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FINAL

GENERAL WORK PLAN

DOT&PF Statewide PFAS Addendum 007-YAK-01 2022 Yakutat Site Characterization

YAKUTAT, ALASKA

SHANNON & WILSON

March 2022

Shannon & Wilson No: 102896-008

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Submitted To: Alaska Department of Transportation& Public Facilities
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Juneau, Alaska 99811-2506
Attn: Samantha Cummings

Subject: FINAL GENERAL WORK PLAN, DOT&PF STATEWIDE PFAS
ADDENDUM 007-YAK-01
2022 YAKUTAT SITE CHARACTERIZATION, YAKUTAT, ALASKA

Shannon & Wilson prepared this Draft Work Plan Addendum (Addendum) on behalf of the Alaska Department of Transportation & Public Factifies (DOT&PF). This Addendum is a supplement to the *Revision 1 - DOT&PF Statewide PFAS General Work Plan* (GWP), approved by the Alaska Department of Environmental Conservation (DEC) in August 2020. The services proposed in this GWP Addendum describe the DOT&PF planned activities for initial site characterization associated with the per- and polyfluoroalkyl substances (PFAS) contamination originating from the Yakutat Airport (YAK).

The scope of services for this Addendum was specified in our proposal dated June 24, 2021 and authorized in a notice to proceed issued on August 20, 2021 by DOT&PF under Professional Services Agreement Number 25-19-013 *Per- and Polyfluorinated Substances (PFAS) Related Environmental & Engineering Services*. Funding to implement the scope defined in this document will be requested in a separate proposal and will be conducted following DEC approval.

This GWP Addendum was prepared and reviewed by:

For Amber Masters
Amber Masters
Environmental Scientist, Author

Ashley Jaramillo
Senior Chemist, Project Manager

ARM:AMJ:KRF:CBD/arm

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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film forming foam
ARFF	aircraft rescue and firefighting
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CFR	Code of Federal Regulations
COPC	contaminant of potential concern
CSM	Conceptual Site Model
CSP	contaminated sites program
DEC	Alaska Department of Environmental Conservation
DoD	Department of Defense
DOT&PF	Alaska Department of Transportation & Public Facilities
DRO	diesel range organics
FAA	Federal Aviation Administration
EPA	U.S. Environmental Protection Agency
GAC	granular activated carbon
GRO	gasoline range organics
GWP	*Revision 1 - DOT&PF Statewide PFAS General Work Plan*
IDW	investigative-derived waste
LHA	lifetime health advisory
LOD	limit of detection
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
ng/L	nanograms per liter
PAH	polycyclic aromatic hydrocarbons
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
POC	point of contact
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RL	reporting limit

ACRONYMS

RRO	residual range organics
SAP	sampling and analysis plan
SIM	selective ion monitoring
SSHP	Site Safety and Health Plan
TWP	temporary well point
YAK	Yakutat Airport Terminal
YCHC	Yakutat Community Health Center
µg/L	micrograms per liter
µg/kg	micrograms per kilogram

1 INTRODUCTION

This Work Plan Addendum (Addendum) is a supplement to *Revision 1 - DOT&PF Statewide PFAS General Work Plan* (GWP) approved by the Alaska Department of Environmental Conservation (DEC) on August 10, 2020. This Addendum describes our proposed approach for initial per- and polyfluoroalkyl substances (PFAS) site characterization activities at the Yakutat Airport (YAK) in Yakutat, Alaska (Figure 1, Exhibit 1-1).

Exhibit 1-1: Airport Information

Airport Name:	Bethel Airport
Airport Code:	YAK
DEC File No. / Hazard ID:	1530.38.022 / 27090
Airport Address:	997 Airport Road Yakutat, AK 99689
DOT&PF Region:	Southcoast Region
DOT&PF Regional POC:	Marcus Zimmerman
DOT&PF PFAS POC:	Sammy Cummings
Airport Type:	Current Part 139 Airport
Airport Coordinates (Lat/Long):	59.5033, -139.9928

DEC = Alaska Department of Environmental Conservation, DOT&PF = Alaska Department of Transportation and Public Facilities; PFAS = per- and polyfluoroalkyl substances, POC = point of contact

Shannon & Wilson prepared the GWP and this Addendum in accordance with DEC's March 2017 *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites* and DEC's January 2022 *Field Sampling Guidance* document, with the addition of our Site Safety and Health Plan (SSHP, Appendix A). Additional information and activities required for the site not detailed in the GWP, and deviations made to the GWP, are described in this Addendum, where applicable.

1.1 Background

General background information relating to sites covered under the GWP is included in Section 1.1 of the GWP. Background information specific to the YAK is detailed below.

1.1.1 Site History

In the 1940s the YAK was utilized as the Yakutat Army Airfield, which was constructed as part of the United States Army's Alaska long-range defense program. Until the late 1970s,

the Federal Aviation Administration (FAA) operated the airport. After this, the State of Alaska took over ownership and management of the YAK.

The YAK meets the requirements defined in Title 14, Code of Federal Regulations (CFR), Part 139, which requires specific certification through the FAA. This certification requires, among other things, aircraft rescue and firefighting (ARFF) to ensure safety in air transportation. As part of this certification, Part 139 airports are required to conduct annual ARFF training for emergency response situations using aqueous film-forming foam (AFFF) and demonstrate compliance with federal regulations. The FAA lifted the requirement to use PFAS-containing AFFF during training exercises at the beginning of 2019; alternate FAA-approved testing units have been implemented to test fire apparatus systems without discharging AFFF to the ground surface.

1.1.2 AFFF Use at the Yakutat Airport

PFAS-containing AFFF has been stored and used for emergency and training purposes at various locations on the YAK property. AFFF was first used on the YAK property by Alaska Department of Transportation & Public Facilities (DOT&PF) in the 1990s. Discussions with Robert Lekanof (DOT&PF YAK Manager) during Shannon & Wilson's initial site visit in June 2019 revealed fire training activities using AFFF have been mostly conducted at the end of Runway 2/20 since 2000 (Figure 2). Fire training activities included annual training and triennial training events. During annual events, approximately 500 gallons of 3% mixed AFFF (3% AFFF concentrate and 97% water by volume) were released and during triennial events, approximately 1,500 gallons of 3% mixed AFFF were released.

An unlined burn pit was also used for annual live fire training events near the northern end of Taxiway A (Figure 2). Training at the burn pit occurred between 1996 and 1999. The burn pit has been covered with soil and is currently vegetated.

1.1.3 PFAS Regulatory History

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where AFFF was used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. In May 2016 the U.S. Environmental Protection Agency (EPA) published a recommended Lifetime Health Advisory (LHA) level of 70 nanograms per liter (ng/L) for the sum of PFOS and PFOA in drinking water. The DEC Contaminated Sites Program published groundwater-cleanup levels of 400 ng/L for PFOS and PFOA individually in November 2016. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS. On October 2, 2019, DEC's Contaminated Sites Program (CSP) published a Technical Memorandum amending the April 9, 2019 Technical Memorandum to include additional PFAS analytes in the testing requirements. The action level remains 70

ng/L for the sum of PFOS and PFOA. Current DEC soil cleanup levels are 3.0 micrograms per kilogram (µg/kg) for PFOS and 1.7 µg/kg for PFOA. A summary of changes to action levels and regulatory requirements is described in Section 1.1 of the GWP.

