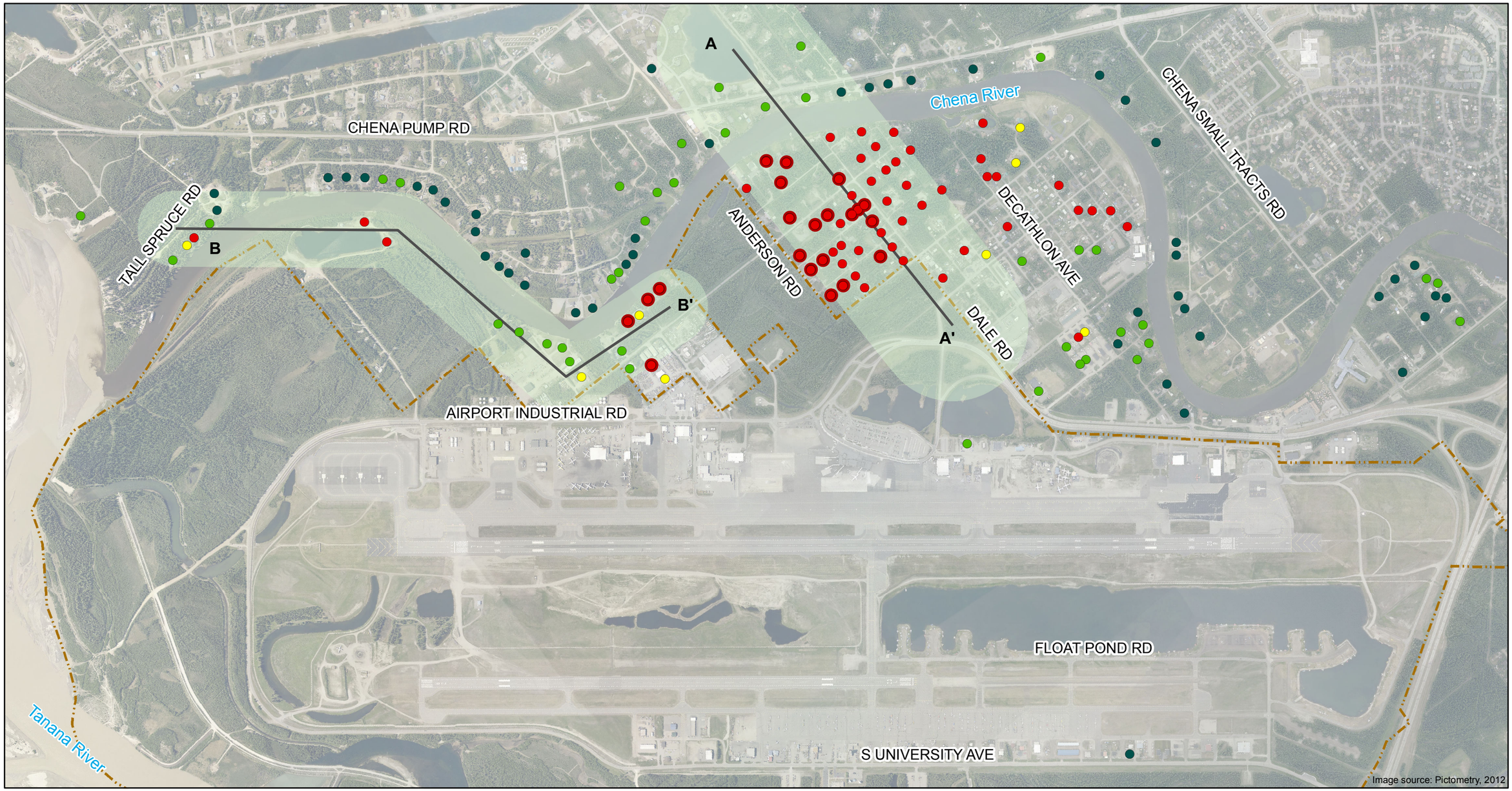
Fairbanks International Airport
Fairbanks, Alaska

QUARTERLY AND ANNUAL WELL MONITORING NETWORK

September 2018 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3



LEGEND

Maximum combined (PFOS+PFOA) result for each private well:

- ≤2.0 ppt
- 2.1 to 34.9 ppt
- 35 to 64.9 ppt
- ≥65 ppt

- PFOS or PFOA ≥400 ppt
- Profile Location
- Profile Search Radius
- FAI Boundary

0 0.5

Miles

N

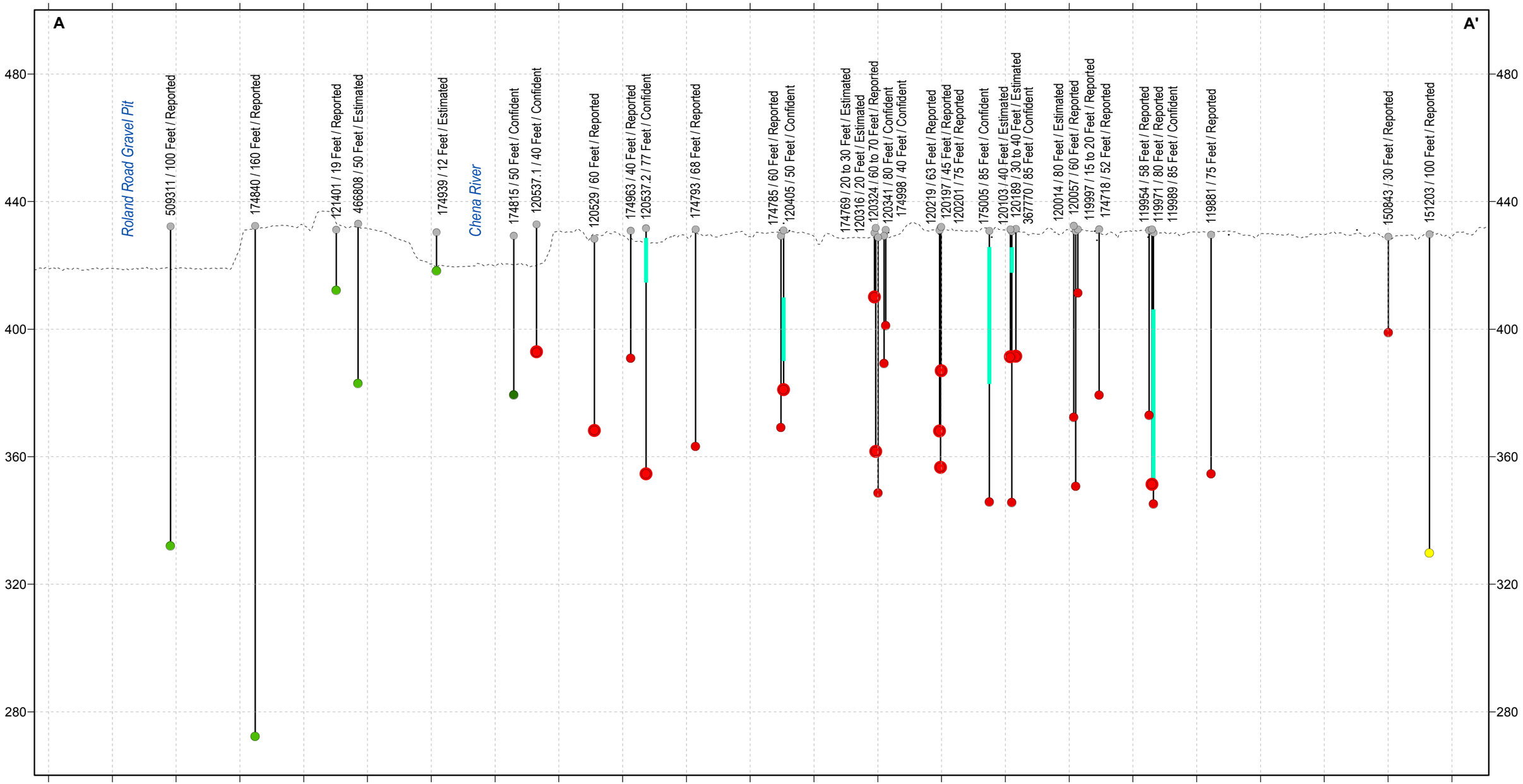
Fairbanks International Airport
Fairbanks, Alaska

PFOS AND PFOA SAMPLE AND SECTION LOCATIONS

September 2018 31-1-20060-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 4



LEGEND

Sample Name /Well
Depth /Depth Description

Well depths are self-reported by property owners and occupants.

Maximum combined (PFOS+PFOA) result for each private well:

- ≤2.0 ppt
- 2.1 to 34.9 ppt
- 35 to 64.9 ppt
- ≥65 ppt

- PFOS or PFOA ≥400 ppt
- Permafrost Noted in Well Log
- Well Depth
- Approximate Ground Surface (DGGS, 2010)

0 300 600 1,200
Feet

Vertical Exaggeration = 10X
1" = 300 feet
Search Radius = 1,000 feet

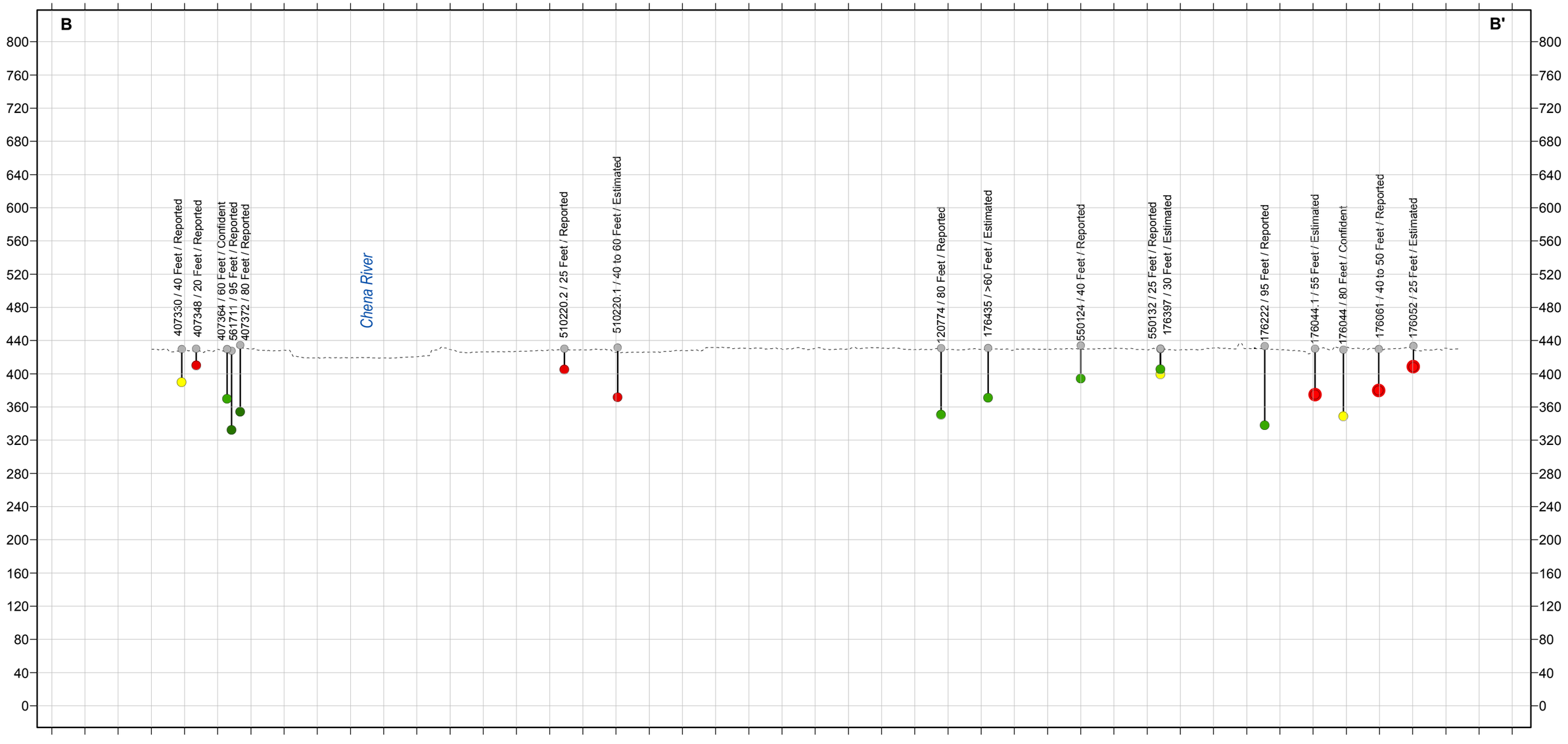
Fairbanks International
Airport Fairbanks, Alaska

SECTION A-A'

September 2018 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 5



LEGEND

Sample Name /Well
Depth /Depth Description

Well depths are self-reported by property owners and occupants.