The current drinking-water action level, DEC groundwater cleanup levels, and DEC soil cleanup levels are summarized in Exhibit 2-1 below. If regulatory changes occur prior to implementation of this work plan Shannon & Wilson may need to amend the sampling and analysis plan.

1.2 Previous Investigations

In late 2018, as part of a Cooperative Agreement with the EPA, the DEC's CSP conducted a limited PFAS Site Discovery Investigation. This included identifying potentially PFAS-impacted communities in Alaska, conducting a risk analysis of identified communities, collecting water supply well samples for the analysis of PFAS, and reporting those results. YAK was identified as a potential PFAS affected community and DEC sampled 12 water supply wells at and near YAK in February 2019. Of the water supply wells sampled, one well (YK-08, Yakutat Lodge) had PFAS concentrations exceeding the applicable DEC PFAS action level for the sum of five PFAS.

In June 2019, Shannon & Wilson began initial investigations of water supply wells on or near YAK. Water supply well samples were collected from 21 wells on or near YAK in June 2019. Results of the samples collected during this investigation did not exceed the applicable actions level of 70 ng/L for the sum of PFOS and PFOA. Currently, eight locations are sampled quarterly, with two additional locations sampled annually. Results from a sample collected during August 2020 quarterly sampling exceeded the applicable action level.

Since June 2019, Shannon & Wilson has collected samples from 21 water supply wells in Yakutat. Water supply well sample concentrations for the sum of PFOS and PFOA range from not detected to 77 ng/L for samples associated with the YAK. Figure 2 depicts the highest water supply well analytical results for the YAK through July 2021.

1.3 Project Scope and Objectives

DOT&PF requested Shannon & Wilson prepare this Addendum for initial site characterization at the YAK. The scope of initial site characterization activities includes the following:

- Pre-Investigation (Section 3.1.1)
  - Site Access and Permitting

  - Utility Locates
- Soil Characterization (Section 3.1.2)
  - Field Screening
  - Surface Soil Sampling
  - Soil Boring Sampling
- Groundwater Characterization (Section 3.1.3)
  - Install, Sample, and Remove Temporary Wells Points (TWPs)
- Surface Water Characterization (Section 3.1.4)
  - Surface Water Sampling
  - Sediment Sampling
- IDW Management (Section 4.13)
- Evaluation and Reporting of the Analytical Data (Section 5).

These tasks are described in the noted sections.

The project objectives are to:

- better understand the extent of PFAS contamination resulting from the historic use of AFFF by DOT&PF;
- evaluate changes to groundwater PFAS concentrations around YAK property;
- identify PFAS source areas and evaluate the horizontal and vertical extent of contamination on the YAK property;
- evaluate the potential groundwater plume of PFAS contamination at various aquifer depths to a maximum of 50 feet below ground surface (bgs); and
- determine the impact to surface-water from YAK runoff drainage channels.

2 SITE AND PROJECT DESCRIPTION

The following sections provide a site and project description.

2.1 Site Location and Boundaries

The YAK terminal is located at 997 Airport Road in Yakutat, Alaska (Figure 2). The property is owned by DOT&PF. Figure 2 shows the property boundaries for land owned by the DOT&PF. The geographic coordinates of the YAK terminal are latitude 59.5033, longitude -139.9928.

Based on the current understanding of site conditions, Shannon & Wilson consider the boundary for the activities described in this addendum to include the YAK and the impacted areas as defined by our previous water supply well search activities.

2.2 Potential Sources of Contamination

General information regarding potential sources of contamination at DOT&PF sites is provided in Section 2.1 of the GWP. Specific potential sources of contamination at the YAK to be investigated as a part of this Addendum are listed below.

- Fire training areas where diesel fuel and AFFF were used; and
- AFFF-equipment testing areas.

At this time, Shannon & Wilson does not have reason to believe PFAS contamination at the YAK originated from sources outside of AFFF use.

2.3 Contaminants of Potential Concern and Regulatory Levels

General information regarding contaminants of potential concern (COPCs) and regulatory levels is included in Section 2.2 of the GWP. The primary COPCs for this project are PFAS compounds PFOS and PFOA. DEC's January 2022 *Field Sampling Guidance* (2019) also identifies gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), and polynuclear aromatic hydrocarbons (PAHs) as COPCs at AFFF training and emergency response areas.

To evaluate analytical data, soil results will be compared to the most conservative of either the migration to groundwater or human health cleanup levels listed in 18 Alaska Administrative Code (AAC) 75.341 *Tables B1 Method Two and B2, Method Two – Above 40 - inch*. Groundwater and surface water samples will be compared to Alaska's 18 AAC 75.341 *Table C, Groundwater Human Health Cleanup Level* for non-PFAS analytes. Groundwater, surface water, and water supply well samples will be compared to the EPA LHA and DEC drinking water action level of 70 ng/L for PFOS, PFOA, or the sum of the two.

The current cleanup levels and analytical reporting limits for the site COPCs are summarized in Exhibit 2-1, below.

Exhibit 2-1: COPCs, Regulatory and Laboratory Reporting Limits

Method	Analyte	Soil Limit[a] (mg/kg)	Water Limit[b] (µg/L)	Laboratory LODs/RLs[c] Soil (mg/kg)	Laboratory LODs/RLs[c] Water (µg/L)
PFAS Analytes					
DoD QSM 5.3 Table B-15[d]	PFOS	0.0030	0.070	0.000200	0.00200
	PFOA	0.0017	0.070	0.000500	0.00200
Petroleum Analytes					
AK101	GRO	300	2,200	1.25	50
AK102	DRO	250	1,500	10	300
AK103	RRO	10,000*	1,100	50	250
EPA 8260 (BTEX)	Benzene	0.022	4.6	0.00625	0.2
	Toluene	6.7	1,100	0.0125	0.5
	Ethylbenzene	0.13	15	0.0125	0.5
	Xylenes Total	1.5	190	0.0375	1.5
PAH Analytes					
EPA 8270D-SIM (PAH)	1-Methylnaphthalene	0.41	11	0.0125	0.025
	2-Methylnaphthalene	1.3	36	0.0125	0.025
	Acenaphthene	37	530	0.0125	0.025
	Acenaphthylene	18	260	0.0125	0.025
	Anthracene	390	43	0.0125	0.025
	Benzo(a)anthracene	0.70	0.30	0.0125	0.025
	Benzo[a]pyrene	1.9	0.25	0.0125	0.01
	Benzo[b]fluoranthene	15*	2.5	0.0125	0.025
	Benzo[g,h,i]perylene	2,300*	0.26	0.0125	0.025
	Benzo[k]fluoranthene	150*	0.80	0.0125	0.025
	Chrysene	600	2.0	0.0125	0.025
	Dibenzo[a,h]anthracene	1.5*	0.25	0.0125	0.01
	Fluoranthene	590	260	0.0125	0.025
	Fluorene	36	290	0.0125	0.025
	Indeno [1,2,3-c,d] pyrene	15*	0.19	0.0125	0.025
	Naphthalene	0.38	1.7	0.0100	0.05
	Phenanthrene	39	170	0.0125	0.025
	Pyrene	87	120	0.0125	0.025

Notes:

a. 18 AAC 75 *Table B2. Method Two - Petroleum Hydrocarbon Soil Cleanup Levels – Over 40-Inch Zone* or *Table B1. Method Two - Soil Cleanup Levels Table*. The most stringent between Human Health and Migration to Groundwater cleanup levels are reported. Migration to Groundwater cleanup level reported unless otherwise identified.

b. 18 AAC 75 *Table C. Groundwater Cleanup Levels*.

c. February 2020 LODs from SGS North America, Inc. for petroleum and PAH analyses. February 2020 RLs from Eurofins TestAmerica, Inc. for PFAS analyses.

d. A full list of PFAS analytes for the analytical method will be requested for analytical reports. However, only PFOS and PFOA have DEC Cleanup Levels and are reported in this table.