Maximum combined (PFOS+PFOA) result for each private well:

- ≤2.0 ppt
- 2.1 to 34.9 ppt
- 35 to 64.9 ppt
- ≥65 ppt
- PFOS or PFOA ≥400 ppt

Well Depth

Approximate Ground Surface (DGGS, 2010)

0 300 600 1,200
Feet

Vertical Exaggeration = 10X
1" = 600 feet
Search Radius = 500 feet

Fairbanks International
Airport Fairbanks, Alaska

SECTION B-B'

September 2018 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 6

APPENDIX A: PUBLIC CORRESPONDENCE

APPENDIX A

Public Correspondence

CONTENTS

- Advisory letter dated November 9, 2017
- Information packet dated November 9, 2017
- Notice of public meeting dated November 30, 2017
- Advisory letter dated December 4, 2017
- Information packet dated December 4, 2017
- DHSS Perfluoroalkyl Substances - Fairbanks International Airport fact sheet dated December 18, 2017
- PFAS fact sheet dated December 20, 2017
- Advisory letter dated January 20, 2018, Area 8 version
- Advisory letter dated January 20, 2018, Areas 6 through 7 version
- Notice of open house dated February 26, 2018
- Advisory letter dated March 7, 2018
- PFAS Well Search and Sample Locations map dated March 29, 2018

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

November 9, 2017

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's preliminary health advisory levels.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Results of the water samples will be shared with property residents. If any wells are found to have PFAS levels at concentrations higher than advised, FAI may assist those property owners with access to clean drinking water.

Shannon & Wilson Inc. will be conducting water sampling beginning Monday, Nov. 13, 2017.

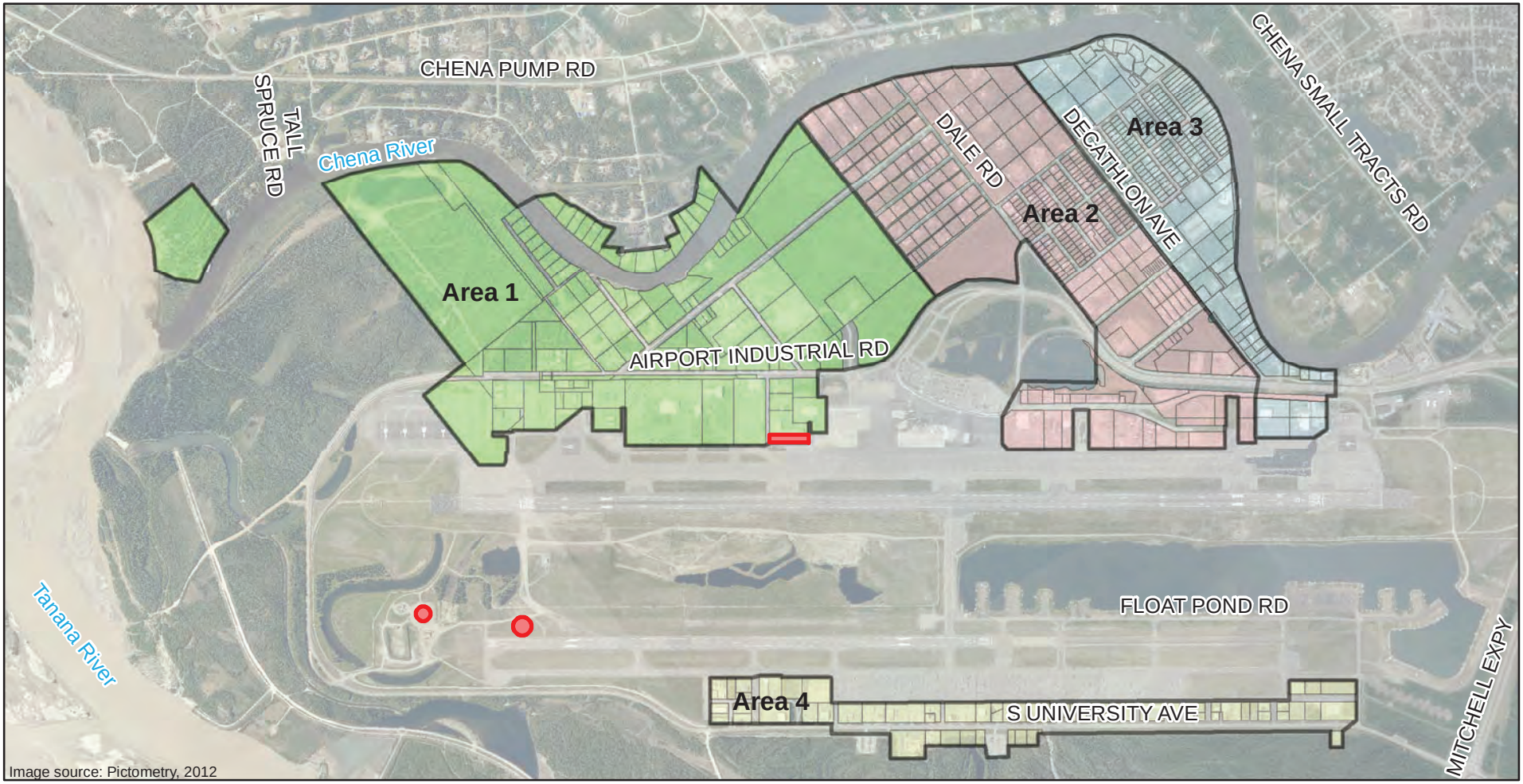
- If you are connected to the College Utilities water system and you do not have an active well please return the attached Private Well Inventory Survey form using the envelope provided.
- If you have an active well please contact, **Shannon & Wilson, Inc. at 474-0600 to schedule a sampling appointment** or return the Private Well Inventory Survey form.

For more information visit dot.alaska.gov/faigroundwater, we appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.

"Keep Alaska Flying and Thriving."



LEGEND

- Area 1 Parcels
- Area 2 Parcels
- Area 3 Parcels
- Area 4 Parcels
- Initial Well Search Areas
- Aircraft Rescue and Firefighting (ARFF) Training Sites

N

0 0.5

Miles

Fairbanks International Airport
Fairbanks, Alaska

INITIAL WELL SEARCH EXTENT

November 2017 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

- PFAS do not occur naturally, but are widespread in the environment.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies a long time.
- Some PFAS do not break down easily in the environment.

How can I be exposed to PFAS?

PFAS contamination may be in drinking water, food, indoor dust, some consumer products, and workplaces. Most non worker exposures occur through drinking contaminated water or eating food that contains PFAS.

Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics

How can I reduce my exposure to PFAS?

PFAS are present at low levels in some food products and in the environment (air, water, soil etc.), so you probably cannot prevent PFAS exposure altogether. However, if you live near known sources of PFAS contamination, you can take steps to reduce your risk of exposure.

- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
  - » drinking
  - » food preparation
  - » cooking
  - » brushing teeth, and
  - » preparing infant formula
- Check for fish advisories for water bodies where you fish.
  - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

How can PFAS affect people's health?

Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful. Although more research is needed, some studies in people have shown that certain PFAS may:

- affect growth, learning, and behavior of infants and older children
- lower a woman's chance of getting pregnant
- interfere with the body's natural hormones
- increase cholesterol levels
- affect the immune system and
- increase the risk of cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of PFAS.

How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
  - CDC Info: https://www.cdc.gov/cdc-info/, or **(800) 232-4636**.
  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
- **National Toxicology Program:** https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at **(800) 638-2772**.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
PFOS	Perfluorooctane sulfonic acid
PFOA (or C8)	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFOSA (or FOSA)	Perfluorooctane sulfonaminde
MeFOSAA (aka Me-PFOSA-AcOH)	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____

Parcel: _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location:
Adults (18 and over) _____
Teenagers (13 to 17) _____
Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

---

1) From where do you obtain your drinking water?
   a) College Utilities Water Supply ☐ b) Well Water ☐
   c) Water Delivery ☐ d) Other ☐

2) If you have a water well, please answer the following questions:
   a) Where is the well located on the property? _____
   b) Is the well in use? Yes ☐ No ☐
   c) If yes, please check all that apply regarding the usage of your well water:
      Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____
   d) If no, is the well usable, unusable, or properly abandoned?
      Usable ☐ Unusable ☐ Abandoned ☐ Method _____
   e) When was the well installed? _____
   f) What is the well depth? _____
   g) What is the well diameter? _____
   h) What is the well type? ☐ Dug Well ☐ Driven ☐ Drilled ☐ Unknown
   i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____
      _____

3) Sample Permission
   Does the Fairbanks International Airport have permission to sample your private water well?
   ☐ Yes ☐ No

_____ _____
Signature Date

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

November 9, 2017

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's preliminary health advisory levels.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Enclosed is a Fact Sheet about PFAS, agency contact information to help address questions, and a Private Well Inventory Survey Form. Please review this information and return the survey by Dec. 1 using the preaddressed envelope. Your participation in the survey helps ensure the study is thorough, but also identifies those in the area at potential risk of drinking PFAS-contaminated water.

Results of the water samples will be shared with property residents. If any wells are found to have PFAS levels at concentrations higher than advised, FAI may assist those property owners with access to clean drinking water.

If you have any questions, please contact me, or see the list of attached contacts to help direct you to the most appropriate person/agency for your inquiry. We appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

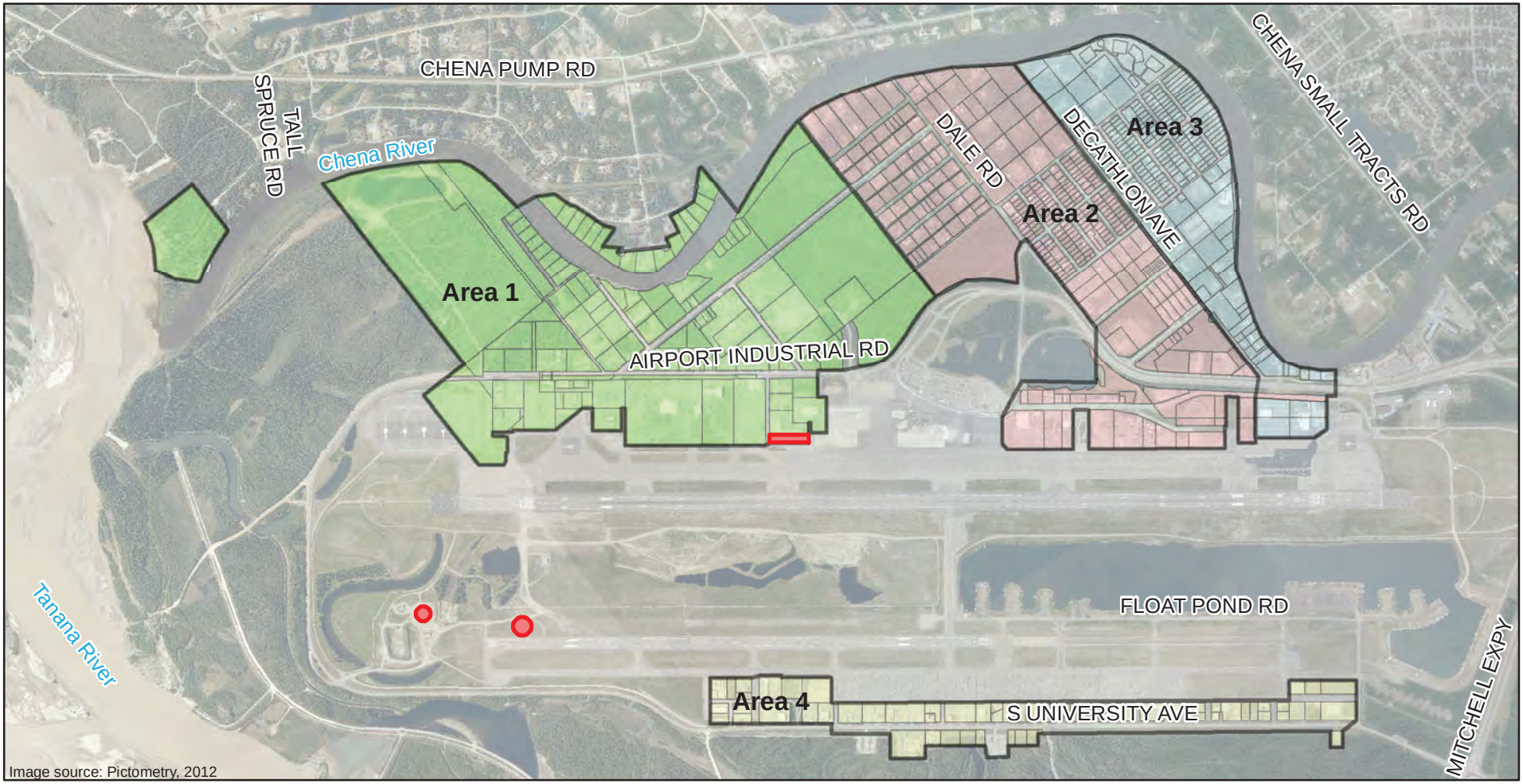
Contacts

For questions about testing & study:
Shannon & Wilson, Inc.
Marcy Nadel, Project Manager
Phone: 907-458-3150
Email: mdn@shanwil.com