* 18 AAC 75 Table B1 and B2 Human Health cleanup level reported.

BTEX = benzene, toluene, ethylbenzene, and total xylenes; DoD = Department of Defense; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; LOD = limit of detection; µg/L = microgram per liter; mg/kg = milligram per kilogram; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid; QSM = Quality Systems Manual; RL = reporting limit; RRO = residual range organics; SIM = selective ion monitoring

2.4 Conceptual Site Model

The most recent conceptual site model (CSM) is presented in Appendix B.

2.4.1 Description of Potential Receptors

The CSM considers commercial/industrial workers, site visitors, construction workers, subsistence hunters and consumers, and residents to be current or future potential receptors.

2.4.2 Potential Exposure Pathways

Human exposure pathways include groundwater ingestion and ingestion of wild and farmed foods, as PFOS and PFOA are bioaccumulative (DEC; 2017). Potential human exposure pathways include incidental soil and surface water ingestion; inhalation of fugitive dust; and

2.4.3 Soil

Limited surface soil samples have been collected from YAK property. Incidental ingestion may be a potential exposure pathway for soil. Direct contact with surface and subsurface soil at the site is unlikely at present. If further investigations indicate soil is contaminated, excavation at the site may result in ingestion of soil by commercial workers, site visitors, residents, or construction workers. Surface soil can become entrained in fugitive dust, which could be an exposure pathway for site workers, visitors, and nearby residents.

2.4.4 Groundwater

Ingestion of groundwater is an exposure pathway, a water supply well near YAK have been found to have PFAS concentrations that exceed regulatory levels.

2.4.5 Surface Water and Biota

Surface water samples have not been collected from YAK. Surface water as dermal exposure is an unlikely exposure pathway as PFAS are not known to permeate the skin and contact with surface water at and near YAK is unlikely at present. If further investigations indicate surface water is contaminated, future work at the site may result in incidental ingestion by workers at the site. Animals may consume surface-water and vegetation at or near YAK. It is unknown whether the area is used for subsistence harvest. Due to the bioaccumulative risk of PFAS, biota is considered a potential pathway for exposure. Our site assessment activities are not designed to assess the biota exposure pathway.

2.5 Project Team

Chris Darrah will be Shannon & Wilson's Principal-in-Charge and Kristen Freiburger is Project Manager for the DOT&PF Statewide PFAS contract. Ashley Jaramillo will serve as the Project Manager for the YAK site and be Shannon & Wilson's primary point of contact (POC). Shannon & Wilson's project team also includes other State of Alaska Qualified Environmental Professionals to support the various field and reporting tasks required to achieve the project objectives. The project team and their associated responsibilities are summarized in Exhibit 2-2 below.

Exhibit 2-2: Project Team

Affiliation	Responsibility	Representative	Contact Number
DOT&PF	Client – Regional POC	Marcus Zimmerman	(907) 465-4655
	Client – Statewide PFAS POC	Sammy Cummings	(907) 888-5671
DEC	Regulatory Agency POC	Jamie Grant	(907) 334-5939
Shannon & Wilson	Principal-in-charge	Christopher Darrah	(907) 458-3143
	Statewide Project Manager	Kristen Freiburger	(907) 458-3146
	Project Manager (POC)	Ashley Jaramillo	(907) 458-3118
Eurofins TestAmerica, Inc.	PFAS analytical laboratory services	David Alltucker	(916) 374-4383
SGS North America, Inc.	Additional analytical laboratory services	Jennifer Dawkins	(907) 474-8656
DRILLER	Soil-boring and TWP installations	TBD	TBD

POC = point of contact, TBD = To be determined, TWP = temporary well point

2.6 Project Schedule and Submittals

Section 2.5 of the GWP provides general information regarding project schedules (i.e. the general order of occurrence of site characterization activities) and associated submittals. The YAK project schedule and submittals are outlined below.

Once DEC approval is received for the proposed scope of services outlined in this Addendum, Shannon & Wilson will coordinate with DOT&PF staff to collect soil, groundwater, surface water and sediment samples. Field activities are anticipated to occur during one sampling event in Spring 2022. Laboratory analysis will be requested on a standard 14-day turn-around time.

After field work is complete, a Site Characterization Report will be prepared documenting the results of the sampling event. The report will include summarized field observations, analytical results and discussion of data quality, photo documentation, figures showing sample locations, description of deviations from the approved Addendum, if any, and conclusions and recommendations. The report will also include an updated CSM.

The following is the anticipated schedule for the YAK initial site characterization activities:

- Work Plan Implementation (field activities) – Spring 2022
- Draft Report Submittal - within 60 days of receipt of analytical results
- Final Report Submittal - within 30 days of receiving DEC comments on the Draft Report

3 SITE CHARACTERIZATION ACTIVITIES

General information regarding field activities is described in Section 3 of the GWP. The following sections describe the field activities to be conducted as a part of the initial site characterization at the YAK. Sampling procedures and analytical methods are described in Section 4, below. A quality assurance project plan (QAPP) is included in Section 5, below. Field personnel will document field activities with notes and photographs using the applicable forms, as detailed in Section 5.2. Analytical laboratories and methods employed as a part of this Addendum are identified in Section 4.10, below. An analytical sample summary is detailed in Exhibit 4-1.

3.1 Pre-investigation Activities

General information regarding pre-investigation tasks is presented in Section 3.2.1 of the GWP. YAK specific pre-investigation activities, including site access and permitting, and utility locates, are outlined in the following subsections.

3.1.1 Site Access and Permitting

Advancing soil borings/TWPs will require an FAA 7460 permit due to the use of a drill rig. Shannon & Wilson will complete the application to obtain permission to conduct the field activities on the YAK. Shannon & Wilson anticipate the FAA will require runway closure during drilling. Shannon & Wilson and the drilling contractor will follow the 7460 permit stipulations related to working hours, locations, etc., and the YAK Airport Manager will issue applicable notices.

Shannon & Wilson will coordinate with DOT&PF Statewide Aviation to prepare a Construction Safety Phasing Plan and DOT&PF required building permit covering the site characterization activities described in this Addendum. Prior to accessing secured areas of the airport, Shannon & Wilson and drilling contractor staff will obtain badges, if required by DOT&PF.

Shannon & Wilson is not aware of other required permits or authorizations for conducting this field effort.

3.1.2 Utility Locates

Utility clearance will be coordinated by contacting the Alaska Digline, Inc. and the YAK Airport Manager. A map of anticipated drilling locations will be provided to the Alaska Digline and YAK Airport Manager, no later than 10 days prior to planned activities. Shannon & Wilson assumes the Digline and YAK Airport Manager will provide information regarding utility locations in the proposed investigation areas and mark utilities that are close to drilling activities.

3.2 Soil Characterization Activities

General information regarding soil characterization activities is described in Section 3.2.2 of the GWP. YAK specific soil characterization activities for this project include field screening and surface soil and soil boring sample collection as described in the following sections.

3.2.1 Field Screening

General information regarding field screening is described in Section 3.2.2.1 of the GWP. Field screening procedures are described in Section 4.2, below.

In areas adjacent to fire training areas (Figures 2 and 3), Shannon & Wilson will field screen for volatile petroleum compounds using a photoionization detector (PID). Soil borings will be field screened at a frequency of one every five feet bgs, until the groundwater table is encountered. Surface soil and drill cuttings will be containerized if PID readings exceed 20 parts per million (ppm) or visual and/or olfactory observations suggest the presence of petroleum contamination. Excess soils from borings will be segregated using the following PID reading guidelines:

- PID readings 0 to 20 ppm are considered not contaminated with petroleum contaminants. Soils will be spread in the immediate surrounding of the boring location.
- PID readings greater than 20 ppm are considered potentially contaminated with petroleum contaminants. Soils will be held pending PFAS and petroleum analytical results.

Drums will be stored at the YAK until approval to transport is requested and approved from DEC pending analytical results. These results will be used to determine waste disposal requirements, as described in Section 4.13.

3.2.2 Surface Soil

General information regarding surface soil characterization is included in section 3.2.2.2 of the GWP.

Shannon & Wilson will collect a total of 32 surface soil samples from along the YAK runways, training areas and airport property, and 19 from the soil borings/TWP locations described in Section 3.1.3.1 for a total of 51 surface soil samples. In areas adjacent to fire training areas (Figure 3), surface soil samples will be collected just below vegetation, if present, and between 0 to 6 inches bgs if not present. Locations of surface soil samples will be made in the field in coordination with DOT&PF.

3.2.3 Soil Borings

General information regarding soil borings is included in Section 3.2.2.4 of the GWP. Soil sampling procedures are described in Section 4.3, below. The drilling subcontractor has not yet been determined for this project.

The drilling subcontractor will advance total of 19 soil borings that will be finished as TWPs (Section 3.1.3.1). Seven soil borings located near the Former Burn Pit and Former Training Area will be used for subsurface soil sample collection for analysis of PFAS and petroleum analytes. The remaining 12 TWPs will be used for subsurface sample collection and analysis of PFAS. Shannon & Wilson field staff will log the soil type encountered during drilling and collect two or three subsurface soil samples from the borings..

These borings will terminate at or just beneath the groundwater table. Use of a Geoprobe® Model 6712 or 66 series direct push/auger is anticipated for drilling the soil borings. The drilling contractor will use a direct-push sampling system equipped with a two- or three-inch MacroCore® for the soil borings. Upon completion of the soil boring, the drilling contractor will install TWPs as described in Section 3.1.3.1.

3.3 Groundwater Characterization

General information regarding groundwater characterization activities is described in Section 3.2.3 of the GWP. Groundwater characterization activities for the YAK include groundwater sample collection from TWPs as described in the following section.

3.3.1 Temporary Well Points

General information regarding TWPs is included in Section 3.2.3.1 of the GWP. TWP sampling procedures are described in Section 4.4, below.

The drilling contractor will install 19 TWPs (Figure 3). The TWPs will consist of pre-screened, disposable 1-inch diameter PVC. The drilling contractor will install TWPs using a direct-push drill rig, so the screened interval intercepts the groundwater table or is set to the desired depth. The depth of groundwater may vary depending on the season, tides, and recent precipitation. Field staff will collect a groundwater sample from the uppermost foot of groundwater at each TWP. Depth to water, groundwater parameters and observations, and any other pertinent local conditions will be documented using the applicable field forms. TWP purge water will be disposed of as described in Section 4.13, below.

The TWPs will be removed after sampling. It would not be practical to leave them in the ground for potential future sampling because the sample locations are close to active runways. Following removal, the TWP boreholes will be backfilled with bentonite chips or grout to two feet bgs. The final two feet will be backfilled with sand, pea gravel, topsoil, asphalt cold patch, epoxy, and/or hydraulic cement to match the previous ground surface.

3.4 Surface Water Characterization

General information regarding surface water characterization and sediment sample collection activities are described in Section 3.2.4 of the GWP. YAK specific surface water characterization activities are described the following sections.

3.4.1 Surface Water Sampling

Surface water sampling procedures are described in Section 4.5, below.

Shannon & Wilson will collect surface water samples from ditches that drain runoff from the YAK and surface water bodies at and near the property, especially those adjacent to the Former Burn pit and Training Area.

Shannon & Wilson proposes to collect a maximum of 20 surface water samples from surface water and drainage ditches on and near the YAK. Locations of surface water bodies to sample will be made in the field in coordination with DOT&PF.

3.4.2 Sediment Sampling

Sediment sampling procedures are described in Section 4.6.

Shannon & Wilson will collect up to 10 sediment samples collocated with some of the surface water samples. Locations of sediment samples to collect will be made in the field in coordination with DOT&PF and in areas where PFAS contamination could be present (e.g. around former fire training pit).

4 SAMPLING AND ANALYSIS PLAN

A general sampling and analysis plan (SAP) describing the methods and procedures for site characterization activities is included as Section 4 of the GWP. The sampling effort described in this Addendum will be conducted in general accordance with the methods and procedures detailed in the SAP. The following sections contain supplemental information and exceptions to the general SAP.

A DEC-qualified sampler will collect and handle the samples for this project and collect required quality control (QC) samples in accordance with DEC's *Field Sampling Guidance*. Field personnel will document field activities with notes and photographs using the applicable forms, as detailed in Section 5.2, below.

Analytical laboratories and methods employed as a part of this Addendum are identified in Section 4.9. An analytical sample summary is detailed in Exhibit 4-1. Sample containers, preservation methods, and holding times are included in Section 4.10. Sample custody, storage, and transport will be followed as described in Section 4.11. Equipment decontamination procedures are outlined in Section 4.12. Investigative-derived waste management is described in Section 4.13.

4.1 Methods for Soil Sample Retrieval

General methods for soil sample retrieval are described in Section 4.2 of the GWP. YAK soil samples will be collected using hand tools from surface soil locations and soil borings as described in Section 4.2.1, 4.2.3, and 4.2.3.1 of the GWP.

4.2 Field Screening

Field screening procedures are detailed in Section 4.3 of the GWP.

4.3 Soil Sampling

Soil sample collection procedures are described in Section 4.4 of the GWP.

4.4 Temporary Well Point Groundwater Sampling

TWP installation, water level measurement, development, and sampling procedures are described in Section 4.5 of the GWP.

4.5 Surface Water Sampling

General surface water sampling procedures are described in Section 4.7 of the GWP.