For regulatory questions:
Alaska Department of Environmental Conservations,
Contaminated Site Program
Robert Burgess, Environmental Program Specialist III
Phone: 907-451-2153
Email: robert.burgess@alaska.gov

For questions about PFC health effects:
Alaska Department of Health & Social Services
Stacey Cooper, Health Assessor
Phone: 907-269-8016
Email: stacey.cooper@alaska.gov
Division of Public Health Website:
www.dhss.alaska.gov/dph/epi/eph/Pages/default.aspx

For questions about ARFF Training Area and all other inquiries:
Angie Spear, Division Operations Manager
Phone: 907-474-2529
Email: angie.spear@alaska.gov
Sammy Loud, Communications Specialist
Phone: 907-474-2522
Email: sam.loud@alaska.gov



LEGEND

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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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   Does the Fairbanks International Airport have permission to sample your private water well?
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_____ _____
Signature Date

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

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How can I be exposed to PFAS?

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Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
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- Some cosmetics

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- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
  - » drinking
  - » food preparation
  - » cooking
  - » brushing teeth, and
  - » preparing infant formula
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  - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

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  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
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PFHxS	Perfluorohexane sulfonic acid

United States Environmental Protection Agency

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

Overview

EPA has established health advisories for PFOA and PFOS based on the agency's assessment of the latest peer-reviewed science to provide drinking water system operators, and state, tribal and local officials who have the primary responsibility for overseeing these systems, with information on the health risks of these chemicals, so they can take the appropriate actions to protect their residents. EPA is committed to supporting states and public water systems as they determine the appropriate steps to reduce exposure to PFOA and PFOS in drinking water. As science on health effects of these chemicals evolves, EPA will continue to evaluate new evidence.

Background on PFOA and PFOS

PFOA and PFOS are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFASs). PFOA and PFOS have been the most extensively produced and studied of these chemicals. They have been used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease or stains. They are also used for firefighting at airfields and in a number of industrial processes.

Because these chemicals have been used in an array of consumer products, most people have been exposed to them. Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer. In 2006, eight major companies voluntarily agreed to phase out their global production of PFOA and PFOA-related chemicals, although there are a limited number of ongoing uses. Scientists have found PFOA and PFOS in the blood of nearly all the people they tested, but these studies show that the levels of PFOA and PFOS in blood have been decreasing. While consumer products and food are a large source of exposure to these chemicals for most people, drinking water can be an additional source in the small percentage of communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, for example, an industrial facility where these chemicals were produced or used to manufacture other products or an airfield at which they were used for firefighting.

EPA's 2016 Lifetime Health Advisories

EPA develops health advisories to provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. EPA's health advisories are non-enforceable and non-regulatory and provide technical information to states agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. In 2009, EPA published provisional health advisories for PFOA and PFOS based on the evidence available at that time. The science has evolved since then and EPA is now replacing the 2009 provisional advisories with new, lifetime health advisories.

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

EPA's 2016 Lifetime Health Advisories, continued

To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.

How the Health Advisories were developed

EPA's health advisories are based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice) and were also informed by epidemiological studies of human populations that have been exposed to PFASs. These studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

EPA's health advisory levels were calculated to offer a margin of protection against adverse health effects to the most sensitive populations: fetuses during pregnancy and breastfed infants. The health advisory levels are calculated based on the drinking water intake of lactating women, who drink more water than other people and can pass these chemicals along to nursing infants through breastmilk.

Recommended Actions for Drinking Water Systems

Steps to Assess Contamination

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should quickly undertake additional sampling to assess the level, scope and localized source of contamination to inform next steps

Steps to Inform

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should promptly notify their State drinking water safety agency (or with EPA in jurisdictions for which EPA is the primary drinking water safety agency) and consult with the relevant agency on the best approach to conduct additional sampling.

Drinking water systems and public health officials should also promptly provide consumers with information about the levels of PFOA and PFOS in their drinking water. This notice should include specific information on the risks to fetuses during pregnancy and breastfed and formula-fed infants from exposure to drinking water with an individual or combined concentration of PFOA and PFOS above EPA's health advisory level of 70 parts per trillion. In addition, the notification should include actions they are taking and identify options that consumers may consider to reduce risk such as seeking an alternative drinking water source, or in the case of parents of formula-fed infants, using formula that does not require adding water.

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

Recommended Actions for Drinking Water Systems, continued

Steps to Limit Exposure

A number of options are available to drinking water systems to lower concentrations of PFOA and PFOS in their drinking water supply. In some cases, drinking water systems can reduce concentrations of perfluoroalkyl substances, including PFOA and PFOS, by closing contaminated wells or changing rates of blending of water sources. Alternatively, public water systems can treat source water with activated carbon or high pressure membrane systems (e.g., reverse osmosis) to remove PFOA and PFOS from drinking water. These treatment systems are used by some public water systems today, but should be carefully designed and maintained to ensure that they are effective for treating PFOA and PFOS. In some communities, entities have provided bottled water to consumers while steps to reduce or remove PFOA or PFOS from drinking water or to establish a new water supply are completed.

Many home drinking water treatment units are certified by independent accredited third party organizations against American National Standards Institute (ANSI) standards to verify their contaminant removal claims. NSF International (NSF®) has developed a protocol for NSF/ANSI Standards 53 and 58 that establishes minimum requirements for materials, design and construction, and performance of point-of-use (POU) activated carbon drinking water treatment systems and reverse osmosis systems that are designed to reduce PFOA and PFOS in public water supplies. The protocol has been established to certify systems (e.g., home treatment systems) that meet the minimum requirements. The systems are evaluated for contaminant reduction by challenging them with an influent of 1.5±30% µg/L (total of both PFOA and PFOS) and must reduce this concentration by more than 95% to 0.07 µg/L or less (total of both PFOA and PFOS) throughout the manufacturer's stated life of the treatment system. Product certification to this protocol for testing home treatment systems verifies that devices effectively reduces PFOA and PFOS to acceptable levels.

Other Actions Relating to PFOA and PFOS

Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer, 3M. EPA also issued regulations to limit future manufacturing, including importation, of PFOS and its precursors, without first having EPA review the new use. A limited set of existing uses for PFOS (fire resistant aviation hydraulic fluids, photography and film products, photomicrolithography process to produce semiconductors, metal finishing and plating baths, component of an etchant) was excluded from these regulations because these uses were ongoing and alternatives were not available.

In 2006, EPA asked eight major companies to commit to working toward the elimination of their production and use of PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. All eight companies have indicated that they have phased out PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. Additionally, PFOA is included in EPA's proposed Toxic Substance Control Act's Significant New Use Rule (SNUR) issued in January 2015 which will ensure that EPA has an opportunity to review any efforts to reintroduce the chemical into the marketplace and take action, as necessary, to address potential concerns.

Other Actions Relating to PFOA and PFOS, continued

EPA has not established national primary drinking water regulations for PFOA and PFOS. EPA is evaluating PFOA and PFOS as drinking water contaminants in accordance with the process required by the Safe Drinking Water Act (SDWA). To regulate a contaminant under SDWA, EPA must find that it: (1) may have adverse health effects; (2) occurs frequently (or there is a substantial likelihood that it occurs frequently) at levels of public health concern; and (3) there is a meaningful opportunity for health risk reduction for people served by public water systems.

EPA included PFOA and PFOS among the list of contaminants that water systems are required to monitor under the third Unregulated Contaminant Monitoring Rule (UCMR 3) in 2012. Results of this monitoring effort are updated regularly and can be found on the publicly-available National Contaminant Occurrence Database (NCOD) (https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3). In accordance with SDWA, EPA will consider the occurrence data from UCMR 3, along with the peer reviewed health effects assessments supporting the PFOA and PFOS Health Advisories, to make a regulatory determination on whether to initiate the process to develop a national primary drinking water regulation.

In addition, EPA plans to begin a separate effort to determine the range of PFAS for which an Integrated Risk Information System (IRIS) assessment is needed. The IRIS Program identifies and characterizes the health hazards of chemicals found in the environment. IRIS assessments inform the first two steps of the risk assessment process: hazard identification, and dose-response. As indicated in the 2015 IRIS Multi-Year Agenda, the IRIS Program will be working with other EPA offices to determine the range of PFAS compounds and the scope of assessment required to best meet Agency needs. More about this effort can be found at https://www.epa.gov/iris/iris-agenda.

Non-Drinking Water Exposure to PFOA and PFOS

These health advisories only apply to exposure scenarios involving drinking water. They are not appropriate for use, in identifying risk levels for ingestion of food sources, including: fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water.

The health advisories are based on exposure from drinking water ingestion, not from skin contact or breathing. The advisory values are calculated based on drinking water consumption and household use of drinking water during food preparation (e.g., cooking or to prepare coffee, tea or soup). To develop the advisories, EPA considered non-drinking water sources of exposure to PFOA and PFOS, including: air, food, dust, and consumer products. In January 2016 the Food and Drug Administration amended its regulations to no longer allow PFOA and PFOS to be added in food packaging, which will likely decrease one source of non-drinking water exposure.

Where Can I Learn More?

- EPA's Drinking Water Health Advisories for PFOA and PFOS can be found at: https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos
- PFOA and PFOS data collected under EPA's Unregulated Contaminant Monitoring Rule are available: https://www.epa.gov/dwucmr/occurrence-data-unregulated-con taminant-monitoring-rule
- EPA's stewardship program for PFAS related to TSCA: https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and -polyfluoroalkyl-substances-pfass-under-tsca
- EPA's research activities on PFASs can be found at: http://www.epa.gov/chemical-research/perfluorinated-chemical-pfc-research
- The Agency for Toxic Substances and Disease Registry's Perflourinated Chemicals and Your Health webpage at: http://www.atsdr.cdc.gov/PFC/

EPA
United States
Environmental Protection
Agency

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
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Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

November 30, 2017

Re: PFAS Project
Fairbanks International Airport
Notice of Public Meeting

Due to the recent discovery of Per- and Polyfluoroalkyl Substances (PFAS) and presence in certain ground water areas and drinking water wells in residences and businesses on or near Fairbanks International Airport (FAI) above the U. S. Environmental Protection Agency's health advisory levels, and public concerns, a meeting is scheduled to share information about the PFAS Project at FAI regarding those affected locations and individuals.

The meeting location, date and time is shown below, and we request that all interested parties attend this informational meeting. FAI will share what actions and steps have been taken and proposed future plans to address and remediate contaminates for those affected by the presence of PFAS in their drinking water wells. This meeting is intended to provide appropriate and correct information regarding PFAS, guidance for those affected, FAI's plan moving forward and our partnership with Alaska Department of Environmental Conservation and Alaska Department of Health and Social Services during the process. Shannon & Wilson, Inc., FAI's environmental services contractor, is continuing to sample wells in designated areas. Residents and business owners in those sampling areas, can set up an appointment by calling 479-0600.

There will be a question and answer session immediately following the presentations to allow everyone an opportunity to discuss their concerns. Please know that the health and safety of those potentially affected by these contaminates is critical and of the utmost importance to FAI. It is our mission to ensure that the public is informed and all concerns are addressed.

Meeting Location: LaQuinta Inn & Suites
4920 Dale Road
Fairbanks, AK 99709

Meeting Date & Time: Monday, December 18, 2017
4:00 p.m. – 7:00 p.m.

Presenters: Angie Spear, Fairbanks International Airport
Robert Burgess, Alaska Department of Environmental Conservation
Stacey Cooper, Alaska Department of Health and Social Services

Please do not hesitate to contact Angie Spear, Fairbanks International Airport, at 474-2529, if you have questions or concerns prior to the scheduled meeting time.

Regards,

Angie Spear
Division Operations Manager

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

December 4, 2017

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas. In late November the FAI encountered PFASs in groundwater in the Dale Road area, east of the Chena River.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Results of the water samples will be shared with property residents. Where wells are found to have PFAS levels at concentrations higher than advised, the FAI is assisting those property owners with access to clean drinking water.

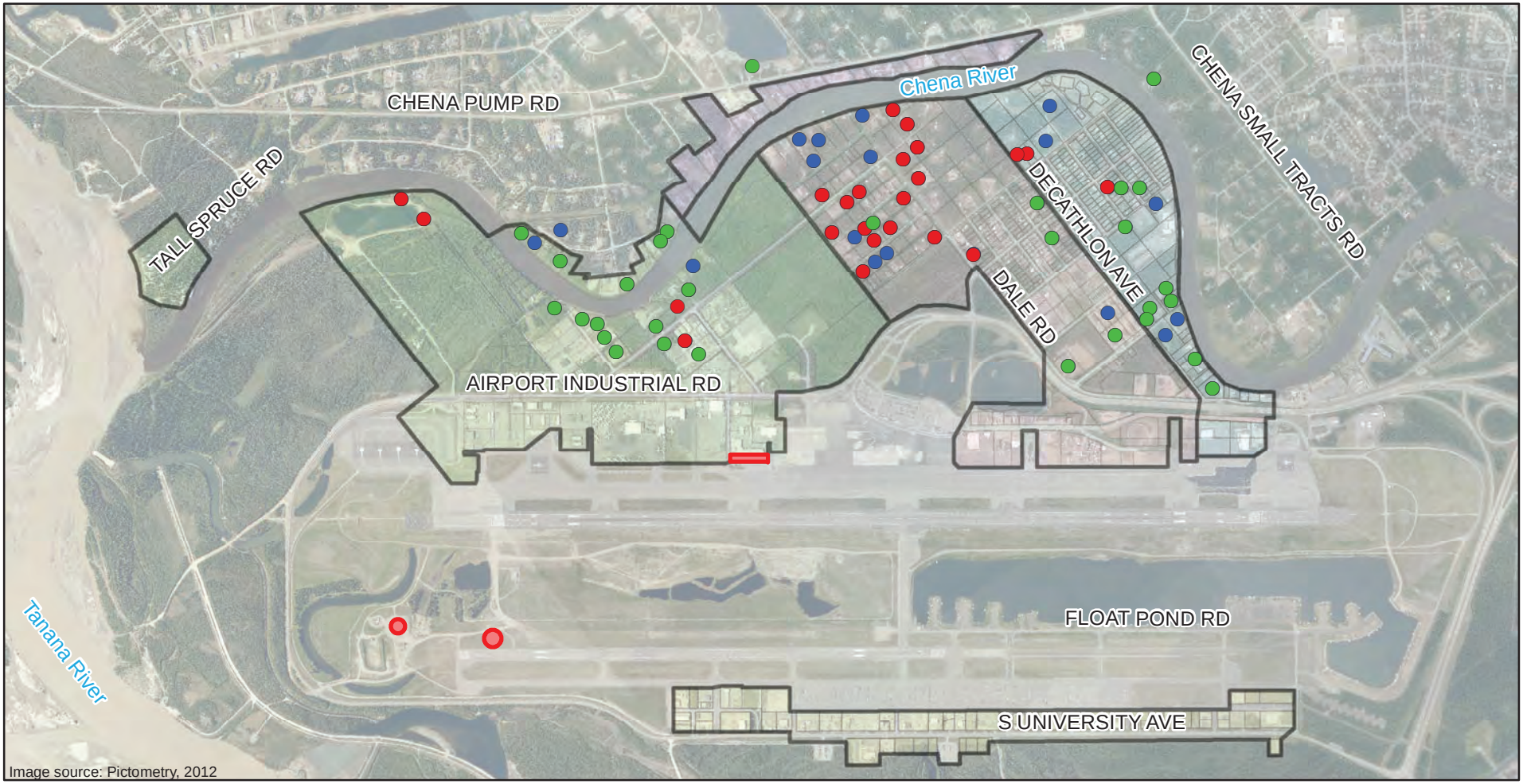
Shannon & Wilson Inc. is conducting water sampling in your area. Enclosed is a Private Well Inventory Survey Form.

- If you have an active well please return the attached Private Well Inventory Survey form using the envelope provided.
- If you have an active well that is used for drinking or cooking please contact **Shannon & Wilson, Inc. at 479-0600 to schedule a sampling appointment**.

For more information visit dot.alaska.gov/faigroundwater, we appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.



LEGEND

- PFOS and PFOA Under Lifetime Health Advisory Level (70 ng/L)
- Over 70 ng/L
- Result not yet received
- Initial Well Search Areas
- Aircraft Rescue and Firefighting (ARFF) Training Sites
- Area 1 Parcels
- Area 2 Parcels
- Area 3 Parcels
- Area 4 Parcels
- Area 5 Parcels

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Miles

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Fairbanks International Airport
Fairbanks, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

December 2017 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

- PFAS do not occur naturally, but are widespread in the environment.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies a long time.
- Some PFAS do not break down easily in the environment.

How can I be exposed to PFAS?

PFAS contamination may be in drinking water, food, indoor dust, some consumer products, and workplaces. Most non worker exposures occur through drinking contaminated water or eating food that contains PFAS.

Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics

How can I reduce my exposure to PFAS?

PFAS are present at low levels in some food products and in the environment (air, water, soil etc.), so you probably cannot prevent PFAS exposure altogether. However, if you live near known sources of PFAS contamination, you can take steps to reduce your risk of exposure.

- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
  - » drinking
  - » food preparation
  - » cooking
  - » brushing teeth, and
  - » preparing infant formula
- Check for fish advisories for water bodies where you fish.
  - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

How can PFAS affect people's health?

Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful. Although more research is needed, some studies in people have shown that certain PFAS may:

- affect growth, learning, and behavior of infants and older children
- lower a woman's chance of getting pregnant
- interfere with the body's natural hormones
- increase cholesterol levels
- affect the immune system and
- increase the risk of cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of PFAS.

How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
  - CDC Info: https://www.cdc.gov/cdc-info/, or **(800) 232-4636**.
  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
- **National Toxicology Program:** https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at **(800) 638-2772**.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
PFOS	Perfluorooctane sulfonic acid
PFOA (or C8)	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFOSA (or FOSA)	Perfluorooctane sulfonaminde
MeFOSAA (aka Me-PFOSA-AcOH)	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____

Parcel: _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location:
Adults (18 and over) _____
Teenagers (13 to 17) _____
Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

---

1) From where do you obtain your drinking water?
   a) College Utilities Water Supply ☐ b) Well Water ☐
   c) Water Delivery ☐ d) Other ☐

2) If you have a water well, please answer the following questions:
   a) Where is the well located on the property? _____
   b) Is the well in use? Yes ☐ No ☐
   c) If yes, please check all that apply regarding the usage of your well water:
      Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____
   d) If no, is the well usable, unusable, or properly abandoned?
      Usable ☐ Unusable ☐ Abandoned ☐ Method _____
   e) When was the well installed? _____
   f) What is the well depth? _____
   g) What is the well diameter? _____
   h) What is the well type? ☐ Dug Well ☐ Driven ☐ Drilled ☐ Unknown
   i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____
      _____

3) Sample Permission
   Does the Fairbanks International Airport have permission to sample your private water well?
   ☐ Yes ☐ No

_____ _____
Signature Date

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

November 30, 2017

Re: PFAS Project
Fairbanks International Airport
Notice of Public Meeting

Due to the recent discovery of Per- and Polyfluoroalkyl Substances (PFAS) and presence in certain ground water areas and drinking water wells in residences and businesses on or near Fairbanks International Airport (FAI) above the U. S. Environmental Protection Agency's health advisory levels, and public concerns, a meeting is scheduled to share information about the PFAS Project at FAI regarding those affected locations and individuals.

The meeting location, date and time is shown below, and we request that all interested parties attend this informational meeting. FAI will share what actions and steps have been taken and proposed future plans to address and remediate contaminates for those affected by the presence of PFAS in their drinking water wells. This meeting is intended to provide appropriate and correct information regarding PFAS, guidance for those affected, FAI's plan moving forward and our partnership with Alaska Department of Environmental Conservation and Alaska Department of Health and Social Services during the process. Shannon & Wilson, Inc., FAI's environmental services contractor, is continuing to sample wells in designated areas. Residents and business owners in those sampling areas, can set up an appointment by calling 479-0600.

There will be a question and answer session immediately following the presentations to allow everyone an opportunity to discuss their concerns. Please know that the health and safety of those potentially affected by these contaminates is critical and of the utmost importance to FAI. It is our mission to ensure that the public is informed and all concerns are addressed.

Meeting Location: LaQuinta Inn & Suites
4920 Dale Road
Fairbanks, AK 99709

Meeting Date & Time: Monday, December 18, 2017
4:00 p.m. – 7:00 p.m.

Presenters: Angie Spear, Fairbanks International Airport
Robert Burgess, Alaska Department of Environmental Conservation
Stacey Cooper, Alaska Department of Health and Social Services

Please do not hesitate to contact Angie Spear, Fairbanks International Airport, at 474-2529, if you have questions or concerns prior to the scheduled meeting time.

Regards,

Angie Spear
Division Operations Manager

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

December 4, 2017

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas. In late November the FAI encountered PFASs in groundwater in the Dale Road area.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Enclosed is a Fact Sheet about PFAS, agency contact information to help address questions, and a Private Well Inventory Survey Form. Your participation in the survey helps ensure the study is thorough, but also identifies those in the area at potential risk of drinking PFAS-contaminated water.

Results of the water samples will be shared with property residents. Where wells are found to have PFAS levels at concentrations higher than advised, the FAI is assisting those property owners with access to clean drinking water.

If you have any questions, please contact me, or see the list of attached contacts to help direct you to the most appropriate person/agency for your inquiry. We appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