4.6 Sediment Sampling

Sediment sampling procedures are detailed in Section 4.8 of the GWP. Sediment samples will be collected using hand tools such a trowel, shovel, or hand auger. Shannon & Wilson anticipate the water depth will be less than two feet. Field staff will remove vegetation or plant matter prior to collecting the sediment samples.

4.7 Special Considerations for PFAS

Special considerations for PFAS sampling are described in Section 4.10 of the GWP.

4.8 Analytical Sample Summary

Exhibit 4-1: Analytical Sample Summary[1]

	Matrix	PFAS (DoD QSM 5.3 Table B-15)	BTEX (EPA 8260)	GRO (AK 101)	DRO (AK 102)	RRO (AK 103)	PAH (EPA 8270-SIM)
Number of Samples	Surface Soil	32 + 3 FD	9 + 1 FD	9 + 1 FD	9 + 1 FD	9 + 1 FD	9 +1 FD
	Boring Surface Soil	19 + 2 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD
	Groundwater	19 + 2 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD	7 + 1 FD
	Boring Subsurface Soil	57 + 6 FD	21 + 3 FD	21 + 3 FD	21 + 3 FD	21 + 3 FD	21 + 3 FD
	Surface Water	20 + 2 FD	5 + 1 FD	5 + 1 FD	5 + 1 FD	5 + 1 FD	5 + 1 FD
	Sediment	10+ 1 FD	2 + 1 FD	2 + 1 FD	2 + 1 FD	2 + 1 FD	2 + 1 FD

Notes:

1 In addition to field duplicate samples, other possible QC samples include equipment blank samples, field blank samples, and trip blank samples. Laboratory QC samples are not included in these totals. A GAC effluent sample will also be collected. Table assumes all potential samples will be collected.

2 Two or three analytical samples will be collected from soil borings, the table represents three analytical samples from each boring.

BTEX = benzene, toluene, ethylbenzene, and total xylenes; DoD = Department of Defense; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; FD = field duplicate; GAC = granular activated carbon; GRO = gasoline range organics; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; QC = quality control sample; QSM = Quality Systems Manual; RRO = residual range organics; SIM = selective ion monitoring

More information regarding QC samples can be found in Section 5.4 and 5.5.

4.9 Analytical Laboratories and Methods

The GRO, DRO, RRO, BTEX, and PAH soil and water samples will be submitted to SGS North America, Inc. in Anchorage, Alaska. The PFAS soil, water, and sediment samples will

be submitted to Eurofins TestAmerica of Sacramento, California. PFAS analysis will report the full list of PFAS analytes for which the laboratory is Alaska-certified to report by the method compliant with Quality Systems Manual 5.3 Table B-15.

4.10 Sample Containers, Preservation, and Holding Times

General information regarding sample containers, preservation, and holding times is described in Section 4.12 of the GWP. This information is provided in Exhibit 4-2, below, for the analytical methods employed for this project.

Exhibit 4-2: Sample Containers, Preservation, and Holding Time Requirements

Analyte	Method	Media	Container and Sample Volume	Preservation	Holding Time
PFAS	EPA 537.1	Drinking Water	2 x 250 mL polycarbonate	Trizma 0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
	DoD QSM 5.3 Table B-15	Water	2 x 250 mL polycarbonate	0 °C to 6 °C	
		Soil	4-oz polycarbonate	0 °C to 6 °C	
GRO	AK101	Water	3 x 40-mL VOA vials (no headspace)	HCl to <4 0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
		Soil	Pre-weighed 4-oz amber glass jar with septa	25mL MeOH 0 °C to 6 °C	
DRO	AK102	Water	2 x 250-mL amber glass	HCl to <4 0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
RRO	AK103	Water	2 x 250-mL amber glass	HCl to <4 0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction
BTEX	EPA 8260	Water	3 x 40-mL VOA vials (no headspace)	HCl to <4 0 °C to 6 °C	14 days
		Soil	Pre-weighed 4-oz amber glass jar with septa	25mL MeOH 0 °C to 6 °C	
PAHs	EPA 8270D-SIM	Water	2 x 250-mL amber glass	0 °C to 6 °C	7 days to extraction, analyzed within 40 days of extraction
		Soil	4-oz amber glass jar		14 days to extraction, analyzed within 40 days of extraction

Notes:

BTEX = benzene, toluene, ethylbenzene, and total xylenes; °C = degrees Celsius; DoD = Department of Defense; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; HDPE = high density polyethylene; HCl = hydrochloric acid; mL = milliliter; oz = ounce; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; QSM = Quality Systems Manual; RRO = residual range organics; SIM = selective ion monitoring; VOA = volatile organic analysis

4.11 Sample Custody, Storage, and Transport

Sample custody, storage, and transport procedures are described in Section 4.13 of the GWP.

4.12 Equipment Decontamination

Equipment decontamination procedures are described in Section 4.14 of the GWP.

4.13 Investigative-Derived Waste Management

General information regarding investigative-derived waste (IDW) management is included in Section 4.15 of the GWP. IDW for this project may consist of soil cuttings, TWP development and purge water, decontamination rinsate water, and disposable sampling equipment.

Soil cuttings will be spread in the immediate surroundings of the boring location unless field observations (i.e. visual staining, odor, or PID readings greater than 20 ppm) suggest the presence of contamination. If contaminants are suspected to be present in soil cuttings, the cuttings will be combined and placed in a 55-gallon drum or supersack and temporarily stored at the YAK. The appropriate soil disposal method will be selected following the receipt of analytical results.

Liquids will be treated using three in-line five-gallon granular activated carbon (GAC) filters and discharged to the ground surface at least 100 feet from drainage ditches or surface water bodies. Silty TWP development water will be allowed to settle prior to filtration. An effluent sample will be collected following the completion of the sampling event.

Other IDW will primarily consist of disposable sampling equipment (nitrile gloves, pump tubing, etc.). These items will be disposed of at an onsite dumpster and ultimately the Yakutat refuse facility.

5 QUALITY ASSURANCE PROJECT PLAN

The QAPP is intended to guide activities during assessment and review of resulting data. Shannon & Wilson will be responsible for conducting data reduction, evaluation, and reporting under this QAPP. A general QAPP is provided as Section 5 of the GWP. Additionally, a Data-Validation Program Plan which describes the procedures for qualifying analytical data in a consistent manner, has been prepared, and is included as Appendix C to the GWP. The following sections describe specific procedures to be followed for data

collected at the YAK, so sampling and documentation are effective, laboratory data are usable, and the information acquired is of high quality and reliable.

5.1 Quality Assurance Objectives

Data quality objectives are detailed in Section 5.1 of the GWP. Numeric QA objectives for this project are presented in Exhibit 5-1 below.

Exhibit 5-1: Quality Assurance Objectives for Analytical Samples

Analyte	Method	Matrix	Precision	Accuracy	Completeness
PFAS	DoD QSM 5.3 Table B-15	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%
GRO	AK101	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
DRO	AK102	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
RRO	AK103	Water	±30%	60-120%	85%
		Soil	±50%	60-120%	85%
BTEX	8260	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%
PAHs	8270D-SIM	Water	±30%	(analyte dependent)	85%
		Soil	±50%	(analyte dependent)	85%

BTEX = benzene, toluene, ethylbenzene, and xylenes; COPC = contaminant of potential concern; DoD = Department of Defense; DRO = diesel range organics; EPA = U.S. Environmental Protection Agency; GRO = gasoline range organics; PAH = polynuclear aromatic hydrocarbons; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid; RRO = residual range organics; SIM = selective ion monitoring.

5.2 Field Documentation

Field documentation is described in Section 5.2 of the GWP.

5.3 Field Instrument Calibration

Field instrument calibration is discussed in Section 5.3 of the GWP.

5.4 Field Quality Control Samples

Field QC samples are discussed in Section 5.4 of the GWP. The field quality assurance (QA)/QC program for this project includes the collection of the following QA/QC samples as described below.

5.4.1 Field Duplicate Sample

Field duplicate sample collection procedures and frequency are described in Section 5.4.1 of the GWP. Refer to Exhibit 4-1 for the number of field duplicates to be collected for each matrix.

5.4.2 Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS) and matrix spike duplicate (MSD) samples are discussed in Section 5.4.2 of the GWP. MS/MSD samples will not be collected for this project. However, the laboratories may report these QC samples collected from projects not associated with this Addendum to meet their reporting requirements.

5.4.3 Trip Blank Samples

Trip blank samples are described in Section 5.4.3 of the GWP.

5.4.4 Equipment Blank Samples

Equipment blank sample collection procedures and frequency are described in Section 5.4.4 of the GWP.

5.4.5 Field Blank Samples

Field blank sample collection procedures are described in Section 5.4.5 of the GWP. Field blank samples are needed for areas with potential for PFAS-containing particulate matter to enter samples (i.e. high-contamination areas, windy/dusty conditions, etc.). Shannon & Wilson will collect two field blank samples, one at each of the two AFFF training areas during the collection of groundwater samples.

5.4.6 Temperature Blank Samples

Temperature blanks are described in Section 5.4.6 of the GWP.

5.5 Laboratory Quality Control Samples

Laboratory quality control samples are described in Section 5.5 of the GWP.

5.6 Laboratory Data Deliverables

Laboratory data deliverables are described in Section 5.6 of the GWP.

5.7 Data Reduction, Evaluation, and Reporting

Data reduction, evaluation, and reporting are discussed in Section 5.7 of the GWP.

6 REFERENCES

Alaska Department of Environmental Conservation (DEC), 2019a, 18 AAC 75, Oil and Other Hazardous Substances Pollution Control: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, January available: http://dec.alaska.gov/commish/regulations/.

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Alaska Department of Environmental Conservation (DEC), 2019c, 18 AAC 75.341, Soil Cleanup Levels: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, Section 341, January, available: http://dec.alaska.gov/commish/regulations/.

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Shannon & Wilson, Inc., 2020, Summary report, February 2019 to June 2020 Water Supply Well Monitoring, Yakutat, Alaska: Report prepared by Shannon & Wilson, Inc., Fairbanks, Alaska, 102896-004, for Alaska Department of Administration's Division of Risk Management, Juneau, Alaska, February.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Airport Property Boundary

Project Location

0 2 4 6

Miles

N

2022 Site Characterization GWP Addendum
Yakutat, Alaska

SITE VICINITY

March 2022

102896-008

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- ≤17 nanograms per liter (ng/L)
- 18 to 69 ng/L
- ≥70 ng/l
- Airport Boundary
- Aircraft Rescue and Firefighting (ARFF) Site

N

0 2,000 4,000

Feet

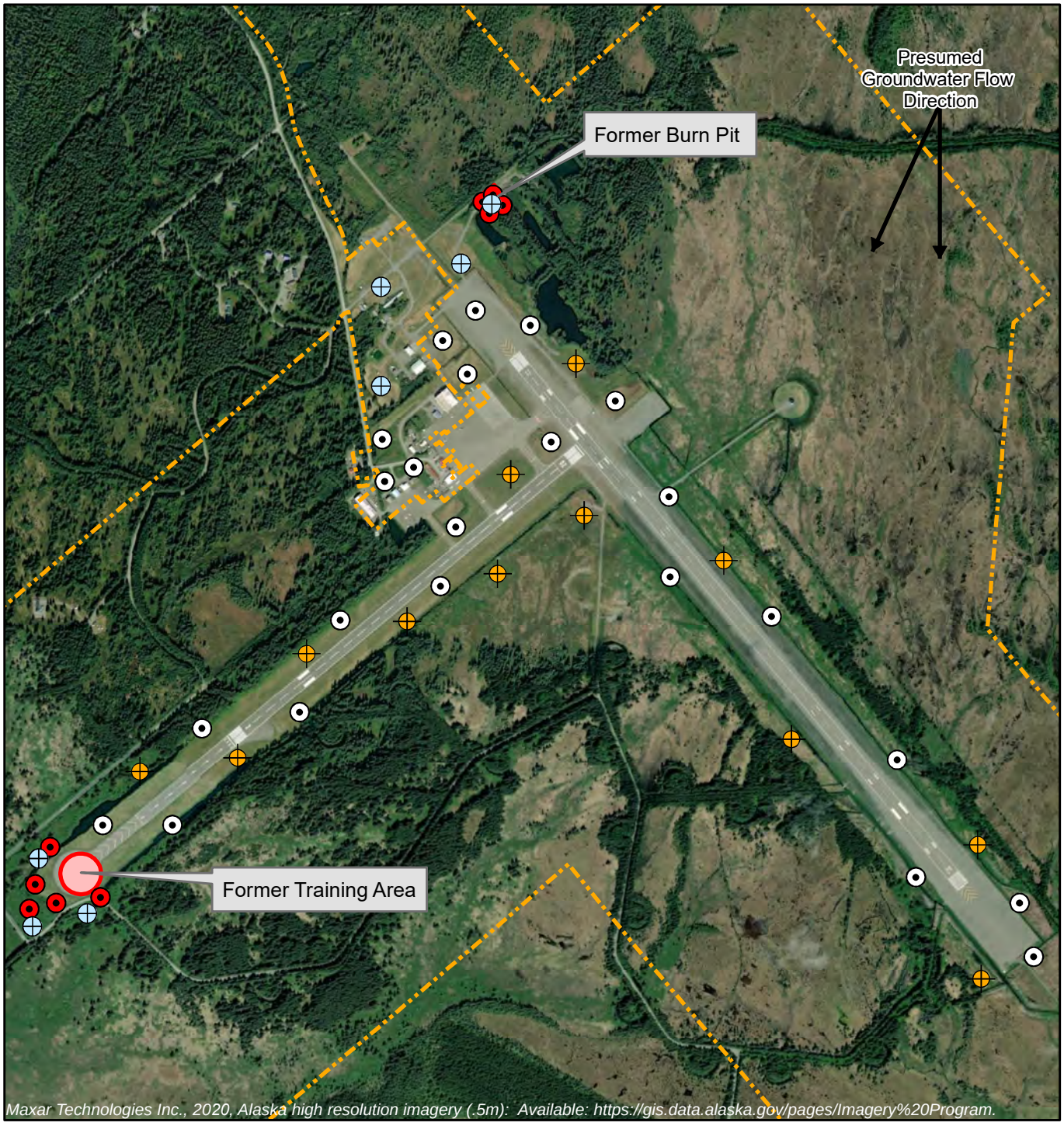
2022 Site Characterization GWP Addendum
Yakutat, Alaska

SITE MAP

March 2022 102896-008

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2



Note: Surface water samples will be collected from surface water adjacent to the Former Training Area and Burn Pit, surface and stormwater drainage areas, and at locations identified by DOT&PF staff during mobilization.

0 0.25 0.5
Miles

LEGEND

Proposed Sample Locations

- Surface Soil PFAS Sample
- Surface Soil PFAS and Petroleum Sample
- Soil Boring, Temporary Well Point, Surface and Subsurface Soil PFAS Samples
- Soil Boring, Temporary Well Point, Surface and Subsurface Soil PFAS and Petroleum Sample
- Aircraft Rescue and Firefighting (ARFF) Site
- Airport Boundary

N

2022 Site Characterization GWP Addendum
Yakutat, Alaska

PROPOSED SAMPLE LOCATIONS

March 2022

102896-008

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Figure 3

APPENDIX A: SITE SAFETY AND HEALTH PLAN

Appendix A

Site Safety and Health Plan

CONTENTS

Exhibits

APPENDIX A: SITE SAFETY AND HEALTH PLAN

A.1 SITE SAFETY AND HEALTH PLAN

Shannon & Wilson prepared this SSHP for the site characterization and water supply well sampling activities at and near the YAK. The purpose of this SSHP is to protect the health and safety of field personnel from physical and chemical hazards associated with work at this site.

The provisions of this plan apply to Shannon & Wilson personnel who will potentially be exposed to safety and/or health hazards during this investigation. Shannon & Wilson employees are also covered under its Corporate Safety and Health Program. General safety and health requirements described in that program will be met. Each Shannon & Wilson employee on the site will complete the personal acknowledgement form documenting they have read and understand this SSHP and agree to abide by its requirements. A copy of this SSHP will be kept on-site throughout the duration of sampling operations.

A.2 SITE HAZARD ANALYSIS

There are two categories of hazards that may occur during the field work: potential chemical exposure hazards and physical hazards associated with site characterization activities. These hazards are discussed below.

A.2.1 Chemical-Exposure Hazards

Contaminated soil and water may be encountered during site exploration activities. PFAS are believed to be the primary contaminants of potential concern and may be encountered in soils and water at unknown concentrations.

Shannon & Wilson personnel will implement skin protection when they are to contact potentially contaminated soil or water. Field personnel will wear work gloves or nitrile gloves as needed, and Level D personal protective equipment. Field personnel will not require respiratory protection based on the current understanding of site conditions and scope of services.

A.2.2 Physical Hazards

Primary physical hazards associated with site characterization activities include drilling equipment; temperature stress; lifting, slipping, tripping, falling; and risk of eye injuries. In addition, wildlife may be a hazard in forested areas around the airport. The best means of

protection against accidents related to physical hazards are careful control of equipment activities in the planned work area and use of experienced and safety- and health-trained field personnel.

Field personnel will not enter confined spaces for site characterization activities, nor will they enter trenches or excavations greater than four feet in depth.

A.2.2.1 Temperature Stress

Wearing personal protective equipment (PPE) may put a worker at risk of developing heat stress; however, since the field screening activities will be conducted in Level D PPE the risk of heat stress is considered low. Cold stress or injury due to hypothermia will be guarded against by wearing appropriate clothing, having warm shelter available, scheduling rest periods, adequate hydration, and self-monitoring physical and mental conditions.

A.2.2.2 Lifting Hazards

Moving coolers of soil samples or other heavy objects presents a lifting hazard. Personnel will use proper lifting techniques and obtain assistance when lifting objects weighing more than 40 pounds.

A.2.2.3 Slips, Trips, and Falls

The most common hazards on a job site are typically slips, trips, and falls. These hazards will be reduced through the following practices:

- Personnel will stay alert.
- All access-ways will be kept free of materials, supplies, and obstructions at all times.
- Tools and other materials will be located so as not to cause tripping or other hazards.
- Personnel should be aware of potential tripping hazards associated with vegetation, debris, and uneven ground.
- Personnel should be aware of limitations imposed by work clothing and PPE.

The project site may be inherently hazardous due to the potential presence of rain, snow, and ice, which can alter the character of the ground surface. The risk for slips, trips, and falls by site workers is increased due to wet or icy surfaces; therefore, workers will use caution when walking at the site.

A.2.2.4 Insects and Animals

During the summer months in Alaska, mosquitoes and other insects are common in areas predominantly covered with vegetation. Wearing PPE should be sufficient to protect site workers. Animals such as moose and bears are also commonly seen in Alaska. If a large animal approaches the site, workers should keep their distance or seek shelter in their vehicles.

A.2.2.5 Congested Areas

The site investigation may at times require field personnel to work adjacent to or in roadways, taxiways, and airport runways. Field personnel will observe the speed and frequency of traffic proximal to the work site. Appropriate cones, barricades, or signs to secure the work area will be used when required. Shannon & Wilson will coordinate with airport security and maintenance staff to conduct work at times that will limit risk, with escort, and using airport required signs, cones, barricades, or PPE.

A.2.3 Other Hazards

Biological, ionizing radiation, and other hazards are not expected to be present. However, be aware of the surroundings and maintain safe work practices in accordance with Shannon & Wilson's Corporate Health & Safety Plan.

A.3 PERSONAL RESPONSIBILITIES, TRAINING, AND MEDICAL SURVEILLANCE

Below is a summary of the assignment of responsibilities, training requirements, and medical surveillance information for Shannon & Wilson personnel.

A.3.1 Assignment of Responsibilities

Shannon & Wilson is responsible for understanding and complying with the requirements of this SSHP. Following is a list of responsibilities of all Shannon & Wilson personnel working on the site:

- Review and follow this SSHP.
- Attend and participate in safety meetings.
- Take appropriate action as described in this SSHP regarding accidents, fires, or other emergency situations.

- Take all reasonable precautions to prevent injury to themselves and their fellow workers.
- Perform only those tasks they believe they can do safely, and immediately report any accidents or unsafe conditions to Shannon & Wilson's Project Manager or Office Health and Safety Manager.
- Halt work, by themselves or by others, when they observe an unsafe act or potentially unsafe working condition.
- Report accidents, illnesses, and near-misses to the local contact and to Shannon & Wilson's Fairbanks office Health and Safety Manager.

A.3.2 Personal Training

Shannon & Wilson personnel performing activities on this site and under this plan have completed the appropriate training requirements specified in 29 CFR 1910.120(e). All staff has completed an annual eight-hour refresher-training course and/or initial 40-hour training course within the last year.

A personal acknowledgement form will be completed by field personnel prior to commencing field activities. This acknowledgment form will document that they have read and understand this SSHP.

A.3.3 Medical Surveillance Program

All field personnel performing activities on this site covered by this SSHP have undergone baseline and annual physical/medical examinations as part of Shannon & Wilson's Corporate Health and Safety Program. All field personnel are active participants in Shannon & Wilson's Medical Monitoring Program or in a similar program, which complies with 29 CFR 1910.120(f).

A.4 PERSONAL PROTECTIVE EQUIPMENT

PPE will be required during the course of the field work. PPE selection will be based primarily on work-task requirements and potential exposure. Field personnel will use Level D protective equipment during normal work activities. Personnel are trained in the use of PPE that is, or may be, required. All personnel shall wear Level D PPE as a minimum:

- standard work clothes or cotton overalls;
- reflective, high-visibility safety vest;
- safety-toe boots;

- safety glasses;
- hearing protection;
- gloves; and,
- hard hat.

Disposable nitrile gloves will be worn during any activity that may require dermal contact with potentially contaminated media.

A.5 DECONTAMINATION PROCEDURES

Equipment decontamination procedures are necessary for any reusable equipment that comes into contact with contaminated soil and/or water. Decontamination procedures will consist of a rinse with non-phosphate-based detergent, a second rinse with plain tap water, and a final rinse with distilled water. Sampling equipment and PPE that is expendable will be disposed of at the site or in a landfill off-site.

Shannon & Wilson will conduct all site characterization activities in Level D PPE. Personnel decontamination will consist of the following:

- At the conclusion of site work each day, disposable PPE (likely limited to nitrile gloves) will be placed in trash bags for off-site disposal.
- Employees will wash their hands and face with soap and water before eating, drinking, smoking, or applying cosmetics.

A.6 ACCIDENTS AND EMERGENCIES

Shannon & Wilson field personnel are current in first aid and cardiopulmonary resuscitation (CPR) training. At a minimum, the following site safety equipment and first aid supplies shall be available in the field:

- PPE and clothing specialized for known site hazards;
- first aid kit, including first aid booklet;
- portable eye wash;
- clean water in portable containers; and
- other decontamination supplies.

The primary emphasis of any health and safety plan is accident prevention. If an injury or illness occurs during the course of field work, the severity of the problem will dictate the

level of response. Minor injuries or illness will be addressed with basic first aid measures as recommended by a registered nurse through Shannon & Wilson's corporate Medcor service (1-800-775-5866). More serious injuries will require assistance from the medical staff at the Yakutat Community Health Center (YCHC), located at 115 Airport Road in Yakutat, Alaska. The telephone number for the YCHC is (907) 784-3275. Field phones will be kept easily accessible in the case of an emergency.

Exhibit 1: Map Showing Directions from the YAK to YCHC

Shannon & Wilson's Corporate Health and Safety Program requires accident reporting when there is a site-related accident, near-miss incident, or medical emergency. If an employee is treated by medical personnel, the medical attendant will complete an Incident Medical Treatment Documentation form. Completion of an Alaska Department of Labor

Report of Occupational Injury or Illness is also required within 10 days for any work-related injury or illness.

A.7 GENERAL SITE SAFETY REQUIREMENTS

The following measures are designed to augment the specific health and safety guidelines provided in this plan:

- Field personnel should avoid contact with potentially contaminated surfaces such as: walking through puddles or pools of liquid; kneeling on the ground; or leaning, sitting, or placing equipment on contaminated soil or containers.
- Field personnel will be familiar with procedures for initiating an emergency response.
- Hazard assessment is a continual process; personnel must be aware of their surroundings and any chemical/physical hazards present.
- Personnel in the exclusion area shall be the minimum number necessary to perform work tasks in a safe and efficient manner.
- The use of contact lenses is prohibited; soft lenses may absorb irritants, and all lenses concentrate irritants.
- Equipment contacting potentially contaminated soil or water must be decontaminated or properly discarded before leaving the site.

Field personnel will be familiar with the physical characteristics of the work site including wind direction, site access, and location of communication devices and safety equipment.

A.8 COVID SPECIFIC REQUIREMENTS

Shannon & Wilson has produced guidance documents for conducting field work during the outbreak of the coronavirus disease (COVID-19). These guidance documents are included as an attachment to this appendix. Additionally, DOT&PF has provided guidance to their contractors for work conducted for the State of Alaska during the COVID-19 outbreak. This information is located at the following link: http://dot.alaska.gov/2020.

SITE SAFETY AND HEALTH PLAN PERSONAL ACKNOWLEDGEMENT FORM

DOT&PF STATEWIDE GENERAL WORK PLAN
ADDENDUM 007-YAK-01: YAKUTAT INITIAL SITE CHARACTERIZATION

I have reviewed this document and understand its contents and requirements. A copy of the above-referenced document has been made available to me. I agree to abide by the requirements of this Site Safety and Health Plan.

_____	_____
Signature	Name (printed)
_____	_____
Date	Representing
_____	_____
Signature	Name (printed)
_____	_____
Date	Representing

APPENDIX B: CONCEPTUAL SITE MODEL

Appendix B

Conceptual Site Model

Scoping and Graphics Form

CONTENTS

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

File Number: 1530.38.022

Completed by: Amber Masters, Shannon & Wilson, Inc.

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Aqueous film forming foam (AFFF) release; petroleum compounds

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☐

If the box is checked, label this pathway complete: Incomplete

Comments:

Due to the lack of surface soil samples, the box was not checked. It may change following the collection of surface soil samples during site characterization activities.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Surface water has not been evaluated at this site; however, it is unlikely that surface water in this area would be used as a drinking water source.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

Due to the lack of surface water and soil samples, the box was not checked. It may change following the collection of surface water and soil samples during site characterization activities. It is unknown whether this area is or could be used for collection of subsistence foods.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Due to the lack of volatile samples at this site, the box was not checked. It may change following the collection of samples during site characterization activities.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Due to the lack of volatile analysis at this site, the box was not checked. It may change following the collection of samples during site characterization activities.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Due to the lack of surface soil samples, the box was not checked. It may change following the collection of surface soil samples during site characterization activities.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: ADOT&PF Yakutat Airport Sitewide PFAS

Completed By: Amber Masters

Date Completed: 9/29/2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media	Transport Mechanisms
☑ Surface Soil (0-2 ft bgs)	☐ Direct release to surface soil — check soil
	☐ Migration to subsurface — check soil
	☑ Migration to groundwater — check groundwater
	☐ Volatilization — check air
	☐ Runoff or erosion — check surface water
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☐ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil
	☐ Migration to groundwater — check groundwater
	☐ Volatilization — check air
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☐ Ground-water	☐ Direct release to groundwater — check groundwater
	☐ Volatilization — check air
	☐ Flow to surface water body — check surface water
	☐ Flow to sediment — check sediment
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Surface Water	☐ Direct release to surface water — check surface water
	☐ Volatilization — check air
	☐ Sedimentation — check sediment
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Sediment	☐ Direct release to sediment — check sediment
	☑ Resuspension, runoff, or erosion — check surface water
	☑ Uptake by plants or animals — check biota
	☐ Other (list):

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion	I	C/F	C/F	C/F	I	I	
	☐ Dermal Absorption of Contaminants from Soil							
	☐ Inhalation of Fugitive Dust							
☑ groundwater	☑ Ingestion of Groundwater	C/F	C/F	I	C/F			
	☐ Dermal Absorption of Contaminants in Groundwater							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ air	☐ Inhalation of Outdoor Air							
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☑ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ sediment	☑ Direct Contact with Sediment	I	C/F	I	C/F			
☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F				C/F	C/F	

Revised, 10/01/2010

IMPORTANT INFORMATION

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

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 that 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

IMPORTANT INFORMATION

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.

IMPORTANT INFORMATION

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