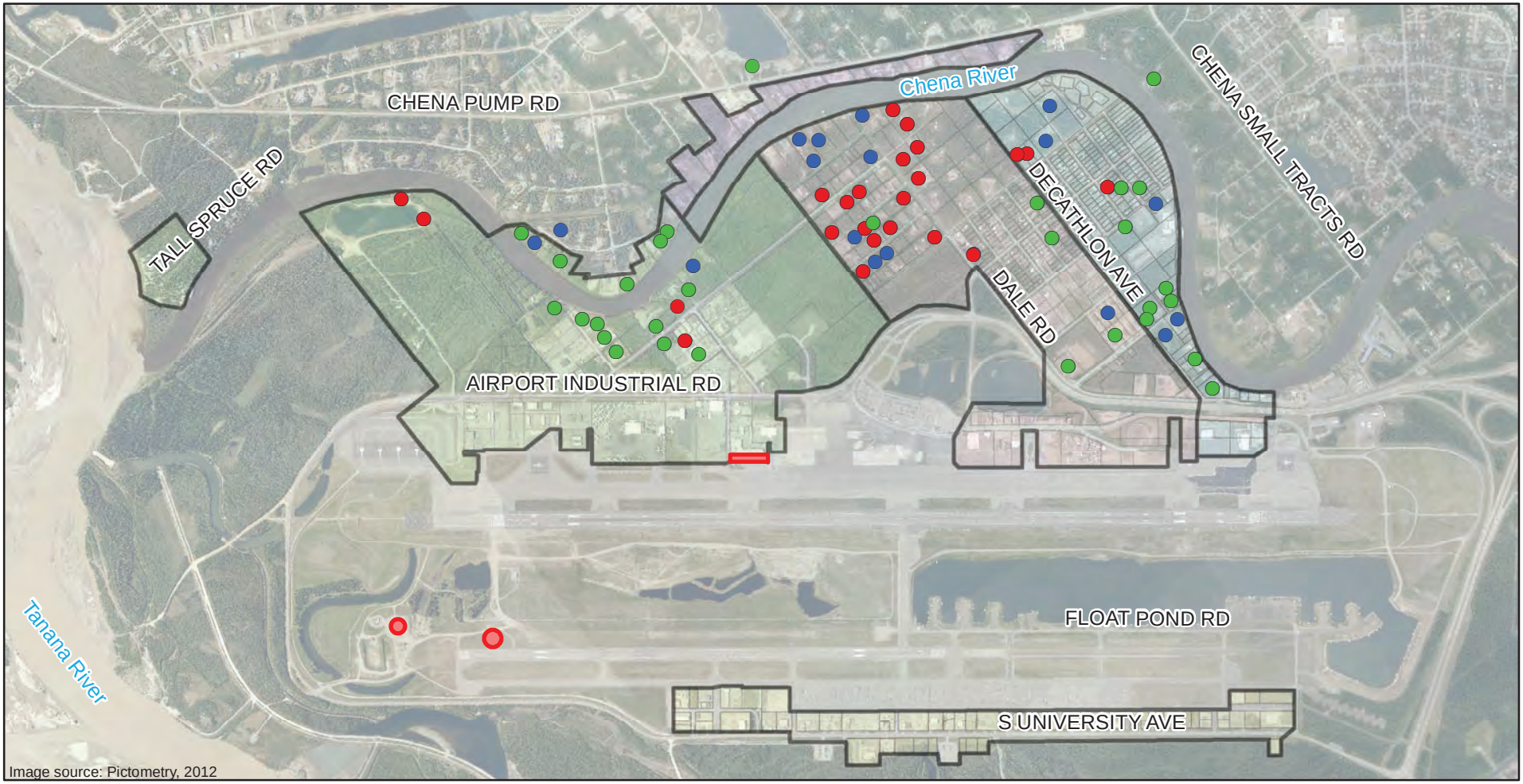
Contacts

For questions about testing & study:
Shannon & Wilson, Inc.
Marcy Nadel, Project Manager
Phone: 907-458-3150
Email: mdn@shanwil.com

For regulatory questions:
Alaska Department of Environmental Conservations,
Contaminated Site Program
Robert Burgess, Environmental Program Specialist III
Phone: 907-451-2153
Email: robert.burgess@alaska.gov

For questions about PFC health effects:
Alaska Department of Health & Social Services
Stacey Cooper, Health Assessor
Phone: 907-269-8016
Email: stacey.cooper@alaska.gov
Division of Public Health Website:
www.dhss.alaska.gov/dph/epi/eph/Pages/default.aspx

For questions about ARFF Training Area and all other inquiries:
Angie Spear, Division Operations Manager
Phone: 907-474-2529
Email: angie.spear@alaska.gov
Sammy Loud, Communications Specialist
Phone: 907-474-2522
Email: sam.loud@alaska.gov



LEGEND

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- Over 70 ng/L
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Miles

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Fairbanks International Airport
Fairbanks, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

December 2017 31-1-20060-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____

Parcel: _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location:
Adults (18 and over) _____
Teenagers (13 to 17) _____
Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

---

1) From where do you obtain your drinking water?
   a) College Utilities Water Supply ☐ b) Well Water ☐
   c) Water Delivery ☐ d) Other ☐

2) If you have a water well, please answer the following questions:
   a) Where is the well located on the property? _____
   b) Is the well in use? Yes ☐ No ☐
   c) If yes, please check all that apply regarding the usage of your well water:
      Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____
   d) If no, is the well usable, unusable, or properly abandoned?
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   f) What is the well depth? _____
   g) What is the well diameter? _____
   h) What is the well type? ☐ Dug Well ☐ Driven ☐ Drilled ☐ Unknown
   i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____
      _____

3) Sample Permission
   Does the Fairbanks International Airport have permission to sample your private water well?
   ☐ Yes ☐ No

_____ _____
Signature Date

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

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- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
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  - » cooking
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  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
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Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

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- interfere with the body's natural hormones
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  - CDC Info: https://www.cdc.gov/cdc-info/, or **(800) 232-4636**.
  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
- **National Toxicology Program:** https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at **(800) 638-2772**.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
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Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

United States Environmental Protection Agency

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

Overview

EPA has established health advisories for PFOA and PFOS based on the agency's assessment of the latest peer-reviewed science to provide drinking water system operators, and state, tribal and local officials who have the primary responsibility for overseeing these systems, with information on the health risks of these chemicals, so they can take the appropriate actions to protect their residents. EPA is committed to supporting states and public water systems as they determine the appropriate steps to reduce exposure to PFOA and PFOS in drinking water. As science on health effects of these chemicals evolves, EPA will continue to evaluate new evidence.

Background on PFOA and PFOS

PFOA and PFOS are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFASs). PFOA and PFOS have been the most extensively produced and studied of these chemicals. They have been used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease or stains. They are also used for firefighting at airfields and in a number of industrial processes.

Because these chemicals have been used in an array of consumer products, most people have been exposed to them. Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer. In 2006, eight major companies voluntarily agreed to phase out their global production of PFOA and PFOA-related chemicals, although there are a limited number of ongoing uses. Scientists have found PFOA and PFOS in the blood of nearly all the people they tested, but these studies show that the levels of PFOA and PFOS in blood have been decreasing. While consumer products and food are a large source of exposure to these chemicals for most people, drinking water can be an additional source in the small percentage of communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, for example, an industrial facility where these chemicals were produced or used to manufacture other products or an airfield at which they were used for firefighting.

EPA's 2016 Lifetime Health Advisories

EPA develops health advisories to provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. EPA's health advisories are non-enforceable and non-regulatory and provide technical information to states agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. In 2009, EPA published provisional health advisories for PFOA and PFOS based on the evidence available at that time. The science has evolved since then and EPA is now replacing the 2009 provisional advisories with new, lifetime health advisories.

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

EPA's 2016 Lifetime Health Advisories, continued

To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.

How the Health Advisories were developed

EPA's health advisories are based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice) and were also informed by epidemiological studies of human populations that have been exposed to PFASs. These studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

EPA's health advisory levels were calculated to offer a margin of protection against adverse health effects to the most sensitive populations: fetuses during pregnancy and breastfed infants. The health advisory levels are calculated based on the drinking water intake of lactating women, who drink more water than other people and can pass these chemicals along to nursing infants through breastmilk.

Recommended Actions for Drinking Water Systems

Steps to Assess Contamination

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should quickly undertake additional sampling to assess the level, scope and localized source of contamination to inform next steps

Steps to Inform

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should promptly notify their State drinking water safety agency (or with EPA in jurisdictions for which EPA is the primary drinking water safety agency) and consult with the relevant agency on the best approach to conduct additional sampling.

Drinking water systems and public health officials should also promptly provide consumers with information about the levels of PFOA and PFOS in their drinking water. This notice should include specific information on the risks to fetuses during pregnancy and breastfed and formula-fed infants from exposure to drinking water with an individual or combined concentration of PFOA and PFOS above EPA's health advisory level of 70 parts per trillion. In addition, the notification should include actions they are taking and identify options that consumers may consider to reduce risk such as seeking an alternative drinking water source, or in the case of parents of formula-fed infants, using formula that does not require adding water.

FACT SHEET
PFOA & PFOS Drinking Water Health Advisories

Recommended Actions for Drinking Water Systems, continued

Steps to Limit Exposure

A number of options are available to drinking water systems to lower concentrations of PFOA and PFOS in their drinking water supply. In some cases, drinking water systems can reduce concentrations of perfluoroalkyl substances, including PFOA and PFOS, by closing contaminated wells or changing rates of blending of water sources. Alternatively, public water systems can treat source water with activated carbon or high pressure membrane systems (e.g., reverse osmosis) to remove PFOA and PFOS from drinking water. These treatment systems are used by some public water systems today, but should be carefully designed and maintained to ensure that they are effective for treating PFOA and PFOS. In some communities, entities have provided bottled water to consumers while steps to reduce or remove PFOA or PFOS from drinking water or to establish a new water supply are completed.

Many home drinking water treatment units are certified by independent accredited third party organizations against American National Standards Institute (ANSI) standards to verify their contaminant removal claims. NSF International (NSF®) has developed a protocol for NSF/ANSI Standards 53 and 58 that establishes minimum requirements for materials, design and construction, and performance of point-of-use (POU) activated carbon drinking water treatment systems and reverse osmosis systems that are designed to reduce PFOA and PFOS in public water supplies. The protocol has been established to certify systems (e.g., home treatment systems) that meet the minimum requirements. The systems are evaluated for contaminant reduction by challenging them with an influent of 1.5±30% µg/L (total of both PFOA and PFOS) and must reduce this concentration by more than 95% to 0.07 µg/L or less (total of both PFOA and PFOS) throughout the manufacturer's stated life of the treatment system. Product certification to this protocol for testing home treatment systems verifies that devices effectively reduces PFOA and PFOS to acceptable levels.

Other Actions Relating to PFOA and PFOS

Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer, 3M. EPA also issued regulations to limit future manufacturing, including importation, of PFOS and its precursors, without first having EPA review the new use. A limited set of existing uses for PFOS (fire resistant aviation hydraulic fluids, photography and film products, photomicrolithography process to produce semiconductors, metal finishing and plating baths, component of an etchant) was excluded from these regulations because these uses were ongoing and alternatives were not available.

In 2006, EPA asked eight major companies to commit to working toward the elimination of their production and use of PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. All eight companies have indicated that they have phased out PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. Additionally, PFOA is included in EPA's proposed Toxic Substance Control Act's Significant New Use Rule (SNUR) issued in January 2015 which will ensure that EPA has an opportunity to review any efforts to reintroduce the chemical into the marketplace and take action, as necessary, to address potential concerns.

Other Actions Relating to PFOA and PFOS, continued

EPA has not established national primary drinking water regulations for PFOA and PFOS. EPA is evaluating PFOA and PFOS as drinking water contaminants in accordance with the process required by the Safe Drinking Water Act (SDWA). To regulate a contaminant under SDWA, EPA must find that it: (1) may have adverse health effects; (2) occurs frequently (or there is a substantial likelihood that it occurs frequently) at levels of public health concern; and (3) there is a meaningful opportunity for health risk reduction for people served by public water systems.

EPA included PFOA and PFOS among the list of contaminants that water systems are required to monitor under the third Unregulated Contaminant Monitoring Rule (UCMR 3) in 2012. Results of this monitoring effort are updated regularly and can be found on the publicly-available National Contaminant Occurrence Database (NCOD) (https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3). In accordance with SDWA, EPA will consider the occurrence data from UCMR 3, along with the peer reviewed health effects assessments supporting the PFOA and PFOS Health Advisories, to make a regulatory determination on whether to initiate the process to develop a national primary drinking water regulation.

In addition, EPA plans to begin a separate effort to determine the range of PFAS for which an Integrated Risk Information System (IRIS) assessment is needed. The IRIS Program identifies and characterizes the health hazards of chemicals found in the environment. IRIS assessments inform the first two steps of the risk assessment process: hazard identification, and dose-response. As indicated in the 2015 IRIS Multi-Year Agenda, the IRIS Program will be working with other EPA offices to determine the range of PFAS compounds and the scope of assessment required to best meet Agency needs. More about this effort can be found at https://www.epa.gov/iris/iris-agenda.

Non-Drinking Water Exposure to PFOA and PFOS

These health advisories only apply to exposure scenarios involving drinking water. They are not appropriate for use, in identifying risk levels for ingestion of food sources, including: fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water.

The health advisories are based on exposure from drinking water ingestion, not from skin contact or breathing. The advisory values are calculated based on drinking water consumption and household use of drinking water during food preparation (e.g., cooking or to prepare coffee, tea or soup). To develop the advisories, EPA considered non-drinking water sources of exposure to PFOA and PFOS, including: air, food, dust, and consumer products. In January 2016 the Food and Drug Administration amended its regulations to no longer allow PFOA and PFOS to be added in food packaging, which will likely decrease one source of non-drinking water exposure.

Where Can I Learn More?

- EPA's Drinking Water Health Advisories for PFOA and PFOS can be found at: https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos
- PFOA and PFOS data collected under EPA's Unregulated Contaminant Monitoring Rule are available: https://www.epa.gov/dwucmr/occurrence-data-unregulated-con taminant-monitoring-rule
- EPA's stewardship program for PFAS related to TSCA: https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and -polyfluoroalkyl-substances-pfass-under-tsca
- EPA's research activities on PFASs can be found at: http://www.epa.gov/chemical-research/perfluorinated-chemical-pfc-research
- The Agency for Toxic Substances and Disease Registry's Perflourinated Chemicals and Your Health webpage at: http://www.atsdr.cdc.gov/PFC/

EPA
United States
Environmental Protection
Agency

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of
Health and Social Services

DIVISION OF PUBLIC HEALTH
Section of Epidemiology

3601 C Street, Suite 540
Anchorage, Alaska 99503
Main: 907.269.8000
Fax: 907.562.7802

December 18, 2017

Perfluoroalkyl Substances — Fairbanks International Airport

Introduction

Recently, chemicals called perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were found at the Fairbanks International Airport (FAI) — and in water wells nearby. Contact with these chemicals — such as drinking contaminated water — may cause health problems. Below you'll find information you need to know about PFOS and PFOA.

Summary

- PFOS and PFOA are chemicals that may harm your health.
- If your well has levels of PFOS and PFOA higher than the health advisory (70 nanograms/liter or parts per trillion), you should use another water source for drinking water and cooking.
- You can still use your water to bathe, clean, wash dishes, and do laundry.
- FAI is providing drinking water to people whose well water is above EPA's advisory level for PFOS and PFOA.

About PFOS and PFOA

What are PFOS and PFOA?

PFOS and PFOA are perfluoroalkyl substances (PFAS) — human-made chemicals that have been used for both residential and industrial purposes. PFAS have been found in some products that resist fire, stains, grease, and water such as:

- Furniture
- Carpeting
- Clothing
- Firefighting foams
- Food Packaging

At the FAI, the source(s) of PFAS is certain firefighting foams that contained PFAS.

How could I come into contact with PFAS?
Because PFAS were widely used worldwide, stay in the environment for a long time, and travel long distances in water and air, there are small amounts in many water and some food sources. Most people have come into contact with low levels of PFAS. PFAS are also found in the blood or tissue of wildlife, like fish and marine mammals such as seals and sea lions.

Usually, people come into contact with PFAS by eating or drinking them in food and water. Additionally:

- Women who are exposed to PFAS pass it to their unborn babies during pregnancy — and to their infants through breastfeeding.
- Children may come into contact with small amounts of PFAS in the home by touching products (such as carpet) with PFAS and then putting their hands in their mouths.

How can PFAS affect my health?
Some, but not all, scientific literature suggests that certain PFAS may affect a variety of systems in the body. Additional research is needed to better understand possible human health effects from exposure to PFAS in water and food.

Scientists are not yet certain about the possible health effects resulting from human exposure to PFAS at levels typically found in our food and water. Some, but not all studies in humans have suggested that certain PFAS may affect the developing fetus and child. Potential health effects from exposure to PFAS may include:

- Affect the development of unborn babies and breastfeeding infants — including possible changes in growth, learning, and behavior
- Decrease fertility and interfere with the body's natural hormones
- Increase cholesterol
- Affect the immune system
- Increase the risk of certain types of cancer

More research is needed to confirm or rule out possible links between health effects of potential concern and exposure to PFAS. At this time, we cannot tell if drinking well water near the FAI in Fairbanks could be causing any current health problems — or if it will cause problems in the future.

How can I tell if I have come into contact with PFAS?
PFAS can be measured in the blood, however, there are some limitations on blood tests to consider. Individuals who feel they may have been exposed to high levels of PFOA or PFOS and would like to have their blood levels measured should keep in mind that this is not a routine test that health care providers offer. The test results will not provide clear answers for existing or possible health effects. Individuals who feel the need to be tested should consult with their health care provider, local and state health department or other health professionals on how to move forward. The body's natural elimination processes are the only way to remove PFAS from the body.

What is the health advisory for PFOS and PFOA?
The U.S. Environmental Protection Agency (EPA) has set a lifetime health advisory (LHA) level for PFOS and PFOA — individually or combined— of no more than 70 nanograms per liter of water (ng/L or ppt - parts per trillion). The LHA is designed to protect people from contact with PFOS and PFOA in drinking water — including unborn babies and infants.

Safety Information for Fairbanks Residents

Can I drink my well water? What about my pets?
If levels of PFOS or PFOA (or the 2 combined) are at or above the health advisory level (70 ng/L or parts per trillion), do **not** drink your tap water or use it to prepare baby formula. Also avoid giving it to pets and other animals.

Is it safe to cook with my well water?
If your well water has levels of PFOS or PFOA (or the 2 combined) at or above the health advisory, do **not** use your well water to cook — even if you heat or boil it first. Boiling water doesn't remove PFOS and PFOA.

Is it safe to shower, take baths, and brush my teeth with my well water?
It is very unlikely that showering or taking baths with well water could cause any health problems. This is because:

- Your skin does not absorb (take in) enough PFOS and PFOA to cause problems. PFOS and PFOA also do not irritate the skin.
- PFOS and PFOA do not move easily from water to air — that means it is unlikely that you will breathe it in when using well water.

It is safe to shower and bathe in PFAS- contaminated water. If your water contains PFAS, particularly if levels exceed the LHA, you can reduce exposure by using an alternative or treated water source for brushing teeth, and any activity that might result in ingestion of water.

Can I clean, wash dishes, wash clothes, and rinse food with my well water?
It is safe to use well water to clean your house, wash dishes, and do laundry. However, we recommend that you rinse food with clean water.

Can I breastfeed my child if I have been drinking my well water?
Breastfeeding is linked with numerous health benefits for both infants and mothers. At this time, it is recommended that nursing mothers continue to breastfeed. The science on the health effects of PFAS for mothers and babies is evolving. However, given the scientific understanding at this time, the benefits of breastfeeding outweigh any known risk. To better weigh the risks and benefits of breastfeeding, please talk to your doctor.

Is it safe to water my vegetable garden with my well water?
We do not have a clear answer to this question at this time. Some studies have shown that vegetables grown in soil with high levels of PFAS may absorb the chemicals. But this could depend on a lot of different factors (e.g., level of PFAS in water, the type of PFAS contamination, the amount of garden watering, and the type of produce grown).

One study showed that garden plants watered with water contaminated with PFAS took in only very small amounts of the chemicals. The study also noted that the health benefits of eating fresh vegetables outweigh any health risks from small amounts of PFAS.

Soil particles can stick to plants, vegetables, and fruits. Low-lying plants, leafy vegetables (e.g., spinach and lettuce) and root crops (e.g., potatoes and carrots) are more likely to have soil particles on them and possibly contribute to human exposure through incidental ingestion. Some studies show that PFAS can accumulate at low levels in plant roots. Uptake of contaminants by the roots of a plant may move into other portions of the plant but usually at even lower concentrations. Your exposure to PFAS through garden vegetables is not likely to be significant compared to other primary exposure routes such as drinking contaminated water.

In the end it is up to you. Some people living near the FAI may feel more comfortable using a different water source with confirmed lower PFAS levels for their vegetable gardens. However, if you choose to use your well for your garden, we recommend you wash your vegetables with clean water and peel root vegetables.

Next Steps

How often will my well water be tested for PFAS?
The FAI is currently checking wells near the airport. How often the wells are checked will depend on how high the levels of PFAS are. Wells that contain concentrations of PFAS exceeding 35 ng/L (half the LHA) will be sampled quarterly. Homes that have wells that exceed the LHA will not be resampled, as interim water is being provided and they will be connected to a permanent source of municipal drinking water as soon as possible.

What is the Alaska Section of Epidemiology doing to address concerns about PFAS in drinking water?
The Section of Epidemiology is taking steps to protect Fairbanks residents, including:

- Working with the Alaska Department of Environmental Conservation (ADEC) and the Agency for Toxic Substances and Disease Registry (ATSDR) to understand how PFAS from well water may affect people living near the FAI.
- Finding more information about PFAS and updating our recommendations as data become available.

Where can I get more information?

- To learn more about health effects of PFAS, contact the Alaska Section of Epidemiology at **907-269-8000.**
- To learn more about well water testing, contact the Alaska Department of Environmental Conservation at **907-451-2153.**
- If you have health concerns about PFAS, please talk with your health care provider.

You can also find additional information in the following resources:

- ATSDR's PFAS web page: https://www.atsdr.cdc.gov/pfc/index.html
- PFOS and PFOA Drinking Water Health Advisories (EPA) https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf
- Alaska Environmental Public Health Program http://dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

PFAS Fact Sheet

December 2017

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFAS are considered emerging environmental contaminants and the health effects are not well known. The presumed source of PFASs in groundwater near the Fairbanks International Airport (FAI) is the use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) training areas. The FAI has hired Shannon & Wilson to test private water-supply wells for PFASs.

The FAI has tested over 100 private water-supply wells starting in November 2017. Some properties in the well testing area are connected to the College Utilities water system and do not have water wells.

We are testing water for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and several other PFASs.

The U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water is **70 parts per trillion** for PFOS, PFOA, or the sum of the two.

We advise that residents with test results above this level do not use their water for drinking or cooking. The health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFAS exposure are not well established.

Test results are typically available within two to three weeks.

PFASs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting foams.

An updated PFAS results map is available at:
www.dot.alaska.gov/faiiap/arff-training-areas-contamination.shtml

For questions about well testing and study:
Shannon & Wilson Inc.
Marcy Nadel, Project Manager
Phone: 907-479-0600 Email: mdn@shanwil.com

For regulatory questions:
Alaska Dept. of Environmental Conservation
Robert Burgess, Contaminated Sites Program
Phone: 907-451-2153 Email: robert.burgess@alaska.gov

For questions about PFAS health effects:
Alaska Dept. of Health & Social Services
Stacey Cooper, Health Assessor
Phone: 907-269-8016 Email: stacey.cooper@alaska.gov

To arrange your next water delivery:
Vision Construction
Phone: 907-479-0380 Email: water@visionunited.com

To file an insurance claim:
Alaska Dept. of Admin., Risk Management
Jack Albrecht, Claims Administrator
Phone: 907-465-2183 Email: jack.albrecht@alaska.gov

For questions about ARFF training & other inquiries:
Angie Spear, Division Operations Manager
Phone: 907-474-2529
Sammy Loud, Communications Specialist
Phone: 907-474-2522
Email: FAIgroundwater@alaska.gov

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

January 10, 2018

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas. In late November, the FAI encountered PFASs in groundwater in the Dale Road area, east of the Chena River.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Results of the water samples will be shared with property residents. Where wells are found to have PFAS levels at concentrations higher than advised, the FAI is assisting those property owners with access to clean drinking water.

Shannon & Wilson Inc. is conducting water sampling in your area. Enclosed is a Private Well Inventory Survey Form. If you have a well please return the attached Private Well Inventory Survey form using the envelope provided, or contact Shannon & Wilson, Inc. at 479-0600.

For more information please see the enclosed PFAS Fact Sheet or visit dot.alaska.gov/faigroundwater. We appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.

Fairbanks International Airport
AeroNexus®

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

January 10, 2018

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Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Results of the water samples will be shared with property residents. Where wells are found to have PFAS levels at concentrations higher than advised, the FAI is assisting those property owners with access to clean drinking water.

We have not encountered PFASs above the lifetime health advisory level on the Chena Pump Road side of the Chena River. However, Shannon & Wilson Inc. is conducting water sampling in your area. Enclosed is a Private Well Inventory Survey Form. If you have a well please return the attached Private Well Inventory Survey form using the envelope provided, or contact Shannon & Wilson, Inc. at 479-0600.

For more information please see the enclosed PFAS Fact Sheet or visit dot.alaska.gov/faigroundwater. We appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

Angie Spear
Division Operations Manager, C.M.

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Ted Stevens Anchorage International Airport
Fairbanks International Airport

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PFAS Fact Sheet

January 2018

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The FAI has tested over 115 private water-supply wells starting in November 2017. Some properties in the well testing area are connected to the College Utilities water system and do not have water wells.

We are testing water for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and several other PFASs.

The U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water is **70 parts per trillion** for PFOS, PFOA, or the sum of the two.

We advise that residents with test results above this level do not use their water for drinking or cooking. The health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFAS exposure are not well established.

Test results are typically available within two to three weeks of sample collection.

PFASs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting foams.

An updated PFAS results map is available at:
www.dot.alaska.gov/faigroundwater

For questions about well testing and study:
Shannon & Wilson Inc.
Marcy Nadel, Project Manager
Phone: 907-479-0600 Email: mdn@shanwil.com

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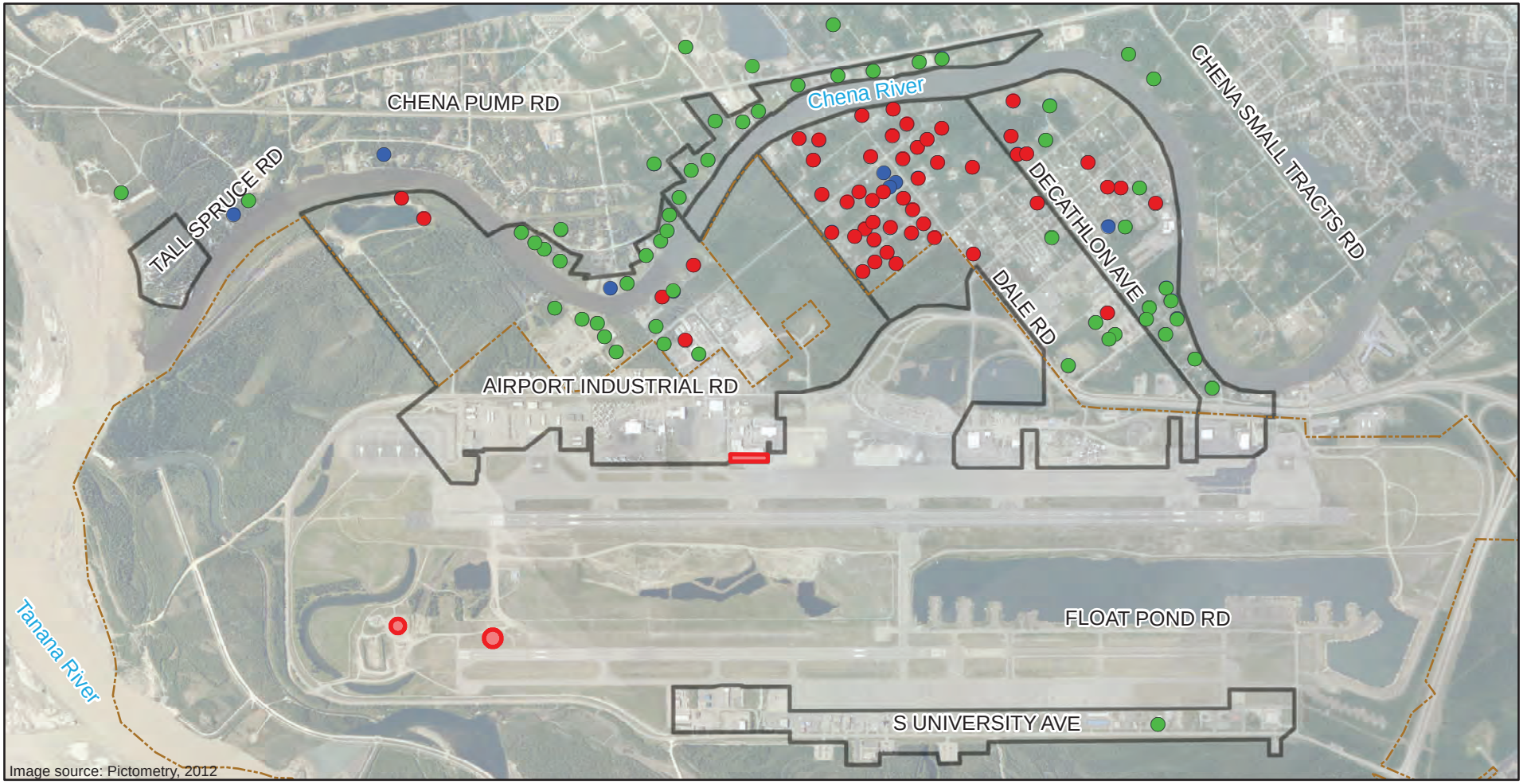
For questions about PFAS health effects:
Alaska Dept. of Health & Social Services
Stacey Cooper, Health Assessor
Phone: 907-269-8016 Email: stacey.cooper@alaska.gov

To arrange your next water delivery:
Vision Construction
Phone: 907-479-0380 Email: water@visionunited.com

To file an insurance claim:
Alaska Dept. of Admin., Risk Management
Jack Albrecht, Claims Administrator
Phone: 907-465-2183 Email: jack.albrecht@alaska.gov

For questions about ARFF training & other inquiries:
Angie Spear, Division Operations Manager
Phone: 907-474-2529
Sammy Loud, Communications Specialist
Phone: 907-474-2522
Email: FAIgroundwater@alaska.gov



LEGEND

- PFOS and PFOA Under Lifetime Health Advisory Level (70 ppt)
- Over 70 ppt
- Result not yet received
- Aircraft Rescue and Firefighting (ARFF) Training Sites
- FAI Boundary
- Initial Well Search Areas

0 0.5

Miles

N

Fairbanks International Airport
Fairbanks, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

December 27, 2017 31-1-20060-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

- PFAS do not occur naturally, but are widespread in the environment.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies a long time.
- Some PFAS do not break down easily in the environment.

How can I be exposed to PFAS?

PFAS contamination may be in drinking water, food, indoor dust, some consumer products, and workplaces. Most non worker exposures occur through drinking contaminated water or eating food that contains PFAS.

Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics

How can I reduce my exposure to PFAS?

PFAS are present at low levels in some food products and in the environment (air, water, soil etc.), so you probably cannot prevent PFAS exposure altogether. However, if you live near known sources of PFAS contamination, you can take steps to reduce your risk of exposure.

- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
  - » drinking
  - » food preparation
  - » cooking
  - » brushing teeth, and
  - » preparing infant formula
- Check for fish advisories for water bodies where you fish.
  - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

How can PFAS affect people's health?

Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful. Although more research is needed, some studies in people have shown that certain PFAS may:

- affect growth, learning, and behavior of infants and older children
- lower a woman's chance of getting pregnant
- interfere with the body's natural hormones
- increase cholesterol levels
- affect the immune system and
- increase the risk of cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of PFAS.

How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
  - CDC Info: https://www.cdc.gov/cdc-info/, or **(800) 232-4636**.
  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
- **National Toxicology Program:** https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at **(800) 638-2772**.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
PFOS	Perfluorooctane sulfonic acid
PFOA (or C8)	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFOSA (or FOSA)	Perfluorooctane sulfonaminde
MeFOSAA (aka Me-PFOSA-AcOH)	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____

Parcel: _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location:
Adults (18 and over) _____
Teenagers (13 to 17) _____
Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

---

1) From where do you obtain your drinking water?
   a) College Utilities Water Supply ☐ b) Well Water ☐
   c) Water Delivery ☐ d) Other ☐

2) If you have a water well, please answer the following questions:
   a) Where is the well located on the property? _____
   b) Is the well in use? Yes ☐ No ☐
   c) If yes, please check all that apply regarding the usage of your well water:
      Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____
   d) If no, is the well usable, unusable, or properly abandoned?
      Usable ☐ Unusable ☐ Abandoned ☐ Method _____
   e) When was the well installed? _____
   f) What is the well depth? _____
   g) What is the well diameter? _____
   h) What is the well type? ☐ Dug Well ☐ Driven ☐ Drilled ☐ Unknown
   i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____
      _____

3) Sample Permission
   Does the Fairbanks International Airport have permission to sample your private water well?
   ☐ Yes ☐ No

_____ _____
Signature Date

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709
Main: 907.474.2500
Fax: 907.474.2513

February 26, 2018

Re: PFAS Project
Fairbanks International Airport
Notice of Open House

Due to the discovery of Per- and Polyfluoroalkyl Substances (PFAS) in groundwater on or near Fairbanks International Airport (FAI), an open house is scheduled to share updated information about the PFAS Project at FAI regarding construction, timelines, Risk Management's role and their insurance claims process, and long-term monitoring.

FAI will share what actions have been taken and proposed future plans to address and remediate contaminates for those affected by the presence of PFAS in their wells. This meeting is intended to provide appropriate and correct information regarding PFAS, guidance for those affected, and FAI's plan moving forward to connect impacted residences to College Utilities water. FAI along with Alaska Department of Environmental Conservation, Alaska Department of Health and Social Services, Risk Management, FAI's environmental services contractors, Shannon & Wilson, Inc. and R&M Consultants will be in attendance to answer questions. Shannon & Wilson, Inc. is continuing to sample wells in designated areas while R&M Consultants will begin on-site characterization and monitoring.

Presentations by R&M Consultants and FAI's project design contractor, PDC Engineers, will begin at 4:30 p.m. and end at 5:30 p.m. Once presentations have been completed the agencies listed above will be available at individual tables to answer one-on-one questions. Please know that the health and safety of those potentially affected by these contaminates is critical and of the utmost importance to FAI. It is our mission to ensure that the public is informed and all concerns are addressed.

Individuals with test results above the health advisory level of 70 parts per trillion who have not filed their claim can do so with Risk Management at the Open House. Claims must be filed with Risk Management in order to connect affected properties to College Utilities.

Meeting Location:	LaQuinta Inns & Suites 4920 Dale Rd. Fairbanks, AK 99709
Meeting Date & Time:	Tuesday, March, 13, 2018 4 p.m. to 7 p.m.
Presenters:	R&M Consultants PDC Engineering

For additional information visit dot.alaska.gov/faigroundwater.

Please contact me at 474-2529 if you have any questions or concerns prior to the scheduled meeting time.

Regards,

Angie Spear
Division Operations Manager

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

6450 Airport Way, Suite 1
Fairbanks, Alaska 99709

March 7, 2018

Dear Property Owner:

Fairbanks International Airport (FAI) was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in the groundwater at the Aircraft Rescue and Firefighting (ARFF) Training Areas. In late November, the FAI encountered PFASs in groundwater in the Dale Road area, east of the Chena River.

Firefighters from the FAI Fire Department and other agencies used Aqueous Film Forming Foam, a standard firefighting agent that contains PFAS, during training exercises and emergency events to extinguish hydrocarbon fires. The PFAS discovered in the groundwater at the ARFF Training Areas are in concentrations higher than the U.S. Environmental Protection Agency's lifetime health advisory level.

FAI is working with the environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation to identify and sample private water wells near the airport to determine if these substances are present and above health advisory levels. PFAS are considered emerging contaminants and the health effects are not well known.

Results of the water samples will be shared with property residents. Where wells are found to have PFAS levels at concentrations higher than advised, the FAI is assisting those property owners with access to clean drinking water.

Shannon & Wilson Inc. is conducting water sampling in your area. Enclosed is a Private Well Inventory Survey Form. If you have a well please return the attached Private Well Inventory Survey form using the envelope provided, or contact Shannon & Wilson, Inc. at 479-0600.

For more information please see the enclosed PFAS Fact Sheet or visit dot.alaska.gov/faigroundwater. We appreciate your patience as we work through this process and we look forward to receiving your completed survey.

Fairbanks International Airport

_____

Angie Spear
Division Operations Manager, C.M.

Alaska International Airport System
Ted Stevens Anchorage International Airport
Fairbanks International Airport

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Fairbanks, Alaska 99709

PFAS Fact Sheet

March 2018

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been used for a wide variety of residential, commercial, and industrial uses. PFAS are considered emerging environmental contaminants and the health effects are not well known. The presumed source of PFASs in groundwater near the Fairbanks International Airport (FAI) is the use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) training areas. The FAI has hired Shannon & Wilson to test private water-supply wells for PFASs.

The FAI has tested over 150 private water-supply wells starting in November 2017. Some properties in the well testing area are connected to the College Utilities water system and do not have water wells.

We are testing water for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and several other PFASs.

The U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water is **70 parts per trillion** for PFOS, PFOA, or the sum of the two.

We advise that residents with test results above this level do not use their water for drinking or cooking. The health advisory level has been set based on the latest peer-reviewed science. However, the human health risks associated with PFAS exposure are not well established.

Test results are typically available within two to three weeks of sample collection.

PFASs are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting foams.

An updated PFAS results map is available at:
www.dot.alaska.gov/faigroundwater

For questions about well testing and study:
Shannon & Wilson Inc.
Marcy Nadel, Project Manager
Phone: 907-479-0600 Email: mdn@shanwil.com

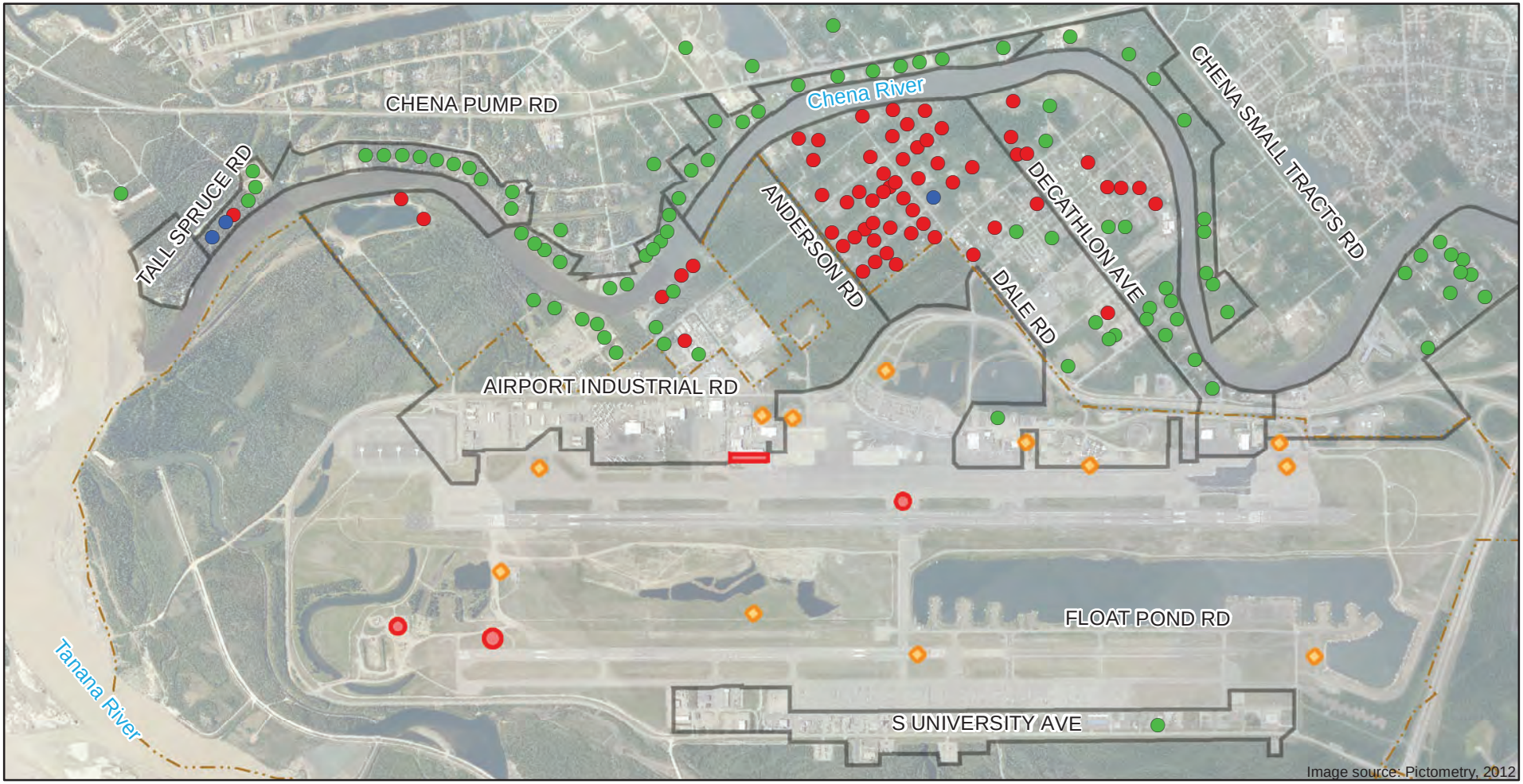
For regulatory questions:
Alaska Dept. of Environmental Conservation
Robert Burgess, Contaminated Sites Program
Phone: 907-451-2153 Email: robert.burgess@alaska.gov

For questions about PFAS health effects:
Alaska Dept. of Health & Social Services
Stacey Cooper, Health Assessor
Phone: 907-269-8016 Email: stacey.cooper@alaska.gov

To arrange your next water delivery:
Vision Construction
Phone: 907-479-0380 Email: water@visionunited.com

To file an insurance claim:
Alaska Dept. of Admin., Risk Management
Jack Albrecht, Claims Administrator
Phone: 907-465-2183 Email: jack.albrecht@alaska.gov

For questions about ARFF training & other inquiries:
Angie Spear, Division Operations Manager
Phone: 907-474-2529
Sammy Loud, Communications Specialist
Phone: 907-474-2522
Email: FAIgroundwater@alaska.gov



LEGEND

- Result not yet received
- PFOS and PFOA Under Effective Lifetime Health Advisory Level (65 ppt)
- Over 65 ppt
- Aircraft Rescue and Firefighting (ARFF) Training Sites
- ARFF Emergency Response Sites
- FAI Boundary
- Well Search Area

0 0.5

Miles

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Fairbanks International Airport
Fairbanks, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

March 14, 2018 31-1-20060-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
Frequently Asked Questions

What are PFAS?

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

- PFAS do not occur naturally, but are widespread in the environment.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies a long time.
- Some PFAS do not break down easily in the environment.

How can I be exposed to PFAS?

PFAS contamination may be in drinking water, food, indoor dust, some consumer products, and workplaces. Most non worker exposures occur through drinking contaminated water or eating food that contains PFAS.

Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics

How can I reduce my exposure to PFAS?

PFAS are present at low levels in some food products and in the environment (air, water, soil etc.), so you probably cannot prevent PFAS exposure altogether. However, if you live near known sources of PFAS contamination, you can take steps to reduce your risk of exposure.

- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
  - » drinking
  - » food preparation
  - » cooking
  - » brushing teeth, and
  - » preparing infant formula
- Check for fish advisories for water bodies where you fish.
  - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
  - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

How can PFAS affect people's health?

Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful. Although more research is needed, some studies in people have shown that certain PFAS may:

- affect growth, learning, and behavior of infants and older children
- lower a woman's chance of getting pregnant
- interfere with the body's natural hormones
- increase cholesterol levels
- affect the immune system and
- increase the risk of cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of PFAS.

How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
  - CDC Info: https://www.cdc.gov/cdc-info/, or **(800) 232-4636**.
  - www.atsdr.cdc.gov/pfc/index.html
  - https://www.cdc.gov/exposurereport/index.html
- **Environmental Protection Agency (EPA):** https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas
- **Food and Drug Administration:** https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm
- **National Toxicology Program:** https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at **(800) 638-2772**.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
PFOS	Perfluorooctane sulfonic acid
PFOA (or C8)	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFOSA (or FOSA)	Perfluorooctane sulfonaminde
MeFOSAA (aka Me-PFOSA-AcOH)	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____

Parcel: _____

Name (Owner): _____

Name (Occupant): _____

Physical Address: _____

Mailing Address: _____

Email Address (optional): _____

Contact Phone Number: (owner) _____ (occupant) _____

Number of persons residing at this location:
Adults (18 and over) _____
Teenagers (13 to 17) _____
Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

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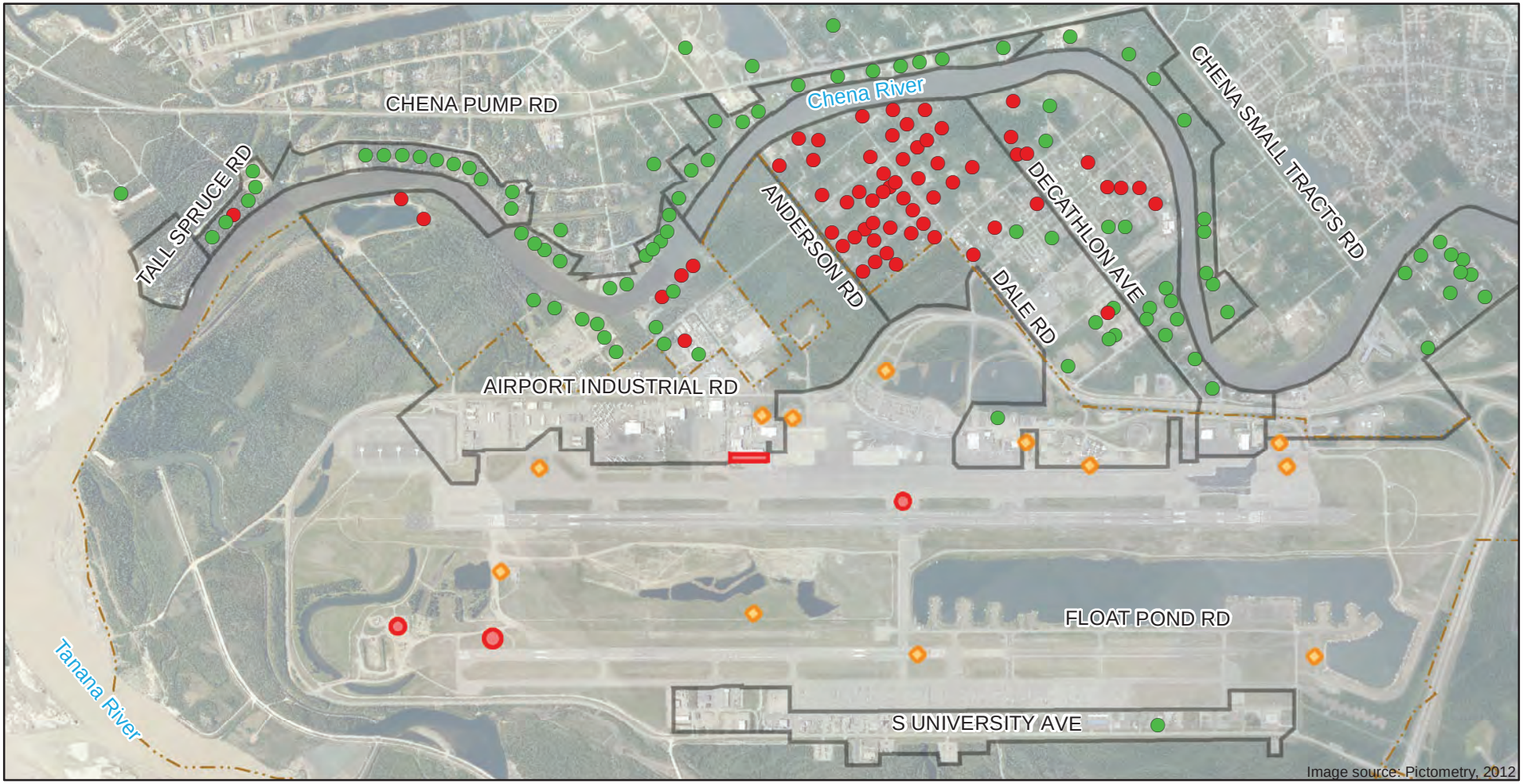
1) From where do you obtain your drinking water?
   a) College Utilities Water Supply ☐ b) Well Water ☐
   c) Water Delivery ☐ d) Other ☐

2) If you have a water well, please answer the following questions:
   a) Where is the well located on the property? _____
   b) Is the well in use? Yes ☐ No ☐
   c) If yes, please check all that apply regarding the usage of your well water:
      Drinking ☐ Cooking ☐ Gardening ☐ Pets ☐ Other _____
   d) If no, is the well usable, unusable, or properly abandoned?
      Usable ☐ Unusable ☐ Abandoned ☐ Method _____
   e) When was the well installed? _____
   f) What is the well depth? _____
   g) What is the well diameter? _____
   h) What is the well type? ☐ Dug Well ☐ Driven ☐ Drilled ☐ Unknown
   i) Do you have any treatment on your well (e.g. water softener)? Please describe. _____
      _____

3) Sample Permission
   Does the Fairbanks International Airport have permission to sample your private water well?
   ☐ Yes ☐ No

_____ _____
Signature Date



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Miles

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Fairbanks International Airport
Fairbanks, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

March 29, 2018 31-1-20060-001

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

APPENDIX B: FIELD NOTES

APPENDIX B

Field Notes

INCLUDES

- Residential Well Sampling Logs
- Private Well Inventory Survey Forms

This appendix contains personal information. Content has been removed for confidentiality.

APPENDIX C: LABORATORY REPORTS

APPENDIX C

Laboratory Reports

AND ADEC DATA REVIEW CHECKLISTS

This appendix has been separated from the primary document to reduce the file size.

APPENDIX D: IMPORTANT INFORMATION

APPENDIX D

Important Information

ABOUT YOUR ENVIRONMENTAL REPORT

To:	Fairbanks International Airport Attn: Angie Spear
Re:	November 2017 to April 2018 Private Well Sampling Summary Report

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland