Original and Former Fire Training Facilities Second Quarter 2022 Grounwater Monitoring Report Portland International Airport Portland, Oregon ECSI No. 3324

Prepared for:
Port of Portland

August 30, 2022
1264-09

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1.0 Introduction

This *Second Quarter 2022 Groundwater Monitoring Report* (the Report) presents a summary of field activities and chemical analysis of groundwater samples collected during the reporting period in the vicinity of, or potentially impacted by, the Original and Former Fire Training Facilities (Original and Former Facilities; the Site) at Portland International Airport (PDX; Figures 1 and 2). Work at the Site is being conducted with oversight from the Oregon Department of Environmental Quality (DEQ) in accordance with the Voluntary Cleanup Agreement (VCP) between the DEQ and the Port of Portland (Port) for ECSI No. 3324, dated February 8, 2017. Groundwater sampling was conducted in accordance with the *Revised Monitoring and Well Installation Work Plan* initially submitted to DEQ on October 15, 2021, and revised December 9, 2021 (Apex, 2021).

1.1 Purpose

The purpose of the sampling described in this report was to conduct additional delineation and monitoring activities to address data gaps for impacts from per- and polyfluorinated alkyl substances (PFAS).

- **Overbank Deposit (OD) Groundwater.** Gauging and sampling of the OD well network will be conducted for four quarters (fourth quarter 2021 through third quarter 2022) to monitor the stability of the PFAS plume. The OD monitoring will include four quarters of select perimeter well monitoring, as well as annual monitoring of select interior wells related to the Fire Training Facilities investigation, as per the approved Work Plan (Apex, 2021). Annual sampling was conducted during the fourth quarter 2021 monitoring activities.
- **Upper Columbia River Sand Aquifer (CRSA) Groundwater Monitoring.** Based on the results of historical monitoring activities, PFAS concentrations in Upper CRSA wells have consistently been below the Oregon Health Authority (OHA) Health Advisory Level (HAL). One additional year of quarterly gauging and one sampling event (performed in the fourth quarter 2021) will provide additional data to assess the stability of PFAS concentrations in deeper groundwater at the Site. Groundwater samples collected from deep wells during the fourth quarter 2021 event did not contain detections of PFAS.

1.2 Scope of Work

The field activities and sample analysis during this reporting period included implementation of the current groundwater monitoring program for Site monitoring wells (Table 1 and Figure 2). The second quarter 2022 monitoring program included quarterly measurements of groundwater levels from all Site wells and the PDX Rental Car Quick Turnaround (QTA) well; quarterly collection of groundwater samples for analysis of PFAS from select perimeter OD monitoring wells; and preparation of this quarterly report. Collected groundwater samples were analyzed for a list of 24 PFAS compounds as identified by the U.S. Environmental Protection Agency (EPA), as well as GenX, ADONA, and F53-B.

1.3 Limitations

During the second quarter 2022 monitoring event, monitoring well MW-28 was not found due to vegetation overgrowth. Monitoring well MW-28 is gauged quarterly and is not sampled. The absence of groundwater level data from monitoring well MW-28 is not significant since elevation data from previous sampling events has not significantly influenced groundwater elevation contours.

2.0 Background

Appendix A presents a brief description of the Site, its history, and available physical and chemical data. The Site is located in the northwest portion of PDX (shown on Figures 1 and 2). Wells monitored during this investigation were screened in either the shallow (OD) or the deeper (CRSA) groundwater unit. The regional and local geology and hydrogeology is discussed in greater detail in Appendix A and the *Original and Former Fire Training Facilities, Additional Investigations Report* (Apex, 2018b and 2018c).

3.0 Groundwater Screening Levels

Currently, there are no applicable DEQ screening levels for PFAS in groundwater, stormwater, surface water, sediment, or soil. In the *Revised Investigation Results Report* dated January 31, 2018 (Apex, 2018a), the potential Site receptors and exposure pathways were identified and screening levels that had been developed by the EPA, other U.S. states, and countries globally were surveyed and selected based on receptor and pathway. Apex is tracking advancements in PFAS screening levels in U.S. states and internationally to the extent practicable; therefore, the screening levels were revisited in June 2022. Appendix B includes a summary of the results of the survey of drinking water, groundwater, and surface water screening levels, including newly published values as of June 28, 2022.

Data were screened against OHA published drinking water HALs for PFOA, PFOS, perfluorononaoic acid (PFNA), and perfluorohexane sulfonic acid (PFHxS) of 30 nanograms per liter (ng/L) individually or combined. In addition to the OHA HALs, the data were screened against the interim updated and final EPA HALs for perfluorobutane sulfonic acid (PFBS), PFOA, PFOS, and HPDO-DA (GenX), and Texas residential drinking water, Canada drinking water, and Germany groundwater values for the remaining compounds, which is consistent with previous sampling events.

Although groundwater screening levels were identified for several states, conservative values for protection of human health through drinking water were used to screen groundwater analytical data. A summary of screening levels is provided in Appendix B (Table B-5), and they are applied in Table 4.

4.0 Groundwater Monitoring

Groundwater levels were measured on May 31 through June 1, 2022 from the expanded shallow (OD) monitoring well network (wells MW-1 through MW-37) and from the three deep (CRSA) monitoring wells (DW-1 through DW-3) at the Site. To prevent cross-contamination, Apex personnel followed the PFAS-specific sampling procedures in Appendix C. Monitoring well gauging and sampling procedures for PFAS are also included in Appendix C. Monitoring well MW-11 contained free product during the second quarter 2022 monitoring event, which is consistent with historical measurements. The QTA well was also gauged. This well is located within the on-site Pump House (Port building Q143), located adjacent to the QTA facility east of the PDX Main Terminal, within the southwestern corner of this building. The access point for gauging the well is a port at the top of the well within the building.

Groundwater elevations are provided in Table 2, and groundwater contour maps for the shallow (OD) and deep (CRSA) June 2022 data are presented as Figures 3 and 4. Historical groundwater level data are presented in Appendix D.

Groundwater samples were collected on May 31 through June 2, 2022 from the shallow (OD) monitoring wells MW-15, MW-17, MW-19, MW-21, MW-23, MW-24, MW-30, and MW-34 through MW-37 (Figures 2, 5, and 6). Groundwater monitoring field sheets are presented in Appendix E and field parameters are presented in Table 3.

4.1 Analytical Program

Chemical analyses were performed on the collected groundwater samples. Samples were analyzed on a standard turnaround time (usually 21 days depending on analyses). Analytical laboratory reports and a data quality review are provided in Appendix F.

Groundwater samples were analyzed for PFAS. PFAS analysis by Isotope Dilution Method (formerly Modified EPA Method 537) was conducted by Vista Analytical of El Dorado Hills, California. Reported PFAS included 28 compounds based on discussion with DEQ (i.e. the EPA list of 24 compounds plus GenX, ADONA, and F53-B [11Cl-PF3OUdS and 9Cl-PF3ONS]). The complete list of reported PFAS is provided in Table 4.

4.2 Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the groundwater monitoring activities consisted of non-hazardous purge and decontamination water. The water was collected in 5-gallon buckets during sampling and subsequently transferred to 55-gallon drums that were stored on-site. A total of approximately 23 gallons of water were purged from monitoring wells and drummed. Water IDW will be land-applied (to

evaporate) within the lined area that is currently being used for fire training activities. Sampling materials and personal protective equipment (PPE) were disposed of as solid waste.

4.3 Work Plan Deviations

Monitoring well MW-28 was not gauged during the second quarter 2022 event due to field conditions. The vicinity of MW-28 was overgrown with thick vegetation consisting of Himalayan blackberry, thistle, and tall grasses. Reasonable attempts were made to locate the well using a handheld Trimble GPS unit. Monitoring well MW-28 is gauged quarterly and is not sampled. The absence of groundwater level data from monitoring well MW-28 is not significant since elevation data from previous sampling events has not significantly influenced groundwater elevation contours.

5.0 Investigation Results

The following sections present the analytical results of samples submitted for chemical analyses. Laboratory analytical reports and a review of laboratory data quality are included in Appendix F. Analytical results are summarized in Table 4 and on Figures 5 and 6. Groundwater elevation data are presented in Table 2. Historical groundwater elevation data are included in Appendix D, and historical groundwater analytical results are included in Appendix G.

5.1 Groundwater Analytical Results

This section presents a summary of groundwater analytical results for the reporting period. The detected concentrations were consistent with results collected since 2017.

5.1.1 Groundwater Monitoring – OD Wells

Groundwater samples were collected from wells MW-15, MW-17, MW-19, MW-21, MW-23, MW-24, MW-30, and MW-34 through MW-37 installed in the shallow overbank deposits per the quarterly groundwater monitoring program.

A total of 10 PFAS were detected in one or more of the 11 groundwater samples collected from the shallow (OD) monitoring wells. Specific compounds and detection frequency for shallow (OD) monitoring wells were similar to the fourth quarter 2021 and first quarter 2022 groundwater monitoring results and are provided below.

PFAS Detection Frequency:

Target Analyte	Detections Per Well	Detection Frequency
PFHxS	4/11	36%
PFOA	4/11	36%
PFBA	3/11	27%
PFPeA	3/11	27%
PFHxA	3/11	27%
PFBS	1/11	9%
PFPeS	1/11	9%
PFHpA	1/11	9%
PFOS	1/11	9%
6:2 FTS	1/11	9%
PFHpS	0/11	0%
PFNS	0/11	0%
HFPO-DA	0/11	0%
PFNA	0/11	0%
PFDS	0/11	0%
PFDA	0/11	0%
PFUnA	0/11	0%
PFDoA	0/11	0%
PFTrDA	0/11	0%
PFTeDA	0/11	0%
MeFOSAA	0/11	0%
EtFOSAA	0/11	0%
PFOSA	0/11	0%
4:2 FTS	0/11	0%
8:2 FTS	0/11	0%
11Cl-PF3OUdS	0/11	0%
9Cl-PF3ONS	0/11	0%
ADONA	0/11	0%

Consistent with the first quarter 2022, PFAS with the highest relative concentrations for individual monitoring wells included PFOS (MW-19), PFOA (MW-35), PFHxS (MW-21 and MW-23), and perfluoropentanoic acid (PFPeA; MW-15). Monitoring wells that had the highest relative concentrations of perfluoroalkyl sulfonic acids (PFOS and PFHxS) are located to the west of the fire training facilities and the highest relative concentrations of perfluoroalkyl carboxylic acids (PFOA and PFPeA) are located to the east of the fire training facilities. Individual PFAS relative concentration differences observed for the monitoring wells are likely due to differing fate and transport and degradation pathways depending on groundwater flow and chemistry.

PFOA concentrations in shallow groundwater ranged from not detected above the minimum reporting limit (MRL) to 49.3 ng/L in well MW-15. PFOS concentrations ranged from not detected above the MRL to 11.5 ng/L in well MW-19. Monitoring wells MW-36 and MW-37 installed in January 2022 did not have PFAS detections above their respective MRLs. Concentrations of PFAS for the second quarter 2022 groundwater monitoring event were within the historical range observed since 2017. Continued trend analysis for these compounds will be evaluated in the third quarter 2022 groundwater monitoring report.

Of the monitoring wells sampled, only MW-15 had a sum of PFOS, PFOA, PFNA, and PFHxS above the OHA HAL of 30 ng/L. Wells nearest the Columbia River were below OHA HALs. PFAS were generally not detected above MRLs for perimeter wells near the Columbia River; however, one perimeter well, MW-35, had PFAS detections (2.17 ng/L perfluorobutanoic acid [PFBA], 5.97 ng/L PFPeA, 4.50 ng/L perfluorohexanoic acid [PFHxA], and 7.58 ng/L PFOA).

PFAS results for OD groundwater samples are presented in Table 4 and on Figures 5 and 6.

Evaluation of these results suggests that the lateral extent of shallow groundwater impacts has been broadly delineated. Concentrations of PFAS generally attenuate with distance from the Original and Former Fire Training Facilities.

5.2 Groundwater Elevations and Flow Direction

Groundwater levels were measured on May 31 and June 1, 2022 from the expanded shallow (OD) monitoring well network (wells MW-1 through MW-37), the three deep (CRSA) monitoring wells (DW-1 through DW-3), and the QTA production well. Groundwater elevations are provided in Table 2, and groundwater contour maps for the shallow (OD) and deep (CRSA) June 2022 data are presented as Figures 3 and 4. Historical groundwater level data are presented in Appendix D.

In general, groundwater elevations are consistent with historical monitoring events. Groundwater elevations in the Upper CRSA wells (DW-1 through DW-3) are generally consistent with static water level observations in shallow wells (MW-1 through MW-37) installed at the Fire Training Facilities.

As shown on Figures 3 and 4, the groundwater flow direction at the Site is variable. Areas of local shallow (OD) flow direction variation are observed due to the topography and the on-site stormwater drainage ditches. A local shallow groundwater depression was observed in the vicinity of the fire training areas, likely due to infiltration into the stormwater system. The hydraulic gradient for the shallow (OD) groundwater varied between approximately 0.0003 and 0.06 feet/feet.

During the second quarter 2022 event, the groundwater flow in the deep (CRSA) unit was towards the east with a relatively flat hydraulic gradient of approximately 0.0005 feet/feet. The deep unit flow direction is

variable and is generally to the west when the Columbia River is at flood stage and to the north-northeast when the Columbia River is not at flood stage.

SPH were observed at well MW-11 (0.19 feet) during the second quarter 2022 gauging event, which is consistent with observations made since September 2017. The Port will continue to monitor SPH presence and will consider additional product recovery efforts at these monitoring wells during future groundwater monitoring events. SPH could not be recovered from wells MW-11 during the second quarter 2022 sampling event because it was not present at a recoverable thickness. SPH has also been observed at well MW-12 since 2017 and in 1997/1998 previously but has not been observed since the fourth quarter 2021.

5.3 Laboratory Analytical Data Quality

Apex conducted a review of the analytical laboratory data. The results of the data quality control review indicate the data are acceptable for the intended use in this monitoring report. A summary of the data quality review is provided in Appendix F.

6.0 Conclusions

The second quarter 2022 monitoring event included the sampling of 11 select perimeter monitoring wells to monitor the stability of the PFAS plume. Monitoring wells within the area of the Original and Former Fire Training Facilities were not sampled. The PFAS concentrations in shallow (OD) groundwater were consistent with past results collected since 2017 and wells nearest the Columbia River were non-detect or below OHA HALs. PFAS were not detected in monitoring wells MW-36 and MW-37 installed in January 2022, indicating that the plume is delineated to the northeast, which addresses that former data gap.

Continued quarterly monitoring will be conducted in 2022 in accordance with the monitoring program established in the approved Work Plan (Apex, 2021) to continue to assess the stability of the plume.

7.0 References

Apex Companies, LLC (Apex), 2018a. *Revised Investigation Results Report, Original and Former Fire Training Facilities, Portland International Airport. Portland, Oregon, ECSI No. 3324.* January 31, 2018.

Apex, 2018b. *Additional Investigation Results Report, Original and Former Fire Training Facilities, Portland International Airport, Portland, Oregon*. October 5, 2018.

Apex, 2018c. *Additional Investigation Results Report, Original and Former Fire Training Facilities, Portland International Airport. Portland, Oregon, ECSI No. 3324.* November 20, 2018.

Apex, 2020. *Hydrogeologic Summary, 2019 Groundwater Monitoring Data, Portland International Airport, Portland, Oregon.* July 10, 2020.

Apex, 2021. *Revised Monitoring and Well Installation Work Plan, Original and Former Fire Training Facilities, Portland International Airport, Portland, Oregon*. December 9, 2021.

Apex, 2022. *Original and Former Fire Training Facilities, Fourth Quarter 2021 Groundwater Monitoring Report, Portland International Airport, Portland, Oregon.* April 8, 2022.

Environmental Protection Agency (EPA), 2019. *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*. EPA 823R18004. February 2019.

Table 1
Monitoring Program - Fourth Quarter 2021 through Third Quarter 2022
Fire Training Facilities
Portland International Airport
Port of Portland

Well ID	Gauging	Sampling	Basis for Sampling Frequency
Overbank Deposit Wells (Shallow Groundwater)			
MW-1	Quarterly	--	Redundant well location within former FTF area.
MW-2	Quarterly	--	Redundant well location within former FTF area.
MW-3	Quarterly	Annually	Established PFAS concentrations within former FTF area.
MW-4	Quarterly	Annually	Established PFAS concentrations within former FTF area.
MW-5	Quarterly	--	Redundant well location within former FTF area.
MW-6	Quarterly	--	Redundant well location within former FTF area.
MW-7	Quarterly	--	Redundant well location within former FTF area.
MW-8	Quarterly	--	Redundant well location near the FTF.
MW-9	Quarterly	--	Redundant well location within original FTF area.
MW-10A	Quarterly	--	Redundant well location within original FTF area.
MW-11	Quarterly	--	Redundant well location within original FTF area.
MW-12	Quarterly	--	Redundant well location within former FTF area.
MW-13	Quarterly	--	Redundant well location near the FTF.
MW-14	Quarterly	--	Redundant well location near the FTF.
MW-15	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-16	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-17	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-18	Quarterly	--	Redundant well locatin along the plume perimeter
MW-19	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-20	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-21	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-22	Quarterly	--	Redundant well location along the plume perimeter.
MW-23	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-24	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-25	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-26	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-27	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-28	Quarterly	--	Redundant well location near the FTF.
MW-29	Quarterly	--	Redundant well location along the plume perimeter.
MW-30	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-31	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-32	Quarterly	--	Redundant well location along the plume perimeter.
MW-33	Quarterly	Annually	Perimeter well location to monitor PFAS extent.
MW-34	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-35	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-36	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
MW-37	Quarterly	Quarterly	Perimeter well location to monitor PFAS extent.
Upper CRSA (Deep Groundwater)			
DW-1	Quarterly	Annually	Monitor stability of PFAS in deeper groundwater.
DW-2	Quarterly	Annually	Monitor stability of PFAS in deeper groundwater.
DW-3	Quarterly	Annually	Monitor stability of PFAS in deeper groundwater.
Production Well			
QTA	Quarterly	Annually	Monitor stability of PFAS in deeper groundwater and potential impacts to the Columbia South Shore Wellfield.

Notes:

1. -- = Not applicable.
2. Annual sampling conducted in the fourth quarter 2021.
3. FTF = Fire Training Facilities

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-1	03/22/21	8.11	--	--	9.50
(17.61)	01/03/22	7.81	--	--	9.80
	03/22/22	7.93	--	--	9.68
	05/31/22	7.77	--	--	9.84
MW-2	03/22/21	10.02	--	--	7.82
(17.84)	01/03/22	9.76	--	--	8.08
	03/22/22	9.78	--	--	8.06
	05/31/22	9.67	--	--	8.17
MW-3	03/22/21	8.32	--	--	9.27
(17.59)	01/06/22	7.71	--	--	9.88
	03/22/22	8.03	--	--	9.56
	05/31/22	7.67	--	--	9.92
MW-4	03/22/21	8.20	--	--	9.80
(18.00)	01/03/22	7.85	--	--	10.15
	03/22/22	8.01	--	--	9.99
	06/01/22	7.80	--	--	10.20
MW-5	03/22/21	8.00	--	--	11.88
(19.88)	01/06/22	8.50	--	--	11.38
	03/22/22	6.90	--	--	12.98
	06/01/22	10.76	--	--	9.12
MW-6	03/22/21	6.76	--	--	11.32
(18.08)	01/03/22	5.79	--	--	12.29
	03/22/22	7.49	--	--	10.59
	06/01/22	7.64	--	--	10.44
MW-7	03/22/21	9.55	--	--	8.06
(17.61)	01/03/22	9.12	--	--	8.49
	03/22/22	9.44	--	--	8.17
	06/01/22	9.36	--	--	8.25
MW-8	03/22/21	9.80	--	--	8.35
(18.15)	01/03/22	9.51	--	--	8.64
	03/22/22	9.90	--	--	8.25
	05/31/22	9.97	--	--	8.18
MW-9	03/22/21	5.60	--	--	11.47
(17.07)	01/03/22	3.92	--	--	13.15
	03/22/22	5.51	--	--	11.56
	06/01/22	5.30	--	--	11.77

Please see notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-10A	03/22/21	5.66	--	--	11.58
(17.24)	01/03/22	4.55	--	--	12.69
	03/22/22	5.12	--	--	12.12
	06/01/22	5.58	--	--	11.66
MW-11	03/22/21	5.95	Sheen	Sheen	11.40
(17.35)	01/04/22	4.78	Sheen	Sheen	12.57
	03/22/22	5.78	5.74	0.04	11.60
	06/01/22	6.53	6.34	0.19	10.97
MW-12	03/22/21	7.63	7.56	0.07	12.14
(19.71)	01/03/22	8.39	--	--	11.32
	03/22/22	7.36	--	--	12.35
	06/01/22	7.37	--	--	12.34
MW-13	03/22/21	4.18	--	--	14.35
(18.53)	01/03/22	2.74	--	--	15.79
	03/22/22	3.75	--	--	14.78
	06/01/22	4.24	--	--	14.29
MW-14	03/22/21	3.33	--	--	14.40
(17.73)	01/03/22	2.81	--	--	14.92
	03/22/22	2.90	--	--	14.83
	06/01/22	3.32	--	--	14.41
MW-15	03/22/21	8.14	--	--	16.87
(25.01)	01/04/22	5.55	--	--	19.46
	03/21/22	7.76	--	--	17.25
	06/01/22	7.73	--	--	17.28
MW-16	03/22/21	4.50	--	--	18.06
(22.56)	01/03/22	4.58	--	--	17.98
	03/21/22	5.00	--	--	17.56
	06/01/22	5.16	--	--	17.40
MW-17	03/22/21	5.60	--	--	16.97
(22.57)	01/03/22	2.67	--	--	19.90
	03/21/22	5.10	--	--	17.47
	06/01/22	5.49	--	--	17.08
MW-18	03/22/21	5.41	--	--	17.68
(23.09)	01/03/22	3.53	--	--	19.56
	03/21/22	4.95	--	--	18.14
	06/01/22	5.49	--	--	17.60

Please see notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-19	03/22/21	2.49	--	--	14.54
(17.03)	01/03/22	0.00	--	--	17.03
	03/21/22	0.58	--	--	16.45
	06/01/22	2.55	--	--	14.48
MW-20	03/22/21	3.34	--	--	18.52
(21.86)	01/04/22	1.68	--	--	20.18
	03/21/22	2.98	--	--	18.88
	05/31/22	3.29	--	--	18.57
MW-21	03/22/21	5.32	--	--	16.60
(21.92)	01/04/22	0.95	--	--	20.97
	03/22/22	3.55	--	--	18.37
	06/01/22	5.01	--	--	16.91
MW-22	03/22/21	4.05	--	--	17.81
(21.86)	01/04/22	0.60	--	--	21.26
	03/22/22	2.68	--	--	19.18
	06/01/22	3.91	--	--	17.95
MW-23	03/22/21	9.68	--	--	12.64
(22.32)	01/04/22	5.45	--	--	16.87
	03/21/22	8.55	--	--	13.77
	06/01/22	7.95	--	--	14.37
MW-24	03/22/21	16.17	--	--	11.71
(27.88)	01/03/22	13.14	--	--	14.74
	03/21/22	14.41	--	--	13.47
	05/31/22	12.23	--	--	15.65
MW-25	03/22/21	15.77	--	--	10.94
(26.71)	01/03/22	11.55	--	--	15.16
	03/21/22	13.79	--	--	12.92
	05/31/22	11.32	--	--	15.39
MW-26	03/22/21	8.46	--	--	13.15
(21.61)	01/03/22	5.72	--	--	15.89
	03/21/22	6.72	--	--	14.89
	05/31/22	6.48	--	--	15.13

Please see notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-27	03/22/21	6.90	--	--	18.47
(25.37)	01/04/22	5.83	--	--	19.54
	03/21/22	6.62	--	--	18.75
	05/31/22	6.74	--	--	18.63
MW-28	03/22/21	5.25	--	--	14.86
(20.11)	01/04/22	4.13	--	--	15.98
	03/21/22	4.94	--	--	15.17
	06/01/22	Well not found			
MW-29	03/22/21	4.12	--	--	16.32
(20.44)	01/04/22	2.81	--	--	17.63
	03/22/22	3.91	--	--	16.53
	06/01/22	4.15	--	--	16.29
MW-30	03/22/21	14.19	--	--	11.22
(25.41)	01/04/22	11.74	--	--	13.67
	03/21/22	13.17	--	--	12.24
	05/31/22	9.90	--	--	15.51
MW-31	03/22/21	9.23	--	--	14.41
(23.64)	01/04/22	5.20	--	--	18.44
	03/21/22	7.15	--	--	16.49
	05/31/22	7.41	--	--	16.23
MW-32	03/22/21	15.71	--	--	9.91
(25.62)	01/04/22	11.76	--	--	13.86
	03/21/22	14.24	--	--	11.38
	05/31/22	10.10	--	--	15.52
MW-33	03/22/21	14.62	--	--	10.72
(25.34)	01/04/22	10.97	--	--	14.37
	03/21/22	13.14	--	--	12.20
	05/31/22	9.82	--	--	15.52
MW-34	03/22/21	15.71	--	--	9.80
(25.51)	01/04/22	11.74	--	--	13.77
	03/21/22	14.38	--	--	11.13
	05/31/22	9.85	--	--	15.66

Please see notes at end of table.

Table 2
Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-35	03/22/21	16.24	--	--	9.18
(25.42)	01/04/22	11.48	--	--	13.94
	03/21/22	14.48	--	--	10.94
	05/31/22	9.44	--	--	15.98
MW-36	01/03/22	10.81	--	--	13.98
(24.79)	03/21/22	13.98	--	--	10.81
	05/31/22	8.78	--	--	16.01
MW-37	01/03/22	12.83	--	--	17.96
(30.79)	03/21/22	13.10	--	--	17.69
	05/31/22	11.60	--	--	19.19
DW-1	03/22/21	13.94	--	--	9.53
(23.47)	01/04/22	9.82	--	--	13.65
	03/21/22	12.62	--	--	10.85
	05/31/22	7.75	--	--	15.72
DW-2	03/22/21	10.93	--	--	9.83
(20.76)	01/03/22	7.79	--	--	12.97
	03/22/22	9.19	--	--	11.57
	05/31/22	5.65	--	--	15.11
DW-3	03/22/21	10.70	--	--	9.71
(20.41)	01/04/22	6.95	--	--	13.46
	03/22/22	8.96	--	--	11.45
	05/31/22	5.05	--	--	15.36
PDX QTA Well	06/10/20	10.48	--	--	NS
(N/A)	01/05/22	11.50	--	--	NS
	03/23/22	13.00	--	--	NS
	05/31/22	9.63	--	--	NS

Notes:

1. feet MSL = Feet above mean sea level (NAVD88).
2. Casing elevations and groundwater data prior to December 1996 are from a Draft Quarterly Groundwater Monitoring Report dated December 12, 1996, and prepared by Geraghty & Miller.
3. -- = No product.
4. N/A = Well survey information is not available. NS = Well not surveyed
5. Elevation was corrected in wells with the presence of measurable separate-phase petroleum hydrocarbons using the following equation and assuming a specific gravity for gasoline product of 0.8 gram per cubic centimeter (Merck, 1989):

$$h_w = \frac{p_g\, h_g}{p_w}$$

water-level elevation = top of casing elevation + $[h_w - d_w]$

where:

h_w = depth to groundwater correction
d_w = depth to groundwater measuring point
p_g = density of separate-phase hydrocarbons
p_w = density of water
h_g = product thickness

Reference: Merck Index 1989, An Encyclopedia of Chemicals, Drugs and Biologicals, Merck and Company, Rahway, New Jersey.

Table 3
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (ºC)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-15	06/01/22	6.63	13.8	377.9	0.25	-171.1
MW-17	06/01/22	6.39	14.0	201.2	1.14	69.1
MW-19	06/01/22	6.40	13.0	243.2	0.18	-86.8
MW-21	06/02/22	6.30	13.0	259.9	0.16	34.5
MW-23	06/02/22	6.36	12.5	184.8	4.22	163.2
MW-24	06/02/22	6.28	12.6	231.3	1.56	92.4
MW-30	06/02/22	6.30	13.2	228.2	1.97	129.8
MW-34	06/02/22	6.21	14.1	226.5	4.73	147.7
MW-35	06/02/22	6.32	13.9	227.9	7.78	102.7
MW-36	06/02/22	6.28	13.5	244.1	6.01	106.0
MW-37	06/02/22	6.28	14.0	288.3	4.50	102.2

Notes:

1. °C = Degrees Celsius.
2. µS/cm = Microsiemens per centimeter.
3. ORP = Oxidation-reduction potential.
4. mg/L (ppm) = Milligrams per liter (parts per million).
5. mV = Millivolts.

Table 4
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA	ΣPFOS, PFOA, PFNA, PFHxS *
		Concentrations in ng/L																												
EPA Drinking Water Health Advisory Levels (HAL)		*2,000*	--	--	--	--	--	--	--	*0.02*	*0.004*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*10*	--
*Oregon Drinking Water Health Advisory Levels (HAL)**		--	--	--	--	*30*	--	--	--	*30*	*30*	--	*30*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*30*
Other Applicable Screening Levels		--	*71,000*	--	*93*	--	*93*	*300*	*560*	--	--	--	--	*290*	*370*	*290*	*290*	*290*	*290*	--	--	*290*	--	*200*	*200*	--	--	--	--	--
MW-1	05/02/2019	**53.8**	--	--	--	**1,000**	**345**	--	**210**	***10,600***	***833***	--	**127**	--	**9.77**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--	**12,600**
	08/08/2019	**51.1**	**116**	**80.3**	**345**	**919**	**354**	**80.0**	**206**	***8,040***	***723***	**9.48**	**113**	<1.06	**8.83**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	**18.3**	<1.06	**234**	**506**	--	--	--	--	**9,800**
	11/08/2019	**50.0**	**118**	**78.0**	**338**	**778**	**283**	**42.0**	**182**	***5,340***	***729***	**2.20 Q**	**88.7**	<2.05	**5.70 Q**	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	**13.3**	<2.05	**261**	**413**	--	--	--	--	**6,940**
	06/08/2020	**65.3**	**162**	**85.1**	**537**	**970**	**495**	**40.6**	**222**	***7,500***	***799***	<9.54	**99.9**	<4.93	**5.33**	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	**14.6**	**2.60 Q**	**440**	**459**	--	--	--	--	**9,370**
MW-3	08/08/2019	**138**	**508**	**249**	**3,200**	**2,950**	**2,860**	**532**	**861**	***19,200***	***4,760***	**5.54 Q**	**166**	<1.06	**21.6**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	**1.18**	**395**	**67,100 J**	**1,200**	--	--	--	--	**27,100**
	11/08/2019	**159**	**1,420**	**275**	**9,400**	**3,230**	**6,240**	**442**	**1,800**	***17,200***	***5,450***	**5.61**	**170**	<2.13	**57.1**	**4.33**	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	**595**	**898**	**1,850**	--	--	--	--	**26,100**
	06/08/2020	**175**	**825**	**284**	**4,020**	**3,420**	**5,560**	**277**	**1,170**	***21,400***	***5,350***	<29.1	**219**	<15.0	**31.4**	**5.60**	<1.00	<1.00	<1.00	<1.00	<1.00	**4.15**	**159**	**12,400**	**1,570**	--	--	--	--	**30,400**
	01/06/2022	**288**	**1,030**	**460**	**5,090**	**3,790**	**3,590**	**582**	**1,200**	***18,300***	***6,320 D***	**7.91**	**259**	<1.98	**26.0**	**2.61**	<1.98	<1.98	<1.98	<1.98	<1.98	**5.28**	**143**	**11,300**	**2,000**	<1.98	<1.98	<1.98	<1.98	**28,700**
DUP	01/06/2022	**269**	**1,000**	**483**	**4,870**	**5,150**	**3,630**	**645**	**1,170**	***19,500***	***9,560 D***	**8.66**	**261**	<1.98	**24.5**	**2.76**	<1.98	<1.98	<1.98	<1.98	<1.98	**4.66**	**124**	**11,300**	**2,160**	<1.98	<1.98	<1.98	<1.98	**34,500**
MW-4	08/08/2019	**3,440**	**7,350**	**5,100**	**27,800**	**20,600**	**32,100**	**976**	**8,620**	***73,600***	***9,390***	<249	**346**	<249	<249	<249	<249	<249	<249	<249	<249	<249	**958**	**154,000**	**3,590**	<249	<249	<249	<312	**104,000**
DUP	08/08/2019	**5,690**	**8,260**	**8,220**	**23,400**	**30,700**	**22,900**	**1,030**	**8,420**	***110,000***	***6,370***	**3.32**	**310**	<1.02	**10.7**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**1,550**	**157,000**	**5,670**	--	--	--	--	**147,000**
	11/08/2019	**3,600**	**8,220**	**5,440**	**31,300**	**28,900**	**11,600**	**3,770**	**10,700**	***36,200***	***9,940***	<2.10	**369**	<2.10	**10.8**	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	**968**	**1,400**	**7,610**	--	--	--	--	**75,400**
DUP	11/08/2019	**3,550**	**8,940**	**5,290**	**32,800**	**25,200**	**11,700**	**4,780**	**11,000**	***77,400***	***9,050***	**109 Q**	**343**	<2.06	**10.8**	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	**974**	**15,700**	**6,090**	--	--	--	--	**112,000**
	06/08/2020	**7,920**	**9,800**	**6,270**	**30,700**	**18,700**	**26,500**	**299**	**11,200**	***97,700***	***8,460***	<38.4	**370**	<19.8	**11.0**	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	**1,120**	**12,000**	**4,570**	--	--	--	--	**125,000**
DUP	06/08/2020	**4,460**	**9,760**	**4,650**	**30,200**	**19,600**	**28,300**	**1,930**	**10,800**	***91,700***	***7,960***	<39.6	**372**	<20.5	**10.7**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**1,110**	**11,700**	**2,930**	--	--	--	--	**120,000**
	01/06/2022	**2,670**	**7,960**	**3,550**	**28,800**	**17,100**	**22,700**	**950**	**8,350**	***71,400***	***7,110***	<1.97	**422**	<1.97	**14.0**	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	**842**	**14,700**	**7,190 D**	<1.97	<1.97	<1.97	<1.97	**96,000**
DUP	01/06/2022	**2,450**	**8,660**	**2,980**	**29,200**	**17,300**	**21,500**	**850**	**7,580**	***78,000***	***8,400***	<1.95	**426**	<1.95	**14.3**	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	**814**	**14,100**	**4,570 D**	<1.95	<1.95	<1.95	<1.95	**104,000**
MW-6	09/26/2017	**11.0**	--	--	--	**459**	**338**	--	**240**	***1,080***	***383***	--	**149**	--	**11.3**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	--	--	--	--	**2,070**
DUP	09/26/2017	**12.1**	--	--	--	**456**	**351**	--	**249**	***1,160***	***439***	--	**158**	--	**10.4**	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--	**2,210**
MW-7	04/20/2017	**154**	--	--	--	**495**	**1,280**	--	**505**	***2,710***	***476***	--	**76.5**	--	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--	**3,760**
DUP	04/20/2017	**137**	--	--	--	**589**	**1,100**	--	**434**	***819***	***568***	--	**83.9**	--	**2.27**	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--	**2,060**
MW-8	05/02/2019	**47.2**	--	--	--	**279**	**378**	--	**102**	***229***	***215***	--	**37.4**	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--	**760**
	08/08/2019	**69.6**	**197**	**12.0**	**248**	**65.2**	**486**	<1.07	**38.4**	***132***	***186***	<1.07	**8.77**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	**2.37**	**15.8**	**1.95**	--	--	--	--	**392**
	11/08/2019	**60.4**	**206**	**43.1**	**453**	**457**	**373**	**6.01**	**163**	***237***	***465***	<2.03	**25.9**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	**3.15**	**44.9**	<2.03	--	--	--	--	**1,180**
	06/08/2020	**87.0**	**267**	**13.1**	**322**	**68.3**	**635**	<2.08	**49.0**	***82.4***	***224***	<2.01	**3.78**	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	**3.47**	**13.8**	<1.07	--	--	--	--	**378**
MW-9	04/20/2017	**90.7**	--	--	--	**1,910**	**460**	--	**99.4**	***1,360***	***7,880***	--	**24.8**	--	**26.8**	<1.78	<1.78	<1.78	<1.78	<1.78	<1.78	--	--	--	--	--	--	--	--	**11,200**
MW-10A	05/02/2019	**47.0**	--	--	--	**995**	**382**	--	**105**	***314***	***5,640***	--	**18.6**	--	**11.4**	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--	**6,970**
	08/08/2019	**147**	**143**	**102**	**397**	**1,940**	**1,010**	**9.06**	**196**	***714***	***7,290***	<1.07	**24.1**	<1.07	**26.0**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	**185**	**2.10**	--	--	--	--	**9,970**
	11/08/2019	**190**	**122**	**87.7**	**337**	**1,090**	**766**	**8.46**	**154**	***503***	***4,810***	<2.04	**14.3**	<2.04	**14.9**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	**32.9**	**3.84**	--	--	--	--	**6,420**
	06/08/2020	**58.1**	**84.2**	**41.6**	**240**	**1,380**	**469**	**8.34**	**133**	***479***	***6,820***	<2.02	**22.7**	<1.04	**35.7**	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	**1.34 Q**	<1.04	**23.2**	<1.07	--	--	--	--	**8,700**
MW-13	09/26/2017	**10.9**	--	--	--	**301**	**750**	--	**475**	***1,040***	***717***	--	**394**	--	**29.5**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--	**2,450**
MW-14	04/29/2019	**23.2**	--	--	--	**388**	**97.6**	--	**61.1**	***468***	***80.0***	--	**39.7**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--	**976**
	08/08/2019	**16.3**	**70.4**	**31.0**	**147**	**347**	**89.0**	**4.90**	**53.6**	***602***	***95.5***	<1.07	**45.1**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	**1,090**
	11/08/2019	**19.3**	**65.9**	**33.0**	**116**	**346**	**72.8**	**3.11 Q**	**55.7**	***553***	***87.3***	<2.01	**34.7**	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	--	--	--	--	**1,020**
	06/08/2020	**20.6**	**66.0**	**34.3**	**143**	**610**	**119**	**3.94**	**77.1**	***773***	***127***	<1.95	**57.7**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--	**1,570**
MW-15	03/23/2021	**1.13**	**33.3**	<1.23	**104**	**11.3**	**71.7**	<1.01	**45.1**	***1.15***	***57.3***	<1.96	**1.03 Q**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**17.1**	<1.04	--	--	--	--	**70.8**
	01/04/2022	<2.02	**25.7**	<2.02	**79.6**	**13.9**	**56.8**	<2.02	**38.8**	<2.02	***54.0***	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	**8.96**	<2.02	<2.02	<2.02	<2.02	<2.02	**67.9**
	03/21/2022	**2.26**	**27.2**	<1.95	**70.1**	**12.4**	**61.4**	<1.95	**52.5**	<1.95	***52.4***	<1.95	**2.31**	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	**9.81**	<1.95	<1.95	<1.95	<1.95	<1.95	**67.1**
	06/01/2022	<2.03	**22.1**	<2.03	**87.1**	**11.6**	**59.5**	<2.03	**39.4**	<2.03	***49.3***	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	**10.6**	<2.03	<2.03	<2.03	<2.03	<2.03	**60.9**
MW-16	09/23/2020	**1.13**	**11.7**	<1.32	**32.5**	<2.11	**23**	<1.05	**16.8**	***1.59 Q***	***25.8***	<2.11	<1.05	<2.11	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.11	--	--	--	--	**27.4**
	12/14/2020	<1.02	**7.55**	<1.23	**18.6**	**1.85**	**12.4**	<1.02	**10.4**	***1.07 Q***	***12.7***	<1.97	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.05	--	--	--	--	**15.6**
	03/22/2021	<1.01	**7.71**	<1.22	**16.7**	**1.36**	**15.1**	<1.01	**11.6**	<1.01	***13.0***	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--	**14.4**
	01/03/2022	<1.98	**4.03**	<1.98	**8.64**	<1.98	**6.89**	<1.98	**4.48**	***3.68 Q***	***11.1***	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	**14.8**
MW-17	03/23/2021	<1.00	<1.00	<1.21	<1.00	<1.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--	<1.94
	01/03/2022	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98
	03/21/2022	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97
	06/01/2022	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
MW-18	06/05/2020	<0.979	<0.979	<1.22	<0.979	<1.96	<1.08	<1.96	<0.979	<0.979	<0.979	<1.96	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<1.03	--	--	--	--	<1.96
	09/22/2020	<1.01	<1.01	<1.26	<1.01	**4.46**	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--	**4.46**
	12/14/2020	<0.994	<0.994	<1.20	<0.994	**5.21**	<1.08	<0.994	<0.994	<0.994	<0.994	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--	**5.21**
	03/22/2021	<0.977	<0.977	<1.18	<0.977	**2.71**	<1.06	<0.977	<0.977	<0.977	<0.977	<1.89	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<1.01	--	--	--	--	**2.71**

Please refer to notes at end of table.

Table 4
Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA	ΣPFOS, PFOA, PFNA, PFHxS *
		Concentrations in ng/L																												
EPA Drinking Water Health Advisory Levels (HAL)		*2,000*	--	--	--	--	--	--	--	*0.02*	*0.004*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*10*	--
*Oregon Drinking Water Health Advisory Levels (HAL)**		--	--	--	--	*30*	--	--	--	*30*	*30*	--	*30*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*30*
Other Applicable Screening Levels		--	*71,000*	--	*93*	--	*93*	*300*	*560*	--	--	--	--	*290*	*370*	*290*	*290*	*290*	*290*	--	--	*290*	--	*200*	*200*	--	--	--	--	--
MW-19	03/22/2021	**1.03**	**2.82**	<1.22	**2.24**	**8.47**	**2.06**	<1.01	<1.01	***15.2***	***3.36***	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--	**27.0**
	01/03/2022	<2.02	**2.82**	<2.02	<2.02	**11.1**	**2.12**	<2.02	<2.02	***15.9***	***4.33***	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	**31.3**
	03/21/2022	<2.03	<2.03	<2.03	<2.03	**8.13**	<2.03	<2.03	<2.03	***14.3***	***3.13***	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	**25.6**
	06/01/2022	<1.97	**2.57**	<1.97	**2.16**	**7.87**	**2.06**	<1.97	<1.97	***11.5***	***3.77***	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	**23.1**
MW-20	09/22/2020	**6.99**	**12.1**	**6.99**	**13.5**	**41.6**	**16.7**	**1.81**	**8.92**	***40.3***	***16.3***	<2.00	**2.51**	<2.00	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<1.05	--	--	--	--	**101**
	12/15/2020	**6.34**	**4.40**	**5.83**	**3.11**	**26.7**	**3.03**	<0.982	**2.21**	***26.9***	***5.22***	<1.90	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<1.01	--	--	--	--	**58.8**
	03/23/2021	**9.67**	**1.84**	**9.82**	<0.994	**47.6**	<1.08	<0.994	<0.994	***15.3***	***2.32***	<1.92	**1.04 Q**	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--	**66.3**
	01/06/2022	<1.91	<1.91	<1.91	<1.91	**9.58**	<1.91	<1.91	<1.91	***23.7***	***2.08***	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	**35.4**
MW-21	03/23/2021	**1.26**	<1.00	<1.22	<1.00	**5.66**	<1.09	<1.00	<1.00	<1.00	***2.19***	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--	**7.85**
	01/06/2022	<1.96	<1.96	<1.96	<1.96	**4.85**	<1.96	<1.96	<1.96	<1.96	***2.45***	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	**7.30**
	03/22/2022	<1.91	<1.91	<1.91	<1.91	**4.13**	<1.91	<1.91	<1.91	<1.91	***1.92***	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	**6.05**
DUP	03/22/2022	<1.93	<1.93	<1.93	<1.93	**4.58**	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	**4.58**
	06/02/2022	<2.03	<2.03	<2.03	<2.03	**5.24**	<2.03	<2.03	<2.03	<2.03	***2.08***	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	**7.32**
DUP	06/02/2022	<2.06	<2.06	<2.06	<2.06	**5.04**	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	**5.04**
MW-22	06/05/2020	<1.01	<1.01	<1.27	<1.01	<2.03	<1.12	<2.03	<1.01	<1.01	<1.01	<2.03	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.07	--	--	--	--	<2.03
	09/22/2020	<1.01	<1.01	<1.26	<1.01	<2.02	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--	<2.02
	12/15/2020	<1.00	<1.00	<1.21	<1.00	<1.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.93	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--	<1.93
	03/24/2021	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--	<1.95
MW-23	03/24/2021	**4.43**	<0.969	**4.13**	<0.969	**23.1**	<1.06	<0.969	<0.969	***7.65 Q***	<0.969	<1.87	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.998	--	--	--	--	**30.8**
	01/07/2022	**5.14**	<1.95	**4.79**	<1.95	**27.0**	<1.95	<1.95	<1.95	***10.7 Q***	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	**37.7**
	03/22/2022	**3.98**	<1.99	**3.99**	<1.99	**18.5**	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	**18.5**
DUP	03/22/2022	**3.97**	<1.94	**4.03**	<1.94	**20.1**	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	**20.1**
	06/02/2022	**3.91**	<1.93	**3.05**	<1.93	**17.7**	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	**17.7**
DUP	06/02/2022	**4.06**	<1.99	**2.92**	<1.99	**16.3**	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	**16.3**
MW-24	03/23/2021	<1.00	<1.00	<1.22	<1.00	<1.00	<1.10	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.04	--	--	--	--	<1.94
	01/07/2022	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95
	03/22/2022	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05
	06/02/2022	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
MW-25	09/22/2020	<1.02	<1.02	<1.28	<1.02	<2.04	<1.12	<1.02	<1.02	<1.02	<1.02	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--	<2.04
	12/15/2020	<0.976	<0.976	<1.18	<0.976	<0.976	<1.06	<0.976	<0.976	<0.976	<0.976	<1.89	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<1.01	--	--	--	--	<1.89
	03/23/2021	<0.992	<0.992	<1.20	<0.992	<0.992	<1.08	<0.992	<0.992	<0.992	<0.992	<1.92	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<1.02	--	--	--	--	<1.92
	01/07/2022	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01
MW-26	09/22/2020	**25.9**	**55.3**	**18.2**	**174**	**136**	**176**	<1.02	**117**	***1.15***	***354***	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--	**491**
DUP	09/22/2020	**24.8**	**57.8**	**16.2**	**175**	**126**	**172**	<1.03	**112**	***1.70 Q***	***278***	<2.06	<1.03	<2.06	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.08	--	--	--	--	**406**
	12/15/2020	**26.4**	**59.4**	**17.3**	**172**	**120**	**165**	<0.981	**102**	***1.12***	***302***	<1.90	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<1.01	--	--	--	--	**423**
DUP	12/15/2020	**27.6**	**51.4**	**17.5**	**165**	**119**	**155**	<1.03	**107**	***1.44 Q***	***363***	<2.00	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<2.06	<2.06	<2.06	<1.06	--	--	--	**483**
	03/23/2021	**31.4**	**45.4**	**20.9**	**128**	**162**	**134**	<0.994	**106**	***1.60 Q***	***288***	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--	**452**
DUP	03/23/2021	**30.2**	**42.2**	**22.4**	**117**	**149**	**129**	<0.991	**105**	***1.79***	***291***	<1.92	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<1.02	--	--	--	--	**442**
	01/07/2022	**26.4**	**34.1**	**20.5**	**85.8**	**196**	**90.0**	<2.00	**89.2**	***2.59 Q***	***318***	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**517**
MW-27	09/22/2020	<1.01	<1.01	<1.26	<1.01	<2.02	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--	<2.02
	12/15/2020	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--	<1.96
	03/23/2021	<0.985	<0.985	<1.19	<0.985	<0.985	<1.07	<0.985	<0.985	<0.985	<0.985	<1.91	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<1.01	--	--	--	--	<1.91
	01/07/2022	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	***2.09***	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	**2.87**	<2.01	<2.01	<2.01	<2.01	<2.01	**2.09**
MW-28	04/30/2019	**21.8**	--	--	--	**286**	**625**	--	**398**	***7.68***	***20,000***	--	**9.96**	--	**2.19 Q**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--	--	**20,300**
DUP	04/30/2019	**20.3**	--	--	--	**267**	**616**	--	**398**	***9.81***	***20,400***	--	**10.3**	--	**2.17**	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--	--	--	--	--	--	**20,700**
	08/07/2019	**23.9**	**83.3**	**14.2**	**354**	**304**	**600**	<1.03	**395**	<1.03	***11,700***	<1.03	**9.74**	<1.03	**1.72**	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	**13.5**	<1.03	<1.03	<1.03	<1.03	<1.29	**12,000**
DUP	08/07/2019	**23.1**	**79.5**	**13.4**	**320**	**293**	**555**	<1.03	**408**	***8.02***	***17,600***	<1.03	**9.95**	<1.03	**1.74**	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	**12.0**	<1.03	--	--	--	--	**17,900**
	11/06/2019	**26.3**	**93.0**	**20.6**	**400**	**330**	**617**	<2.05	**464**	***8.84***	***17,400***	<2.05	**9.77**	<2.05	**2.06**	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	**15.5**	<2.05	--	--	--	--	**17,700**
DUP	11/06/2019	**29.2**	**89.1**	**20.5**	**402**	**324**	**493**	<2.04	**471**	***11.6 Q***	***18,400***	<2.04	**10.2**	<2.04	**2.17 Q**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	**12.4**	<2.04	--	--	--	--	**18,700**
	06/05/2020	**22.1**	**67.2**	**14.7 Q**	**329**	**288**	**560**	<2.01	**394**	***6.52***	***16,900***	<2.01	**8.59**	<1.00	**1.78**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**14.2**	<1.05	--	--	--	--	**17,200**
DUP	06/05/2020	**21.5**	**82.9**	**14.1 Q**	**337**	**302**	**590**	<1.97	**407**	***7.68***	***15,900***	<1.97	**9.43**	<0.984	**1.64 Q**	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	**11.8**	<1.03	--	--	--	--	**16,200**
MW-29	06/09/2020	**534**	**807**	**1,590**	**2,490**	**12,800**	**3,470**	**53.5**	**3,110**	***14,000***	***3,350***	**14.9**	**405**	<1.01	**26.6**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**2.11**	**4.2**	**2,790**	**4,230**	--	--	--	--	**30,600**
	09/23/2020	**126**	**393**	**365**	**1,150**	**6,660**	**1,200**	**25.5**	**1,300**	***7,070***	***1190***	<10.1	**230**	<2.03	**18.6**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**2.43 Q**	**2.3**	**1,340**	**4,250**	--	--	--	--	**15,200**
	12/16/2020	**177**	**442**	**273**	**1,170**	**4,170**	**888**	**19.4**	**670**	***6,160***	***825***	**9.39**	**199**	<1.02	**18.5**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**2.59**	**5.18 Q**	**934**	**2,800**	--	--	--	--	**11,400**
	03/24/2021	**697**	**1,150**	**1,010**	**3,090**	**5,150**	**2,960**	**52.2**	**1,610**	***6,130***	***1,820***	**11.1**	**419**	<0.999	**23.7**	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	**1.65 Q**	**5.09**	**1,840**	**2,730**	--	--	--	--	**13,500**
MW-30	03/24/2021	<0.985	<0.985	<1.19	<0.985	<0.985	<1.07	<0.985	<0.985	<0.985	<0.985	<1.91	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<1.01	--	--	--	--	<1.91
	01/05/2022	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
	03/22/2022	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96
	06/02/2022	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91

Please refer to notes at end of table.

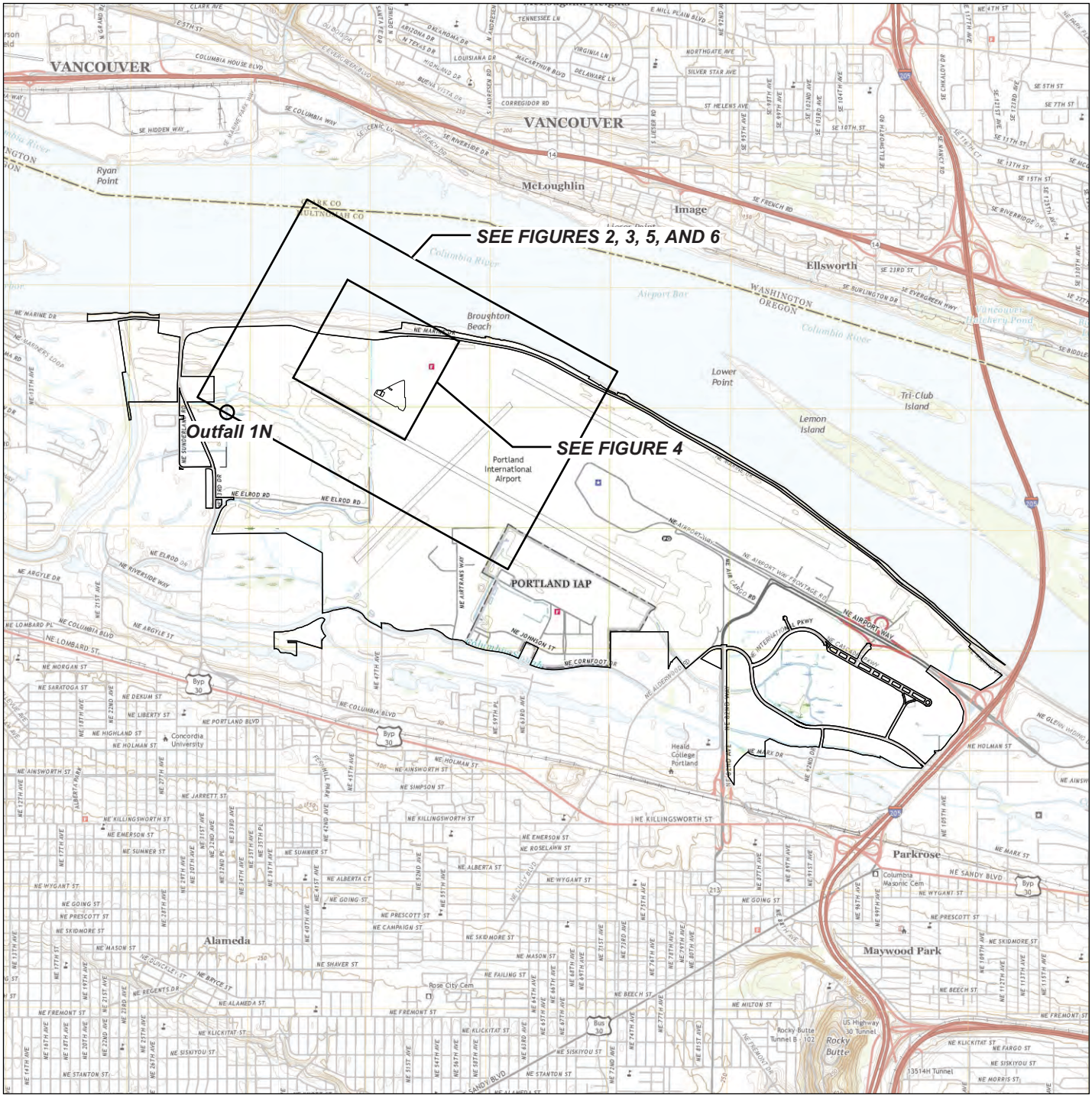
Table 4
Groundwater Analytical Results – Overbank Deposit Wells - PAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA	ΣPFOS, PFOA, PFNA, PFHxS *
		Concentrations in ng/L																												
EPA Drinking Water Health Advisory Levels (HAL)		*2,000*	--	--	--	--	--	--	--	*0.02*	*0.004*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*10*	--
*Oregon Drinking Water Health Advisory Levels (HAL)**		--	--	--	--	*30*	--	--	--	*30*	*30*	--	*30*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*30*
Other Applicable Screening Levels		--	*71,000*	--	*93*	--	*93*	*300*	*560*	--	--	--	--	*290*	*370*	*290*	*290*	*290*	*290*	--	--	*290*	--	*200*	*200*	--	--	--	--	--
MW-31	09/23/2020	**56.4**	**53.9**	**38.1**	**252**	**483**	**294**	**1.90**	**235**	***28.5 Q***	***873***	<1.99	**6.68**	<1.99	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	**14.1**	<1.04	--	--	--	--	**1,390**
DUP	09/23/2020	**60.6**	**59.2**	**41.5**	**285**	**480**	**314**	**1.59**	**247**	***24.3 Q***	***816***	<2.04	**6.79**	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**16.5**	<1.07	--	--	--	--	**1,330**
	12/16/2020	**56.3**	**62**	**48.7**	**295**	**465**	**315**	**1.83**	**251**	***25.9***	***962***	<1.94	**7.54**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	**12.6**	<1.03	--	--	--	**1,460**
DUP	12/16/2020	**56.5**	**59.3**	**41.1**	**304**	**486**	**334**	**2.13**	**256**	***27.4***	***1,010***	<1.91	**7.61**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.98	<1.98	**12.7**	<1.02	--	--	--	--	**1,530**
	03/24/2021	**65.0**	**65.1**	**49.5**	**266**	**620**	**329**	**2.16**	**263**	***30.4 Q***	***1,030***	<1.93	**11.1**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**15.6**	<1.03	--	--	--	--	**1,690**
DUP	03/24/2021	**64.4**	**61.7**	**48.7**	**260**	**619**	**309**	**1.59**	**290**	***29.9 Q***	***969***	<1.91	**11.1**	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	**14.7**	<1.02	--	--	--	--	**1,630**
	01/07/2022	**42.9**	**32.2**	**30.0**	**122**	**383**	**143**	<2.04	**157**	***54.5***	***513***	<2.04	**20.2**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	**971**
MW-32	06/09/2020	<0.994	<0.994	<1.20	<0.994	<1.99	<1.08	<1.99	<0.994	<0.994	<0.994	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	<1.99
	09/23/2020	<1.02	<1.02	<1.28	<1.02	<2.04	<1.12	<1.02	<1.02	<1.02	<1.02	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	<2.04
	12/16/2020	<1.00	<1.00	<1.21	<1.00	<2.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<2.00	<1.03	--	--	--	<2.00
	03/24/2021	<0.986	<0.986	<1.19	<0.986	<0.986	<1.07	<0.986	<0.986	<0.986	<0.986	<1.91	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<1.02	--	--	--	<1.91
MW-33	09/21/2020	<0.990	<0.990	<1.24	<0.990	<1.98	<1.09	<0.990	<0.990	<0.990	<0.990	<1.98	<0.990	<1.98	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<1.04	--	--	--	<1.98
	12/15/2020	**1.27**	**1.12**	<1.20	**3.93**	**7.27**	**4.00**	<0.993	**2.34**	<0.993	***3.54***	<1.92	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<1.02	--	--	--	**10.8**
	03/23/2021	<0.984	<0.984	<1.19	<0.984	<0.984	<1.07	<0.984	<0.984	<0.984	<0.984	<1.90	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<1.01	--	--	--	<1.90
	01/06/2022	<1.98	<1.98	<1.98	<1.98	**2.50**	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	**2.50**
MW-34	03/24/2021	<0.987	<0.987	<1.19	<0.987	<0.987	<1.08	<0.987	<0.987	<0.987	<0.987	<1.91	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<1.02	--	--	--	<1.91
	01/06/2022	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01
	03/22/2022	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
	06/02/2022	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98
MW-35	03/23/2021	<0.989	**3.71**	<1.20	**14.4**	**2.89**	**10.8**	<0.989	**4.81**	<0.989	***19.0***	<1.91	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<1.02	--	--	--	**21.9**
	01/06/2022	<1.96	**2.56**	<1.96	**5.92**	<1.96	**4.17**	<1.96	<1.96	<1.96	***7.42***	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	**7.42**
	03/23/2022	<1.89	**3.60**	<1.89	**11.7**	**2.53**	**9.08**	<1.89	**4.46**	<1.89	***15.2***	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	**17.7**
	06/02/2022	<1.99	**2.17**	<1.99	**5.97**	<1.99	**4.50**	<1.99	<1.99	<1.99	***7.58***	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	**7.58**
MW-36	01/06/2022	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
	03/23/2022	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
	06/02/2022	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93
MW-37	01/06/2022	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
	03/23/2022	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02
	06/02/2022	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92

Notes:

1. ng/L = Nanograms per liter (ppt [parts per trillion]).
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. -- = Value not available.
5. Screening levels for residential drinking water from the United States Environmental Protection Agency (U.S. EPA) for PFBS, PFOA, PFOS, and HFPO-DA (GenX); Oregon Health Authority (OHA) HALs for individual or combined concentrations of PFHxS, PFOS, PFOA, and PFNA; Health Canada for 6:2 FTS and 8:2 FTS; German Ministry of Health for PFHpS; and State of Texas for remainder. See Table B-5.
6. * = The Oregon Drinking Water Health Advisory Level (HAL) applies to each individual compound or the combined concentration of PFHxS, PFOS, PFOA, and PFNA. Not detected values are summed as zero.
7. Shading indicates concentration of analyte was detected above one or more of the screening level values (excluding the EPA HAL for PFOS and PFOA).
8. Italicized indicates that PFOS or PFOA were detected above the reporting limit and subsequently above the EPA HAL.
9. J = The reported concentration is an estimated value.
10. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
11. D = The RPD between the primary and field duplicate sample exceeded the 30% control limit. Issues with precision are suspected.

PFBS *Perfluorobutane sulfonic acid* (C4)
PFBA *Perfluorobutanoic acid* (C4)
PFPeS *Perfluoropentane sulfonic acid* (C5)
PFPeA *Perfluoropentanoic acid* (C5)
PFHxS *Perfluorohexane sulfonoic acid* (C6)
PFHxA *Perfluorohexanoic acid* (C6)
PFHpS *Perfluoroheptane sulfonic acid* (C7)
PFHpA *Perfluoroheptanoic acid* (C7)
PFOS *Perfluorooctane sulfonic acid* (C8)
PFOA *Perfluorooctanoic acid* (C8)
PFNS *Perfluorononane sulfonic acid* (C9)
PFNA *Perfluorononaoic acid* (C9)
PFDS *Perfluorodecane sulfonic acid* (C10)
PFDA *Perfluorodecanoic acid* (C10)
PFUnA *Perfluoroundecanoic acid* (C11)
PFDoA *Perfluorododecanoic acid* (C12)
PFTrDA *Perfluorotridecanoic acid* (C13)
PFTeDA *Perfluorotetradecanoic acid* (C14)
MeFOSAA *Methyl perfluorooctanesulfonamidoacetic acid* (C8)
EtFOSAA *Ethyl perfluorooctanesulfonamidoacetic acid* (C8)
PFOSA *Perfluorooctane sulfonamide* (C8)
4:2 FTS *Fluorotelomer sulfonate* (C4)
6:2 FTS *Fluorotelomer sulfonate* (C6)
8:2 FTS *Fluorotelomer sulfonate* (C8)
11Cl-PF3OUdS *11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)
9Cl-PF3ONS *9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)
ADONA *4,8-Dioxa-3H-perfluorononanoate*
HFPO-DA *2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate* (GenX)



Note: Base map prepared from USGS 7.5-minute quadrangle of Portland and Mount Tabor, WA-OR, dated 2020 as provided by USGS.gov.

0 4,000 8,000

Approximate Scale in Feet

N

Site Location Map

Second Quarter 2022 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 32-22009309	Drawn: JP	Approved: KE	Figure 1
	August 2022			

I:\Client\Port of Portland\Environmental Services Contract\Fire Training Facilities Inv\Groundwater Monitoring\2022\2Q 2022 GW Report\32-22009309 01 (Site Location).des

Legend:

- B-A-GW — Shallow Groundwater and Vadose Zone Soil Location
- B-M-1 — Deep Groundwater Location (40'; Overbank Deposits)
- B-M-2 — Deep Groundwater Location (61.5'; Columbia River Sand Aquifer)
  - Co-located
- MH-1 — Stormwater Sample Location (Manhole)
- SW-1 — Surface Water Sample Location
- MW-1 — Shallow Monitoring Well Location
- DW-1 — Deep Monitoring Well Location
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap
- Quarterly Sampling Location
- Annual Sampling Location

PERIMETER ROAD
NORTH RUNWAY
SOUTH RUNWAY
NE MARINE DRIVE
NORTH PERIMETER ROAD
WEST PERIMETER RD
SERVICE RD
TAXIWAY A
TAXIWAY B
TAXIWAY C
TAXIWAY D
TAXIWAY E
TAXIWAY F
TAXIWAY H
TAXIWAY M
SOUTHWEST RAMP
RUNWAY
TWY G

VEHICLE AND EQUIPMENT STORAGE FACILITY
FAA RTR FACILITY
PDX FIRE STATION
PFFC JET FUEL STORAGE
Former Fire Training Facility Cover
Current Fire Training Facility
Original Fire Training Facility Cover
Former Fire Station (1960-1972)
Former Fire Station (1972-1997)
QTA
PDX Rental Car Quick Turnaround (QTA) Facility Well ~2,080 Feet East

MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, MW-33, MW-34, MW-35, MW-36, MW-37, MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10A, MW-11, MW-12, MW-13, MW-14, DW-1, DW-2, DW-3, SW-1, B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11, B-12, B-13, B-14, B-16, B-A-GW, B-B-GW, B-C-GW, B-D-GW, B-E-GW, B-F-1, B-G-GW, B-H-GW, B-I-GW, B-J-GW, B-K-GW, B-L-GW, B-M-1, B-M-2, B-N-GW, B-O-GW, B-P-GW, B-Q-GW, B-R-GW, B-S-GW, B-T-GW, B-U-GW, B-V-GW, B-W-GW, B-X-GW

0 600 1,200
Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Site Vicinity Plan

Second Quarter 2022 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number:	Drawn:	Approved:	Figure
32-22009309	JP	KE	2
August 2022			

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Legend:

- MW-1 — Shallow Monitoring Well Location
- 9.84 — Groundwater Elevation in Feet MSL
- 15 — Groundwater Elevation Contour
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap

MW-35 15.98 · MW-36 16.01 · MW-37 19.19 · MW-33 15.52 · MW-32 15.52 · MW-34 15.66 · MW-15 17.28 · MW-30 15.51 · MW-31 16.23 · MW-27 18.63 · MW-16 17.40 · MW-25 15.39 · MW-26 15.13 · MW-28 Not Gauged · MW-24 15.65 · MW-23 14.37 · MW-22 17.95 · MW-21 16.91 · MW-20 18.57 · MW-19 14.48 · MW-18 17.60 · MW-17 17.08 · MW-14 14.41 · MW-12 12.34 · MW-1 9.84 · MW-8 8.18 · MW-6 10.44 · MW-2 8.17 · MW-13 14.29 · MW-3 9.92 · MW-29 16.29 · MW-7 8.25 · MW-5 9.12 · MW-11 10.97 · MW-4 10.20 · MW-9 11.77 · MW-10A 11.66

VEHICLE AND EQUIPMENT STORAGE FACILITY · FAA RTR FACILITY · PDX FIRE STATION · PFFC JET FUEL STORAGE · Former Fire Training Facility Cover · Current Fire Training Facility · Original Fire Training Facility Cover

NE MARINE DRIVE · PERIMETER ROAD · NORTH PERIMETER ROAD · WEST PERIMETER RD · SERVICE RD · NORTH RUNWAY · SOUTH RUNWAY · TAXIWAY A · TAXIWAY B · TAXIWAY C · TAXIWAY D · TAXIWAY E · TAXIWAY F · TAXIWAY J · TAXIWAY M · SOUTHWEST RAMP · TWY G

0 600 1,200
Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Shallow (OD) Groundwater Elevations Contour Map (June 2022)

Second Quarter 2022 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 32-22009309	Drawn: JP	Approved: KE	Figure 3
	August 2022			

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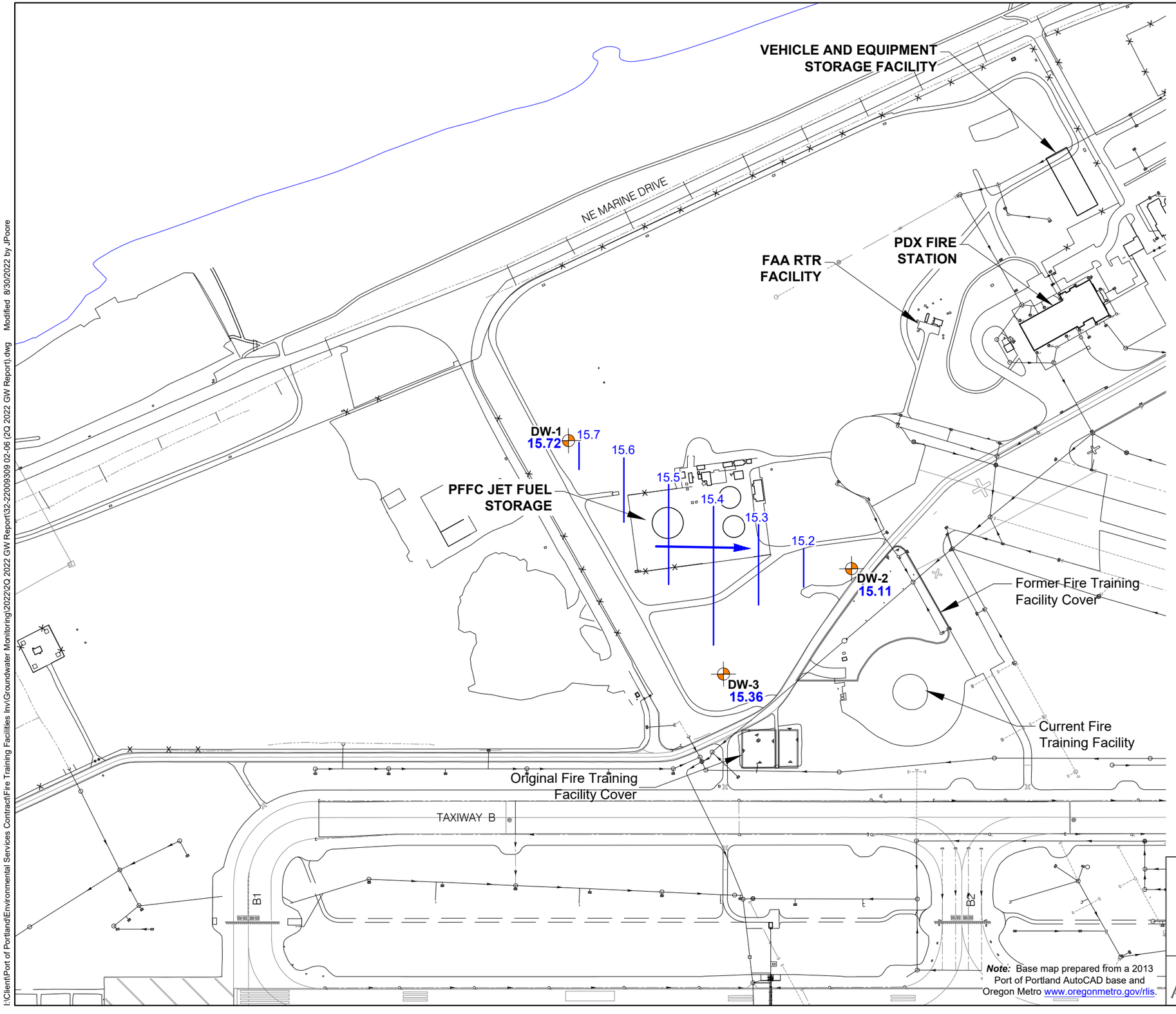

Legend:

- DW-1 — Deep Monitoring Well Location
- 15.72 — Groundwater Elevation in Feet MSL
- 15.7 — Groundwater Elevation Contour
- Apparent Groundwater Flow Direction
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap

N

0 300 600

Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Deep (CRSA) Groundwater Elevations Contour Map (June 2022)

Second Quarter 2022 Groundwater Monitoring
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number:	Drawn:	Approved:	Figure
32-22009309	JP	KE	4

August 2022

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Legend:

- MW-1 — Shallow Monitoring Well Location
- Location Identification
- Date Sampled
- Combined Concentration of PFOA, PFOS, PFHxS, and PFNA in Nanograms per Liter (ng/L, ppt)
- Shading exceeds the Oregon Health Authority (OHA) Health Advisory Level
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap
- 30 — Contour represents the combined concentration of PFOA, PFOS, PFHxS, and PFNA

OHA Health Advisory Level (ng/L)	
PFOA + PFOS + PFHxS + PFNA	30

MW-15 | 6/1/2022 | OHA 60.9

MW-24 | 6/2/2022 | OHA <1.94

MW-23 | 6/2/2022 | OHA 17.7

MW-21 | 6/2/2022 | OHA 7.32

MW-19 | 6/1/2022 | OHA 23.1

MW-17 | 6/1/2022 | OHA <1.94

MW-35 | 6/2/2022 | OHA 7.58

MW-36 | 6/2/2022 | OHA <1.93

MW-37 | 6/2/2022 | OHA <1.92

MW-34 | 6/2/2022 | OHA <1.98

MW-30 | 6/2/2022 | OHA <1.91

MW-25, MW-26, MW-27, MW-28, MW-29, MW-31, MW-32, MW-33, MW-22, MW-20, MW-16, MW-18, MW-14, MW-1, MW-8, MW-12, MW-6, MW-2, MW-13, MW-3, MW-7, MW-5, MW-11, MW-4, MW-9, MW-10A

30 | 300 | 3,000 | 30,000

PERIMETER ROAD | NORTH RUNWAY | SOUTH RUNWAY | VEHICLE AND EQUIPMENT STORAGE FACILITY | FAA RTR FACILITY | PDX FIRE STATION | PFFC JET FUEL STORAGE | Former Fire Training Facility Cover | Current Fire Training Facility | Original Fire Training Facility Cover | NORTH PERIMETER ROAD | WEST PERIMETER RD | SERVICE RD | TAXIWAY A | TAXIWAY B | TAXIWAY C | TAXIWAY D | TAXIWAY E | TAXIWAY E2 | TAXIWAY F | TAXIWAY G | TAXIWAY J | TAXIWAY M | SOUTHWEST RAMP | TWY G

0 600 1,200

Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Shallow (OD) Isocontour Map for OHA Health Advisory Level (June 2022)

Second Quarter 2022 Groundwater Monitoring

Original and Former Fire Training Facilities - Port of Portland

Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number:	Drawn:	Approved:	Figure
32-22009309	JP	KE	5

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Legend:

MW-1 — Shallow Monitoring Well Location

MW-15	
6/1/2022	
PFBS	<2.03
PFOS	<2.03
PFOA	**49.3**
HFPO-DA (GenX)	<2.03

- Location Identification
- Date Sampled
- Concentration in Nanograms per Liter (ng/L, ppt)
- Analyte Sampled

Shading exceeds the EPA Health Advisory Level (HAL)

- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap

—0.004— PFOA Contour is estimated due to the difference between the EPA HAL and the reporting limit.

—0.02— PFOS Contour is estimated due to the difference between the EPA HAL and the reporting limit.

---2,000--- PFBS Contour

EPA Health Advisory Levels (ng/L)		
PFBS	Perfluorobutanesulfonic Acid	2,000
PFOS	Perfluorooctane Sulfonic Acid	0.02
PFOA	Perfluorooctanoic Acid	0.004
HFPO-DA(GenX)	Hexafluoropropylene Oxide-dimer Acid	10

MW-35	
6/2/2022	
PFBS	<1.99
PFOS	<1.99
PFOA	**7.58**
HFPO-DA (GenX)	<1.99

MW-36	
6/2/2022	
PFBS	<1.93
PFOS	<1.93
PFOA	<1.93
HFPO-DA (GenX)	<1.93

MW-37	
6/2/2022	
PFBS	<1.92
PFOS	<1.92
PFOA	<1.92
HFPO-DA (GenX)	<1.92

MW-34	
6/2/2022	
PFBS	<1.98
PFOS	<1.98
PFOA	<1.98
HFPO-DA (GenX)	<1.98

MW-15	
6/1/2022	
PFBS	<2.03
PFOS	<2.03
PFOA	**49.3**
HFPO-DA (GenX)	<2.03

MW-30	
6/2/2022	
PFBS	<1.91
PFOS	<1.91
PFOA	<1.91
HFPO-DA (GenX)	<1.91

MW-17	
6/1/2022	
PFBS	<1.94
PFOS	<1.94
PFOA	<1.94
HFPO-DA (GenX)	<1.94

MW-24	
6/2/2022	
PFBS	<1.94
PFOS	<1.94
PFOA	<1.94
HFPO-DA (GenX)	<1.94

MW-23	
6/2/2022	
PFBS	**3.91**
PFOS	<1.93
PFOA	<1.93
HFPO-DA (GenX)	<1.93

MW-21	
6/2/2022	
PFBS	<2.03
PFOS	<2.03
PFOA	**2.08**
HFPO-DA (GenX)	<2.03

MW-19	
6/1/2022	
PFBS	<1.97
PFOS	**11.5**
PFOA	**3.77**
HFPO-DA (GenX)	<1.97

MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10A, MW-11, MW-12, MW-13, MW-14, MW-16, MW-18, MW-20, MW-22, MW-25, MW-26, MW-27, MW-28, MW-29, MW-31, MW-32, MW-33

PERIMETER ROAD; NORTH PERIMETER ROAD; NORTH RUNWAY; SOUTH RUNWAY; VEHICLE AND EQUIPMENT STORAGE FACILITY; FAA RTR FACILITY; PDX FIRE STATION; PFFC JET FUEL STORAGE; Former Fire Training Facility Cover; Current Fire Training Facility; Original Fire Training Facility Cover; SERVICE RD; TAXIWAY A; TAXIWAY B; TAXIWAY D; TAXIWAY E; TAXIWAY E2; TAXIWAY F; TAXIWAY J; TAXIWAY M; SOUTHWEST RAMP; TWY G

0 600 1,200

Scale in Feet

Shallow (OD) Isocontour Map for EPA Health Advisory Levels (June 2022)

Second Quarter 2022 Groundwater Monitoring

Original and Former Fire Training Facilities - Port of Portland

Portland, Oregon

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number:	Drawn:	Approved:	Figure
32-22009309	JP	KE	6

August 2022

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Appendix A

Site Background

Appendix A – Site Background

This appendix presents a brief description of the Original and Former Fire Training Facilities (Site), its history, and available physical and chemical data. Information included in this section was obtained from previously completed site investigations and related work conducted within the vicinity of the Site.

1.0 Site Description

The Site is located in the northwest portion of the Portland International Airport (PDX; shown on Figures 1 and 2). Portions of the Site have been actively used for aviation firefighting drills since 1963. It is our understanding that the Original Facility was used from approximately 1963 until the early to mid-1970s, after which the Former Facility was used for training exercises until 1989. The Current Facility has been used since approximately 1989.

Retardant firefighting foams (i.e. aqueous film forming foam [AFFF]) were used during training exercises and equipment testing and calibration activities at the Site. The Current Facility is lined to reduce the introduction of chemicals to the subsurface; however, the Original and Former Facilities are not lined, and were not lined during the historical training exercises.

Two former fire stations were located in the northwest portion of PDX (Figures 1 and 2). The first fire station was in operation from 1960 to 1972. The second station was located southwest of the original and was in operation from 1972 to 1997. Historical activities included firetruck and equipment storage and, presumably, AFFF and other fire-fighting chemical storage. The current fire training facility was developed in 1990 and is located east of the former training facilities.

PDX and its fire department are regulated under the Federal Aviation Administration (FAA) and the National Fire Protection Association (NFPA) regulations and guidance which specify the AFFF type, testing, use, and training that is required for use of AFFF on commercial aviation facilities. The PDX fire department has followed these regulations and standards of practice which have resulted in the use of PFAS-containing AFFF since their introduction in the late 1960s.

1.1 Site History

Several historical investigations and remedial actions have been conducted at the Site, including soil excavation and the construction of a protective cap to prevent contact with separate-phase hydrocarbons (SPH) and soil with chemical concentrations that are above human health exposure limits. The findings of previous investigations indicate that a variety of chemical substances (used oil, gasoline, diesel fuel, JP-4 fuel, acetone, and solvents) have been sprayed onto the ground surface and mock aircraft, then ignited for training purposes. Details of the historical Site investigation activities are provided in the Original and Former

Fire Training Facilities, Additional Investigations Report (Apex, 2018b and 2018c). Measurable SPH is occasionally detected in two wells at the Site. Total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), metals, and volatile organic compounds (VOCs) were detected in one or more wells. Polychlorinated biphenyls (PCBs) were detected in one well (MW-10A).

In 2017, the Port began assessing PDX for PFAS impacts related to AFFF use in historical fire training, fire suppression, and firefighting activities. Assessment of PFAS included historical review of activities and working cooperatively with the DEQ to plan and conduct soil, groundwater, surface water, and drainage sediment sampling. This work has shown that the primary PFAS impacts are in soil and groundwater in and around the former fire training facilities, with PFAS detected in groundwater above HALs. The groundwater monitoring well network in the former fire training facilities area is being monitoring on a quarterly basis. A detailed site history is included in the Original and Former Fire Training Facilities Fourth Quarter 2021 Groundwater Monitoring Report (Apex, 2022).

1.2 Geology and Hydrogeology

Wells monitored during this investigation were screened in either the shallow overbank deposits or the deeper CRSA. Overbank deposits consist of fine-grained sediments deposited in floodplains adjacent to river channels. In this environment, natural levees are present along the riverbank immediately adjacent to the channel and are thickest at the channel bank and thin toward the floodplain. Sediments accumulate due to the sudden drop in velocity as water overflows the confining bank. The crest is somewhat below the highest flood level. Away from the channel is the floodplain environment, which is characterized by low relief, generally poor drainage, and fine, organic-rich sediment such as silt or clay.

Overbank deposits are present throughout PDX and are typically between 50 and 60 feet thick (the OD ranges from 20 to 100 feet thick). Based on results from exploratory borings, the overbank deposits consist of soft to stiff, gray (upper portions may be brown) layers of silty clay, silt, silty sand, and sandy silt, with occasional organic or wood debris. Individual layers vary from 5 to 20 feet in thickness. Sandy layers are more likely to be present in the lower portion of this unit, especially where it transitions to the CRSA (if present).

The CRSA fills a former channel of the ancestral Columbia River, just south of the present-day Columbia River channel. This paleochannel segment has a depth of more than 300 feet, eroded within older sedimentary units such as the Troutdale Gravel Aquifer (TGA) and Confining Unit 1 (CU1). The approximate southern extent of this channel generally corresponds to the southern limit of PDX. Where present, the top of the CRSA is approximately 50 to 60 feet below ground surface (bgs). The CRSA is comprised of medium-dense to dense, gray, gray-brown, or black fine- to medium-grained, quartz-rich basaltic sand. Traces of silt, siltstone and sandstone fragments, muscovite flakes, wood, shells, and coarse sand and gravel occur throughout the unit. The CRSA generally becomes siltier with depth; however, in several explorations, the

bottom 10 to 40 feet encountered a coarse sand and gravel layer with minor boulders. This layer probably represents channel lag (bedload) from the former channel.

The regional and local geology and hydrogeology is discussed in greater detail in the Original and Former Fire Training Facilities, Additional Investigations Report (Apex, 2018b and 2018c).

As documented in the July 2020 Hydrogeologic Summary (Apex, 2020), shallow (OD) wells located nearest the Columbia River exhibit the greatest fluctuation in groundwater elevation, correlating with Columbia River flood stage. Groundwater elevations in other shallow (OD) wells farther from the Columbia River are not significantly influenced by river stage. Groundwater flow has variable direction and hydraulic gradient across the Site, with the dominant groundwater flow direction to the north-northwest (towards the Columbia River). For CRSA wells, groundwater elevations also generally correlated with Columbia River stage. Groundwater flow direction in the CRSA was typically to the north-northeast; however, flow was observed to the west-southwest during Columbia River at flood stage.

Appendix B

PFAS Regulatory Status and Survey of PFAS Screening Values

Appendix B – PFAS Regulatory Status

Since the 1940s, PFAS have been used in many industrial and commercial applications. The most extensively produced PFAS chemicals in the United States were perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). By 2002, all production of PFOS had been voluntarily discontinued by manufacturers in the United States. In 2015, as part of the PFOA Stewardship Program, eight major U.S. chemical manufacturers agreed to eliminate the production of PFOA. The U.S. Environmental Protection Agency (EPA) amended the Significant New Use Rule to include PFAS under the Toxic Substances Control Act (TSCA), and in January 2015, it required manufacturers and importers to notify the U.S. EPA at least 90 days prior to starting or resuming use of PFOA and related compounds. PFAS are now regulated, and phase-outs of PFOA/PFOS and precursor compounds are established in the USA, European Union (EU), Canada, and Australia.

In 2016, the U.S. EPA established a provisional health advisory level (HAL) of 70 nanograms per liter (ng/L) for combined concentrations of PFOS and PFOA in drinking water. This provision was updated in 2016 to include chronic exposure of PFOS and PFOA combined. Health advisories provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. The EPA's health advisories are non-enforceable and non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. Additionally, in 2012, PFAS compounds, including PFOS, PFOA, perfluorononaoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorobutane sulfonic acid (PFBS), were added to the third Unregulated Contaminant Monitoring Rule (UCMR) to be monitored in public water supply systems. The U.S. EPA uses the UCMR to collect data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA).

In February 2019, the EPA published EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan (EPA 823R18004; EPA, 2019). The Plan described actions previously taken by EPA, risk management for PFAS, EPA's plan to develop recommendations and standards, mitigation of PFAS exposures, risk communication, and additional research, development, and technical assistance information.

In November 2019, the EPA requested public input on adding PFAS chemicals to the Toxics Release Inventory (TRI). Input received will help EPA determine whether data and information are available to fulfil the TRI chemical listing criteria. In December 2019, the EPA also issued Interim Recommendations for Addressing Groundwater Contaminated with Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonate (PFOS). The interim recommendations include using a screening level of 40 ng/L to determine if PFOA and/or PFOS are present at a site and may warrant further attention, and using the HAL of 70 ng/L as the preliminary remediation goal (PRG) for contaminated groundwater that is a current or potential source of drinking water, where no state or tribal maximum contaminant level (MCL) or other applicable or relevant and appropriate requirements (ARARs) are available or sufficiently protective. The PRG would initially be a target for cleanup

and adjusted on a site-specific basis. These recommendations were rescinded in June 2022, following updates to the EPA HALs discussed below.

In February 2020, the EPA released a PFAS Action Plan Program Update documenting preliminary determinations to regulate PFOA and PFOS in drinking water. The Plan also documented the November and December 2019 publications and included a proposal to ensure that new uses of certain PFAS cannot be manufactured or imported into the U.S. without notification or review under TSCA. In December 2020, EPA released for public comment new interim guidance outlining the current state of the science on techniques or treatments that may be used to destroy or dispose of PFAS and PFAS-containing materials from non-consumer products, including AFFF.

In March 2021, the fifth UCMR was published, which proposed sampling for 29 PFAS within US drinking water systems. UCMR 5 will require sample collection for select public water systems between 2023 and 2025. The UCMR was finalized in December 2021. In April 2021, the EPA released a final report documenting the human health toxicity values for PFBS. EPA also created a council for PFAS in April 2021. This council will work to better understand and reduce potential risk to human health and the environment caused by PFAS.

In August 2021, the EPA published its draft EPA Method 1633, which utilizes isotope dilution and solid-phase extraction (SPE) in a manner similar to the current Isotope Dilution Method and Department of Defense Quality Systems Manual 5.3 method. EPA Method 1633 is the first isotope dilution method for SPE for non-drinking water, solid, and tissue matrices and includes a list of 40 PFAS. Once finalized (expected later in 2022), this method will replace the Isotope Dilution Method currently used to analyze PFAS at the Site. In October 2021, EPA published their PFAS Strategic Roadmap, which outlines actions EPA plans to take to regulate PFAS through 2024. EPA also published a final human health toxicity assessment for GenX in October 2021.

In September 2021, the Oregon Health Authority (OHA) published drinking water HALs for PFOA, PFOS, PFNA and PFHxS of 30 ng/L individually or combined. These HALs are non-regulatory and do not mandate a required action; however, based on discussion with DEQ and to be conservative, these HALs were used to screen PFAS data collected at the Site.

In April 2022, the EPA published three additional water commitments as part of the PFAS Strategic Roadmap. The update included a new method to screen for PFAS in water at the parts per billion level. The new method, Screening Method for the Determination of Adsorbable Organic Fluorine (AOF) in Aqueous Matrices by Combustion Ion Chromatography (CIC), will measure the total concentration of substances containing a carbon-fluorine bond. The method (EPA 1621) is currently draft and has been successfully validated by a single laboratory. Multi-laboratory validation will be completed in the summer of 2022 and the EPA intends to publish an updated method later in 2022.

In a memorandum published on April 28, 2022, the EPA also published revised guidance for addressing PFAS in National Pollutant Discharge Elimination System (NPDES) permits where EPA is the permit issuer and control authority. For applicable industrial direct dischargers, effluent must be monitored during draft EPA method 1633 and results must be reported on Discharge Monitoring Reports (DMRs). Draft method 1621 can also be used in conjunction with draft method 1633, if appropriate. Dischargers with permits must also follow best management practices (BMPs) with specific BMPs for PFAS-containing firefighting foams. These BMPs include: 1) prohibiting the use of AFFFs in stormwater-permitted activities other than for actual firefighting; 2) eliminating PFOA- and PFOS-containing AFFF; and 3) requiring immediate cleanup in all situations where AFFFs have been used, including diversions and other measures that prevent discharges via storm sewer systems.

As part of the April 2022 PFAS Strategic Roadmap update, EPA is also developing national recommended ambient water quality criteria for PFOA and PFOS. They have published draft criteria (chronic criteria include 94,000 ng/L PFOA and 8,400 ng/L PFOS over a 4-day average and not to exceed more than once in three years). The draft criteria also include fish tissue recommendations to protect aquatic life from bioaccumulation. Following the comment period, the EPA intends to issue final PFOA and PFOS recommended criteria.

In May 2022, the EPA updated the Regional Screening Levels (RSL) and Regional Removal Management Levels (RRML) to include HFPO-DA (GenX), PFOA, PFOS, PFNA, and PFHxS. EPA added the first PFAS substance, PFBS, to the RSL and RRML lists in 2014 and updated it in 2021 when EPA released its updated toxicity assessment for PFBS. The RSLs and RRMLs are not cleanup standards and only help determine if further investigation or actions are needed to protect public health.

In June 2022 under the PFAS Strategic Roadmap, the EPA issued the first in a series of TSCA test orders that requires companies to conduct and submit testing on PFAS. The first order applies to Chemours Company, DuPont De Nemours Inc., E. I. du Pont de Nemours and Company, National Foam Inc., and Johnson Controls Inc. and requires the companies to conduct the tests as described in the order for 6:2 fluorotelomer sulfonamide betaine (6:2 FTAB). These tests include reporting physical-chemical properties and health effects following inhalation or providing EPA with existing information that they believe EPA did not identify in its search for existing information.

The EPA lifetime HALs were updated in June 2022. Interim updated EPA HALs for PFOA and PFOS were updated to 0.004 ng/L and 0.02 ng/L, respectively. Previously, the EPA HAL was 70 ng/L for a combined concentration of PFOA and PFOS. The EPA also issued final HALs for HPDO-DA (GenX; 10 ng/L) and PFBS (2,000 ng/L). These HALs identify levels to protect all people and also considers other potential sources of exposure to these PFAS beyond drinking water. Current laboratory capabilities are unable to achieve the interim updated EPA HALs for PFOA and PFOS in complicated matrices such as groundwater and soil. Additional sample preparation method development, instrument verification, and elimination of contamination

sources within the laboratory are necessary for achieving data that is reliable at part per quadrillion (ppq) levels.

Many states, such as California, New Jersey, Texas, Michigan, and Vermont, have established screening level values (SLVs) and MCLs for PFAS in groundwater, surface water, soil, and sediment. Currently, there are no federal or Oregon-established SLVs or MCLs for PFAS. The Port recognizes that final risk-based screening criteria, when they are promulgated by Oregon or the EPA, may be different than the current EPA HAL or interim recommendation level or the OHA HALs.

Table B-1
North American Standards and Guidance Values for PFAS in Water Used for Drinking
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		US EPA [12, 13, 41, 48]			Alaska [14]	California [15, 16, 42]				Connecticut [17]	Delaware [53]	Indiana [40]	Maine [18]	Maryland [49]	Massachusetts [19, 20]
		Office of Water	Interim Recommendation Screening Levels for Groundwater used for Drinking	Regional Screening Level	DEC	SWRCB		OEHHA		DPH	DHSS	DEM	DEP	MDH	DEP
		Lifetime Health Advisory		(TR=1E-06, THQ=1.0)	Action Level	Notification Level	Response Level	Proposed Public Health Goals: Cancer	Proposed Public Health Goals: Non-Cancer	Action Level	Proposed MCLs	Screening Levels	Interim Drinking Water Standard	Health Advisory	Guidance Values
		DW	GW	TW	DW/GW/SW	DW	DW	DW	DW	DW	DW	GW - Tap	DW	DW	DW
		Concentrations in ng/L													
PFOA	*Perfluorooctanoic acid* (C8)	0.004	40	60	70 *	5.1	10	0.007	3	16	21 / 17 *	--	20 *	--	20 * a
PFOS	*Perfluorooctanesulfonic acid* (C8)	0.02	40	40	70 *	6.5	40	1	2	10	14 / 17 *	--	20 *	--	20 * a
PFBS	*Perfluorobutanesulfonic acid* (C4)	2,000	--	6,000	--	500 c	5,000	--	--	--	--	6,000	--	--	
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	59	--	--	--	--	--	12	--	--	20 *	--	20 * a
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	390	--	--	--	--	--	49	--	--	20 *	140	20 * a
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	20 *	--	20 * a
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	20 *	--	20 * a
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	10	--	60	--	--	--	--	--	--	--	--	--	--	--

Please see notes at end of table.

Table B-1
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Fire Training Facilities
Portland International Airport
Portland, Oregon
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		Michigan [21, 22, 23, 24]					Minnesota [25]			Nevada [26]	New Hampshire [35, 46]		New Jersey [27]	New York [38,55]		North Carolina [37]
		DEQ			EGLE	DHHS	Department of Health			DEP	DES	DES	DEP	DWQC	DEC	DHHS
		Water Quality Value	Generic Cleanup Criteria and Screening Levels		Drinking Water Standards	Screening Levels	Health Based Water Guidance			Basic Comparison Limit	Former Max. Contaminant Level	Max. Contaminant Level	Max. Contaminant Level	Maximum Contaminant Level	Human Health	Health Goal
		Drinking Surface Water	Residential Drinking Water	Nonresidential Drinking Water			Short-term	Subchronic	Chronic	Residential					Raw Water Source	
		SW	DW/GW	DW/GW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW
		Concentrations in ng/L														
PFOA	*Perfluorooctanoic acid* (C8)	420 a	70 * a	70 * a	8 a	9	35	35	35	667	12 c	70 *	14 a	10 a	6.7 a	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	11 a	70 * a	70 * a	16 a	8	15	15	15	667	15 c	70 *	13 a	10 a	2.7 a	--
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	420 a	1,000	100	100 **	100 **	667,000	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	7,000 a	7,000 ** a	7,000 ** a	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	6 a	9	--	--	--	--	11 c	--	13 a	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	400,000 a	--	200	200 **	200 **	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	51 a	84	47	47	47	--	18 c	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	370 a	--	--	--	--	--	--	--	--	--	--	140

Please see notes at end of table.

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Fire Training Facilities
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		Ohio [52]	Oregon [50]	Pennsylvania [36, 54]								Rhode Island [28, 51]		Texas [29]	
		EPA	OHA	DEP		Medium Specific Concentrations (MSC)						DEM	DEM	CEQ	
		Health Advisory	Health Advisory	Health Advisory	Proposed Maximum Contaminant Level	Used Aquifers				Non-Use Aquifers		Groundwater Quality Standard	Interim Standard	Tier I Protective Concentration Level	
						TDS ≤ 2500mg/L		TDS > 2500mg/L						Residential Ingestion	Commercial/Industrial Ingestion
		DW	DW	DW	DW	Residential	Non-residential	Residential	Non-residential	Residential	Non-residential	DW/GW	DW	GW	GW
		Concentrations in ng/L													
PFOA	*Perfluorooctanoic acid* (C8)	70 *	30 *	70	14	70	70	7,000	7,000	70	70	70 * a	20 *	290	880
PFOS	*Perfluorooctanesulfonic acid* (C8)	70 *	30 *	70	18	70	70	7,000	7,000	70	70	70 * a	20 *	560	1,700
PFBS	*Perfluorobutanesulfonic acid* (C4)	2,100	--	--	--	10,000	29,000	1,000,000	2,900,000	10,000	29,000	--	--	34,000	100,000
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	71,000	210,000
PFNA	*Perfluorononaoic acid* (C9)	21	30 *	--	--	--	--	--	--	--	--	--	20 *	290	880
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	93	280
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	93	280
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	140	30 *	--	--	--	--	--	--	--	--	--	20 *	93	280
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	20 *	560	1,700
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	20 *	370	1,100
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	290	880
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	21	--	--	--	--	--	--	--	--	--	--	--	--	--

Please see notes at end of table.

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Fire Training Facilities
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Portland, Oregon
Last Completed: June 28, 2022

		Vermont [30, 31]	Washington [43, 47]	Wisconsin [56]	Canada [32, 33, 34]		British Columbia [39]
		DEC	Department of Health	Department of Natural Resources	Health Canada		British Columbia Office of Legislative Counsel
		Maximum Contaminant Level	State Action Levels	MCL	Screening Value	Max. Acceptable Concentration	Generic Numerical Water Standards
		DW/GW	DW	DW	DW	DW	DW
		Concentrations in ng/L					
PFOA	*Perfluorooctanoic acid* (C8)	20 * a	10 a	70 * c	200	200 a	200 a
PFOS	*Perfluorooctanesulfonic acid* (C8)	20 * a	15 a	70 * c	600	600 a	300 a
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	345 a	--	15,000	--	80,000 a
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	30,000	--	--
PFNA	*Perfluorononaoic acid* (C9)	20 * a	9 a	--	20	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	200	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	200	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	20 * a	65 a	--	600	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	20 * a	--	--	200	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	200	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	200	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--

Please see notes at end of table.

Table B-1
North American Standards and Guidance Values for PFAS in Water Used for Drinking
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
4. ** = Set at short-term value.
5. a = Promulgated rule
6. b = Guidance document in draft.
7. c = Recommended value, current law pending.
8. DW = Drinking water
9. SW = Surface water
10. GW = Groundwater
11. TW = Tap water

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Table B-2
International Standards and Guidance Values for PFAS in Water Used for Drinking
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Australia [6]	Denmark [7, 13]		Germany [8]				Italy [9]	The Netherlands [10]	Sweden [11]	United Kingdom [12]
		Department of Health	Ministry of the Environment	Ministry of the Environment	Ministry of Health				National Institute of Health	RIVM	National Food Agency	Public Health England
		Health-Based Guidance Value	Health-Based Guidance	Health-Based Limit Values	Health-Based Precautionary Value	Health-Based	Precautionary Action Value	Precautionary Action Value	Threshold Values	Maximum Permissible Concentration	Maximum Tolerable Level	Public Health Guidance
							Infants	Adults		Surface water used for drinking		
		DW	DW	DW	DW	DW	DW	DW	DW	SW	DW	DW
		Concentrations in ng/L										
PFOA	*Perfluorooctanoic acid* (C8)	560	100 *	2 *	100 *	300 *	500 *	5,000 *	500	--	90 *	10,000
PFOS	*Perfluorooctanesulfonic acid* (C8)	70*	100 *	2 *	100 *	300 *	500 *	5,000 *	30	530	90 *	300
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	100 *	--	--	--	--	--	500	--	90 *	--
PFBA	*Perfluorobutanoic acid* (C4)	--	100 *	--	--	--	--	--	500	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	100 *	2 *	--	--	--	--	500	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	100 *	--	--	--	--	--	500	--	90 *	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	500	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	100 *	--	--	--	--	--	500	--	90 *	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	70*	100 *	2 *	--	--	--	--	500	--	90 *	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	100 *	--	--	--	--	--	500	--	90 *	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	500	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	100 *	--	--	--	--	--	500	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	500	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	500	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	100 *	--	--	--	--	--	500	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	500	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	500	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	500	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	500	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	500	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	500	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	500	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	100 *	--	--	--	--	--	500	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	500	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	500	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	500	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	500	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	500	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
4. DW = Drinking water
5. SW = Surface water

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Table B-3
North American Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Alaska [10]	Colorado [11, 12]	Delaware [12, 13]		Florida[28]	Illinois[26]	Iowa [14]		Hawaii [25]		Maine [15]		Michigan [16]	Montana [24]	New Hampshire [17]	New Jersey [18]	New York[30]	North Carolina [19]
		DEC	DPHE	DNREC		DEP	EPA	DNR		Department of Health		DEP		DEQ	DEQ	DES	DEP	DEC	DWQ
		Cleanup Level	Groundwater Quality Standard / Translation Levels	Reporting Level	Screening Level	Screening Level	Groundwater Standards	Statewide Standard		Interim Environmental Action Levels (EALs) - Groundwater (Is current or potential source of drinking water)		Remedial Action Guidelines		Generic Cleanup Criteria and Screening Levels	Numeric Water Quality Standard - Human Health	Ambient Groundwater Quality Standard	Max. Contaminant Level	Proposed Guidance Values	Interim Maximum Allowable Standard
												Residential	Construction Worker	GW/SW Interface Criteria					
		GW	GW/DW/SW	GW	GW	GW	GW	Protected GW [6]	Non-Protected GW [7]	>150 meters to surface water body	≤ 150 meters to surface water body	GW	GW	GW	GW	GW	GW	GW/SW	GW
		Concentrations in ng/L																	
PFOA	*Perfluorooctanoic acid* (C8)	400 a	70*	70 *	70 *	70 b	21 b	70 * a	50,000 a	40 b	40 b	400	750,000	12,000 a	70 a	12 a	14 a	10 b **	2,000 a
PFOS	*Perfluorooctanesulfonic acid* (C8)	400 a	70*	70 *	70 *	70 b	14 b	70 * a	1,000 a	40 b	40 b	400	750,000	12 a	70 a	15 a	13 a	10 b **	--
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	400,000	--	--	--	140,000 b	2,100 a	10,000 a	600 b	600 b	400,000	100,000,000	--	--	--	--	**	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	7,600 b	7,600 b	--	--	--	--	--	--	**	--
PFNA	*Perfluorononaoic acid* (C9)	--	70*	--	--	--	21 b	--	--	4.4 b	4.4 b	--	--	--	--	11 a	13 a	**	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	800 b	800 b	--	--	--	--	--	--	**	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	4,000 b	4,000 b	--	--	--	--	--	--	**	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	700	--	--	--	140 b	--	--	19 b	19 b	--	--	--	--	18 a	--	**	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	40 b	40 b	--	--	--	--	--	--	**	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	20 b	20 b	--	--	--	--	--	--	**	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	70*	--	--	--	--	--	--	24 b	24 b	--	--	--	--	--	--	**	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	10 b	10 b	--	--	--	--	--	--	**	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	13 b	13 b	--	--	--	--	--	--	**	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	4 b	4 b	--	--	--	--	--	--	**	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	20 b	20 b	--	--	--	--	--	--	**	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	130 b	130 b	--	--	--	--	--	--	**	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	13 b	13 b	--	--	--	--	--	--	**	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	70*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	70*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	70*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
11Cl-PF3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
PFODA	*Perfluorooctadecanoic acid (C18)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
NEtFOSE	*N-Ethyl perfluorooctane sulfonamidoethanol*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
NEtFOSA	*N-Ethyl Perfluorooctane sulfonamide*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	160 b	160 b	--	--	--	--	--	--	**	--

Please see notes at end of table.

Table B-3
North American Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Pennsylvania[29]						Texas[20]		Vermont[21, 22]		Washington[32]		Wisconsin[27]		Canada[23]
		DEP						CEQ		DEC		Department of Ecology		DHS		Minister of the Environment
		Proposed Medium Specific Concentrations (MSCs)						Protective Concentration Level								Groundwater Quality Guidelines
		Residential Used Aquifers TDS ≤ 2500 mg/L	Non-Residential Used Aquifers TDS ≤ 2500 mg/L	Residential Used Aquifers TDS > 2500 mg/L	Non-Residential Used Aquifers TDS > 2500 mg/L	Residential Nonuse Aquifers	Non-Residential Nonuse Aquifers	Residential Class 3 Contaminated GW	Commercial/Industrial Class 3 Contaminated GW	Health Advisory	Preventative Action Level	Model Toxics Control Act Method B	Model Toxics Control Act Method C	Recommended Groundwater Enforcement Standard	Recommended Preventive Action Limit	Course and fine soil type
		GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW		GW		GW
		Concentrations in ng/L														
PFOA	*Perfluorooctanoic acid* (C8)	70* b	70* b	7,000* b	7,000* b	70* b	70* b	29,000	88,000	20 *	10 *	48 a	110 a	20 * b	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	70* b	70* b	7,000* b	7,000* b	70* b	70* b	56,000	170,000	20 *	10 *	48 a	110 a	20 * b	--	68,000
PFBS	*Perfluorobutanesulfonic acid* (C4)	690,000 b	1,900,000 b	69,000,000 b	190,000,000 b	690,000 b	1,900,000 b	3,400,000	10,000,000	--	--	4,800 a	11,000 a	450,000 b	90,000 b	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	7,100,000	21,000,000	--	--	--	--	10,000 b	2,000 b	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	29,000	88,000	20 *	10 *	40 a	88 a	30,000 b	3,000 b	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	9,300	28,000	--	--	--	--	--	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	9,300	28,000	--	--	--	--	150,000 b	30,000 b	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	9,300	28,000	20 *	10 *	160 a	340 a	40,000 b	4,000 b	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	56,000	170,000	20 *	10 *	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	29,000	88,000	--	--	--	--	20,000 b	2,000 b	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	29,000	88,000	--	--	--	--	3,000 b	600 b	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	29,000	88,000	--	--	--	--	500,000 b	100,000 b	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	37,000	110,000	--	--	--	--	300,000 b	60,000 b	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	29,000	88,000	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	29,000	88,000	--	--	--	--	10,000 b	2,000 b	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	29,000	88,000	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	20,000 b	2,000 b	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-PF3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	3,000 b	600 b	--
PFODA	*Perfluorooctadecanoic acid (C18)*	--	--	--	--	--	--	--	--	--	--	--	--	400,000 b	80,000 b	--
NEtFOSE	*N-Ethyl perfluorooctane sulfonamidoethanol*	--	--	--	--	--	--	--	--	--	--	--	--	20,000 b	2,000 b	--
NEtFOSA	*N-Ethyl Perfluorooctane sulfonamide*	--	--	--	--	--	--	--	--	--	--	--	--	20,000 b	2,000 b	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	24	53	300,000 b	30,000 b	--

Please see notes at end of table.

Table B-3
North American Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies. ** NY Guidance Value for any other individual PFAS detected in water is at or above 100 ng/L, and total concentration of PFAS (including PFOA and PFOS) detected in water at or above 500 ng/L.
4. a = Promulgated rule; b = recommended value, current law pending
5. c = Site-Specific to El Paso County only.
6. A saturated bed, formation, or group of formations which has a hydraulic conductivity of at least 0.44 meters per day (m/d) and a total dissolved solids concentration of less than 2,500 milligrams per liter (mg/L).
7. A saturated bed, formation or group of formations which is not a protected groundwater source.
8. GW= Groundwater; DW = Drinking Water; SW = Surface Water
9. DES = Department of Environmental Services

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25. Montana Department of Environmental Quality (DEQ). 2019. Circular DEQ-7, Montana Numeric Water Quality Standards. June. Accessed June 21, 2022.
26. State of Hawaii Department of Health. *Interim Soil and Water Environmental Action Levels (EALs) for Perfluoroalkyl and Polyfluroralkyl Substances (PFASs)* . December 22, 2020. Revised April 8, 2021. Accessed June 21, 2022.
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31. New York Department of Environmental Conservation (DEC). *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS).* January 2021. Accessed June 21, 2022.
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Table B-4
International Non-Drinking Groundwater Standards and Guidance Values for PFAS for Protection of Health and Environment
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Germany [6]		The Netherlands [7]	Sweden [8]
		German Ministry of the Environment		RIVM	Swedish Geotechnical Institute
		Insignificance Threshold	Health Advisory Level	Maximum Permissible Concentration	Preliminary Guide Value
				Freshwater	Lowest value from exposure routes
		GW	GW	GW/SW	GW
PFOA	*Perfluorooctanoic acid* (C8)	100 ^^	--	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	100^^	--	0.65	45
PFBS	*Perfluorobutanesulfonic acid* (C4)	6,000^^	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	10,000^^	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	60^^	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	3,000	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	6,000^^	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	100^^	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	300	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	300	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	100	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	100	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	100	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. ^^ = When these compounds are present at the same the following equation is to be used: Σ (Concentration/Limit) ≤ 1.
4. GW = Ground water
5. SW = Surface water
6. German Ministry of the Environment. *Guidelines for PFAS Assessment.* Updated January 21, 2022. Accessed June 28, 2022..
7. National Institute for Public Health and the Environment (RIVM). *Environmental risk limits for PFOS.* Report 601714013/2010. Accessed June 21, 2022.
8. Swedish Geotechnical Institute. *Preliminary guideline values for highly fluorinated substances (PFAS) in soil and groundwater.* 2015. Accessed October 3, 2017.
9. Shading indicates values were used to screen groundwater results. See Table 4.

Table B-5
Summary of Standards and Guidance Values for PFAS Used in Site-Related Risk Screening
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Groundwater Risk-Based Screening Levels			
		US EPA [10]	**Canada** [12, 13, 14]	**Germany** [15]	**Texas** [11]
			Health Canada	German Ministry of the Environment	CEQ
		Lifetime Health Advisory Level	Screening Value	Health Advisory Level	Tier I Protective Concentration Level Residential Ingestion
		DW	DW	GW	GW
		Concentrations in ng/L			
PFOA	*Perfluorooctanoic acid* (C8)	0.004	200	--	290
PFOS	*Perfluorooctanesulfonic acid* (C8)	0.02	600	--	560
PFBS	*Perfluorobutanesulfonic acid* (C4)	2,000	15,000	--	34,000
PFBA	*Perfluorobutanoic acid* (C4)	--	30,000	--	71,000
PFNA	*Perfluorononaoic acid* (C9)	--	20	--	290
PFPeA	*Perfluoropentanoic acid* (C5)	--	200	3000	93
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	200	--	93
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	600	--	93
PFHpA	*Perfluoroheptanoic acid* (C7)	--	200	300	560
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	300	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	100	290
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	290
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	290
PFDA	*Perfluorodecanoic acid* (C10)	--	--	100	370
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	290
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	290
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	290
H4PFOS	*6:2 Fluorotelomer sulfonic acid (C6)*	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	100	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	200	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	200	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	10	--	--	--

Notes:

1. Water standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
4. a = Promulgated rule
5. DW = Drinking water
6. SW = Surface water
7. GW = Groundwater
8. TW = Tap water
9. Shading indicates values were used to screen results from the investigation. See Table 4.

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11. Texas Commission on Environmental Quality (TCEQ). Texas Risk Reduction Program (TRRP) Protective Concentration Levels. March 2017. Revised January 2021. Accessed June 21, 2022.
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14. Health Canada. 2018. Guidelines for Canadian Drinking Water Quality, Guideline Technical Document. Perfluorooctane Sulfonate (PFOS). December 2018. Accessed June 21, 2022.
15. German Ministry of the Environment. Guidelines for PFAS Assessment. Updated January 21, 2022. Accessed August 15, 2022..

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		US EPA [13, 14]			Alaska [15]				California [33]										Delaware [16]		Florida [30]		
		Regional Screening Level			Cleanup Level				Interim Environmental Screening Levels (ESLs)														
		(TR=1E-06, THQ=1.0)																			DEP Screening Levels		
		Residential	Industrial	Protection of GW	Arctic Zone	Under 40" Zone	Over 40" Zone	Migration to GW	Direct Exposure Human Health Resident Cancer Risk	Direct Exposure Human Health Resident Noncancer Hazard	Direct Exposure Human Health Commercial/Industrial Worker Cancer Risk	Direct Exposure Human Health Commercial/Industrial Worker Noncancer Hazard	Direct Exposure Human Health Construction Worker Cancer Risk	Direct Exposure Human Health Construction Worker Noncancer Hazard	Terrestrial Habitat Significantly Vegetated Area	Terrestrial Habitat Minimally Vegetated Area	Leaching to Groundwater: Drinking Water	Leaching to Groundwater: Aquatic Habitat	Reporting Level	Screening Level	Residential	Commercial / Industrial	Leachability to Groundwater
		Concentrations in µg/kg																					
PFOA	*Perfluorooctanoic acid* (C8)	190	2,500	0.91	2,200	1,600	1,300	1.7	3.8	28	16	370	93	86	84	840	0.097	0.00042	16,000	16,000	1,300	25,000	2
PFOS	*Perfluorooctanesulfonic acid* (C8)	130	1,600	0.038	2,200	1,600	1,300	3	12	110	51	1,500	290	340	13	50	0.4	0.00029	6,000	6,000	1,300	25,000	7
PFBS	*Perfluorobutanesulfonic acid* (C4)	19,000	250,000	1.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononanoic acid* (C9)	190	2,500	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonic acid* (C6)	1300	16,000	0.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid (C7)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	230	3,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Hawaii		Indiana [27]			Iowa [17]	Maine [18]						Massachusetts			Michigan [19]	Minnesota [20]		Nevada [21]		
		Interim Environmental Action Levels (EALs)		IDEM Screening Levels			Statewide Standards	Remedial Action Guidelines						Department of Environmental Protection			Generic Cleanup Criteria and Screening Levels	Pollution Control Agency		Basic Comparison Level		
		>150 meters to surface water body	≤ 150 meters to surface water body	Residential	Commercial/ Industrial	Excavation	Shallow Soil Exposure (0-10ft)	Leaching to GW	Residential Soil	Park User	Commercial Worker	Construction Worker	Beneficial Use	Soil Category S-1 & GW-1	Soil Category S-1 & GW-2	Soil Category S-1 & GW-3	GSI Protection Criteria	Residential Soil Reference Value	Industrial Soil Reference Value	Residential	Indoor Industrial/ Commercial Worker	Outdoor Industrial/ Commercial Worker
		Concentrations in µg/kg																				
PFOA	*Perfluorooctanoic acid* (C8)	1.2	1.2	--	--	--	35,000	1.7	1,700	4,900	22,000	5,100	2.5	0.72	300	300	10,000	240	3,200	1,560	46,700	26,000
PFOS	*Perfluorooctanesulfonic acid* (C8)	7.5	7.5	--	--	--	1,800	3.6	1,700	4,900	22,000	5,100	5.2	2	300	300	0.24	41	560	1,560	46,700	26,000
PFBS	*Perfluorobutanesulfonic acid* (C4)	3.1	3.1	1,800,000	16,000,000	34,000,000	18,000	7,100	1,700,000	4,900,000	22,000,000	51,000,000	1,900	--	--	--	--	5,700	77,000	125,000 sat	125,000 sat	125,000 sat
PFBA	*Perfluorobutanoic acid* (C4)	99	99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	63,000	280,000	--	--	--
PFNA	*Perfluorononanoic acid* (C9)	0.78	0.78	--	--	--	--	--	--	--	--	--	--	0.32	300	300	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	3.1	3.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	13	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonic acid* (C6)	1.8	1.8	--	--	--	--	--	--	--	--	--	--	0.3	300	300	--	130	1,700	--	--	--
PFHpA	*Perfluoroheptanoic acid (C7)*	0.29	0.29	--	--	--	--	--	--	--	--	--	--	0.5	300	300	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	4.1	4.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	15	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	4.5	4.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	8.4	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	0.48	0.48	--	--	--	--	--	--	--	--	--	--	0.3	300	300	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	13	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	84	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	8.4	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	0.32	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		New Hampshire [22]		New York[32]						North Carolina [23]			Pennsylvania[31,35]								
		Direct Contact RBC		Proposed Guidance Values for Anticipated Site Use						Preliminary Soil Remediation Goal			Medium Specific Concentrations (MSCs)								
		Residential (S-1)	Maintenance Worker (S-2)	Unrestricted	Residential	Restricted Residential	Commercial	Industrial	Protection of Groundwater	Residential Health	Industrial/ Commercial Health	Protection of Groundwater	Soil to Groundwater Numeric Value, Used Aquifer, TDS ≤ 2500 mg/L, Residential	Soil to Groundwater Numeric Value, Used Aquifer, TDS ≤ 2500 mg/L, Non-Residential	Soil to Groundwater Numeric Value, Used Aquifer, TDS > 2500 mg/L, Residential	Soil to Groundwater Numeric Value, Used Aquifer, TDS > 2500 mg/L, Non-Residential	Soil to Groundwater Numeric Value, Nonuse Aquifer, Residential	Soil to Groundwater Numeric Value, Nonuse Aquifer, Non-Residential	Direct Contact Residential 0-15 feet	Direct Contact Non-Residential Surface Soil 0-2 feet	Direct Contact Non-Residential Subsurface Soil 2-15 feet
		Concentrations in µg/kg																			
PFOA	*Perfluorooctanoic acid* (C8)	200	1,300	0.66 c	6.6 c	33 c	500 c	600 c	1.1 c	--	--	17	7	7	700	700	7	7	4,400	64,000	190,000,000
PFOS	*Perfluorooctanesulfonic acid* (C8)	100	600	0.88 c	8.8 c	44 c	440 c	440 c	3.7 c	--	--	--	7	7	700	700	7	7	4,400	64,000	190,000,000
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	3,800	49,000	14	1,000	2,900	100,000	290,000	1,000	2,900	66,000	960,000	1,000,000
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononanoic acid* (C9)	100	900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonic acid* (C6)	100	900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid (C7)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		US EPA [37]			Texas [24]											Washington [35]			
		Regional Screening Levels (TR=1E-06, THQ=1.0)			Protective Concentration Level											Cleanup and Screening Levels			
		Resident Soil	Industrial Soil	Protection of Groundwater Site Screening Level	Residential - 0.5 Acre Inhalation, ingestion, dermal, vegetable consumption	Residential - 0.5 Acre Groundwater Protection Ingestion	Residential - 0.5 Acre Groundwater Protection Class 3	Residential - 30 Acres Inhalation, ingestion, dermal, vegetable consumption	Residential - 30 Acres Groundwater Protection Ingestion	Residential - 30 Acres Groundwater Protection Class 3	Commercial - 0.5 Acre Inhalation, ingestion, dermal, vegetable consumption	Commercial - 0.5 Acre Groundwater Protection Ingestion	Commercial - 0.5 Acre Groundwater Protection Class 3	Commercial - 30 Acres Inhalation, ingestion, dermal, vegetable consumption	Commercial - 30 Acres Groundwater Protection Ingestion	Commercial - 30 Acres Groundwater Protection Class 3	MTCA Method B Direct Contact	MTCA Method C Direct Contact	Protective of GW - Vadose at 13 deg C	Protective of GW - Saturated
		Concentrations in µg/kg																	
PFOA	*Perfluorooctanoic acid* (C8)	190	2,500	0.91	600	3	300	490	1.5	150	2,400	8.8	880	1,400	4.4	440	240	11,000	0.063	0.0040
PFOS	*Perfluorooctanesulfonic acid* (C8)	130	1,600	0.038	1,500	50	5,000	1,500	25	2,500	15,000	150	15,000	14,000	75	7,500	240	11,000	0.17	0.0099
PFBS	*Perfluorobutanesulfonic acid* (C4)	19,000	250,000	1.9	86,000	110	11,000	80,000	53	5,300	600,000	320	32,000	440,000	160	16,000	24,000	1,100,000	1.8	0.12
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	180,000	200	20,000	160,000	98	9,800	1,100,000	580	58,000	820,000	290	29,000	--	--	--	--
PFNA	*Perfluorononanoic acid* (C9)	190	2,500	0.25	760	3.1	310	730	1.5	150	6,100	9.2	920	4,900	4.6	460	200	8,800	0.080	0.0048
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	250	0.32	32	250	0.16	16	2,600	0.95	95	2,600	0.48	48	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	250	0.48	48	250	0.24	24	2,600	1.4	140	2,600	0.72	72	--	--	--	--
PFHxS	*Perfluorohexanesulfonic acid* (C6)	1,300	16,000	0.17	250	2	200	240	1	100	2,200	6.1	610	2,000	3	300	780	34,000	0.41	0.026
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	1,500	4.6	460	1,500	2.3	230	16,000	14	1,400	16,000	6.8	680	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	58	920	92,000	31	460	46,000	87	2,800	280,000	45	1,400	140,000	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	800	80	1,800	800	9.2	920	8,200	55	5,500	8,200	27	2,700	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	790	34	3,400	780	17	1,700	7,500	100	10,000	7,000	50	5,000	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	990	22	2,200	980	11	1,100	9,400	67	6,700	8,800	33	3,300	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	800	40	4,000	800	20	2,000	8,200	120	12,000	8,200	60	6,000	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	510	110	11,000	510	56	5,600	8,200	340	34,000	8,200	170	17,000	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	610	61	6,100	610	30	3,000	8,200	180	18,000	8,200	91	9,100	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	230	3,500	--	--	--	--	--	--	--	--	--	--	--	--	--	240	11,000	0.10	0.0072

Please refer to notes at end of table.

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		British Columbia [25]																Canada [26]
		Numerical Soil Standards																Soil Screening Value
		Human Intake of Contaminated Soil								Groundwater Used for Drinking								
		Wildlands Natural	Wildlands Reverted	Agricultural	Urban Park	Residential Low Density	Residential High Density	Commercial	Industrial	Wildlands Natural	Wildlands Reverted	Agricultural	Urban Park	Residential Low Density	Residential High Density	Commercial	Industrial	Agricultural/Residential Parkland Use
		Concentrations in µg/kg																
PFOA	*Perfluorooctanoic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	700
PFOS	*Perfluorooctanesulfonic acid* (C8)	2,500	2,500	1,000	2,500	1,000	2,500	7,500	200,000	350	350	350	350	350	350	350	350	2,100
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61,000
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	114,000
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,300
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-6
North American Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

Notes:

1. Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
2. -- = No criteria or screening level value established.
3. b = Guidance document in draft.
4. c = Recommended value, current law pending.
5. sat = Saturation limit
6. More than 50% of mass contains particles greater than 75 µm mean diameter (D_{50} > 75 µm).
7. More than 50% of mass contains particles less than 75 µm mean diameter (D_{50} < 75 µm).
8. US EPA = United States Environmental Protection Agency
9. HDV = Human drinking water value.
10. NC = No Criteria
11. GSI = Groundwater Surface Water Interface
12. GW = Groundwater
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Table B-7
International Soil Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Australia [9]				Western Australia [10]	Denmark [11]	The Netherlands [14]	Norway [12]	Sweden [13]																						
		Screening Level								Soil Protection											Soil and GW Protection (One Resource)											
		20% of FSANZ TDI	20% of FSANZ TDI	20% of FSANZ TDI	20% of FSANZ TDI			RIVM																							
		Residential	High Density Residential	Industrial/ Commercial	Urban residential/ public open spaces	Health-Based Guidance	Health-Based Guidance	Temporary Background Values		Health Risk Based Guideline Value	Intake of Soil	Skin	Inhalation of Dust	Inhalation of Vapor	Intake of GW as DW	Intake of Plants	Protection of the Environment	Protection of GW	Protection of SW	Preliminary Guideline Value	Health Risk Based Guideline Value	Intake of Soil	Skin	Inhalation of Dust	Inhalation of Vapor	Intake of GW as DW	Intake of Plants	Protection of the Environment	Protection of GW	Protection of SW	Preliminary Guideline Value
		Concentrations in µg/kg																													
PFOA	*Perfluorooctanoic acid* (C8)	100	20,000	50,000	10,000	40,000	1,300 ***	0.8	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	9	2,000	20,000	1,000	4,000	390 ***	0.9	2.3	31	1,900	6,800	2,100,000	3,600,000	33	600	3	6.6	27	3	11,000	17,000	34,000	21,000,000	36,000,000	--	--	300	21	27	20
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	9	2,000	20,000	1,000	4,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	390 ***	390 ***	--	390 ***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OU	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ON	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
2. * = Summed concentration of PFAS cannot exceed value listed. PFAS to sum is determined by federal and state agencies.
3. *** = An additive approach is implemented when PFOS, PFOA and PFOSA occur in soil at the same time: PFOA (conc. mg/kg) / 1.3 mg/kg + PFOS (conc. mg/kg) / 0.39 mg/kg + PFOSA (conc. mg/kg) /0.39 mg/kg < 1
4. -- = No criteria or screening level value established.
5. b = Guidance document in draft.
6. DW = Drinking water
7. SW = Surface water
8. GW = Groundwater

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13. Swedish Geotechnical Institute. *Preliminary guideline values for highly fluorinated substances (PFAS) in soil and groundwater.* 2015. Accessed June 21, 2022.
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Table B-8
North American Non-Drinking Surface Water Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		US EPA [13]		Florida [6]							Maine [7]						Maine [8]
		Office of Water		DEP							CDC						CDC
		Draft Recommended Freshwater Aquatic Life Water Quality Criteria		Screening Level							Former Screening Levels						Screening Level
		SW		SW				Irrigation Water			Child Wading	Child Swimming	Adult Wading	Adult Swimming	Recreational	Construction Worker	
		Acute Water Column (CMC)	Chronic Water Column (CCC)	Human Health - Freshwater	Human Health - Marine	Ecological - Freshwater	Ecological - Marine	Residential	Commercial / Industrial	Produce	SW	SW	SW	SW	SW	SW	SW/RW
		Concentrations in ng/L															
PFOA	*Perfluorooctanoic acid* (C8)	49,000,000 b	94,000 b	500 b	500 b	1,300,000 b	--	6,700 b	750,000 b	--	60	50	440	270	50	220	170
PFOS	*Perfluorooctanesulfonic acid* (C8)	3,000,000 b	8,400 b	10 b	10 b	37,000 b	13,000 b	72,000 b	370,000 b	600 b	1,400	1,200	10,400	6,500	1,200	5,300	300
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,914,000
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table B-8
North American Non-Drinking Surface Water Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Michigan [9]				Minnesota [10]				Wisconsin [14]	Canada [11]	British Columbia [12]
		DEQ				MPCA				Department of Natural Resources	Minister of the Environment	British Columbia Office of Legislative Counsel
		Water Quality Values				Site-Specific Numeric Water Quality Criteria		Class 1/2A Drinking Water, Fish Consumption, and Recreational Exposure Surface Water Use	Class 2B/2D Fish Consumption and Recreational Exposure Surface Water Use	Surface Water Quality Criteria	Environmental Quality Guidelines	Generic Numerical Water Standards
		Non-Drinking Surface Water	Final Chronic Value	Aquatic Max Values	Final Acute Value	Lake	River				Benchmark for the Quality of the Ambient Environment	Aquatic Life
		SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
		Concentrations in ng/L										
PFOA	*Perfluorooctanoic acid* (C8)	12,000 a	880,000 a	7,700,000 a	15,000,000 a	1,620	6	--	--	20 b	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	12 a	140,000 a	780,000 a	1,600,000 a	2,700	7	0.05	0.05	80 b	6,800 a	60,000 a
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononanoic acid* (C9)	--	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. a = Promulgated rule
4. b = Guidance document in draft.
5. SW = Surface water
6. Florida Department of Environmental Protection (DEP). *Per- and Polyfluoroalkyl Substances (PFAS) Dynamic Plan.* July 1, 2020. Updated March 2022. Accessed June 21, 2022.
7. Maine Department of Environmental Health, Center for Disease Control and Prevention (CDC), Department of Health and Human Services. *Human Health Risk-Based Screening Levels for Perfluoroalkyl Compounds* . June 6, 2014. Accessed June 21, 2022. These screening values are no longer in use by the Maine CDC.
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11. Environment and Climate Change Canada. *Canadian Environmental Protection Act, 1999 Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS). June 2018* . Accessed June 21, 2022.
12. British Columbia Office of Legislative Counsel, Ministry of Attorney General, Victoria, British Columbia. Environmental Management Act. Contaminated Sites Regulation. B.C. Rg. 375/96. Amended January 24, 2019. Accessed June 21, 2022.
13. US EPA Office of Water, *Draft 2022 Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS),* April 2022. Accessed June 21, 2022.
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Table B-9
International Non-Drinking Surface Water Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Australia [6]	Australia [7]				EU [8]		Germany State of Bavaria [9]	The Netherlands [10]	
		Department of Health	HEPA				Annual Average Environmental Quality Standard	Maximum Acceptable Concentration	Bavarian State Office for the Environment	RIVM	
		Health-Based Guidance Values	Ecological Criteria						Predicted No Effect Concentration	Maximum Permissible Concentration	
			Freshwater 99% species protection	Freshwater 95% species protection	Freshwater 90% species protection	Freshwater 80% species protection				Freshwater	Marine Water
		RW	SW	SW	SW	SW	SW (Inland)	SW (Inland)	SW	GW/SW	SW
		Concentrations in ng/L									
PFOA	*Perfluorooctanoic acid* (C8)	10,000	19,000	220,000	632,000	1,824,000	--	--	570,000	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	2,000	0.23	130	2,000	31,000	0.65	36,000	50	0.65	0.53
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	3,700,000	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	1,260,000	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	320,000	--	--
PFPeS	*Perfluoropentane sulfonic acid (C5)*	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	1,000,000	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	2,000	--	--	--	--	--	--	250,000	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--
PFHpS	*Perfluoroheptanesulfonic acid* (C7)	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	870,000	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OU	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ON	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--

Notes:

1. Standards and guidance values in ng/L (nanograms per liter), parts per trillion (ppt)
2. -- = No criteria or screening level value established.
3. SW = Surface water
4. GW = Groundwater
5. RW = Recreational water
6. Australian Government Depart of Health. *Health Based Guidance Values for PFAS.* Accessed June 21, 2022.
7. Australia and New Zealand Heads of Environmental Protection Agencies (HEPA). *PFAS National Environmental Management Plan.* January, 2018; revised January 2020 (Version 2.0). Accessed June 21, 2022.
8. European Union (EU), August 2013. Water Framework Directive 2013/39/EU, Environmental Quality Standards.
9. Bavarian State Office of the Environment. *Leitlinien zur vorläufigen Bewertung von PFC-Verunreinigungen in Wasser und Boden.* April 2017 update. Accessed August 17, 2017.
10. National Institute for Public Health and the Environment (RIVM). *Environmental risk limits for PFOS.* Report 601714013/2010. Accessed June 21, 2022.

Table B-10
North American Sediment Standards and Guidance Values for PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Maine [2] Screening Level Recreational Sediment *Concentrations in µg/kg*
PFOA	*Perfluorooctanoic acid* (C8)	5,700
PFOS	*Perfluorooctanesulfonic acid* (C8)	5,700
PFBS	*Perfluorobutanesulfonic acid* (C4)	5,700,000
PFBA	*Perfluorobutanoic acid* (C4)	--
PFNA	*Perfluorononaoic acid* (C9)	--
PFPeA	*Perfluoropentanoic acid* (C5)	--
PFHxA	*Perfluorohexanoic acid* (C6)	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--
PFDoA	*Perfluorododecanoic acid* (C12)	--
PFDA	*Perfluorodecanoic acid* (C10)	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--

Notes:

1. Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
2. Maine Department of Environmental Protection (DEP). *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances, October 19, 2018* (p 47). Accessed June 21, 2022.

Table B-11
Fish Tissue Guidance Values for PFAS - Human Consumption

Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		EPA[3]	Alabama[4]				Connecticut[5]				Maine[14]
		Draft Reference Dose (RfD)	Screening Level				Screening Level				DEP
		Used to Calculate Allowable Limit in Fish Tissue	Fish Consumption				Fish Consumption; Derby CT Site				Remedial Action Guidelines
			No Restriction	1 Meal Per Week	1 Meal Per Month	Do Not Eat	No Consumption Advice	1 Meal Per Week	1 Meal Per Month	Do Not Eat	Recreational Angler Fish Tissue (wet wt)
		µg/kg per day	*Concentrations in µg/kg*								
PFOA	*Perfluorooctanoic acid* (C8)	0.02	--	--	--	--	--	--	--	--	52
PFOS	*Perfluorooctanesulfonic acid* (C8)	0.02	0 to 40	41 to 200	201 to 800	> 800	--	--	--	--	52
PFBS	*Perfluorobutanesulfonic acid* (C4)	20	--	--	--	--	--	--	--	--	52,000
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	0.08	--	--	--	--	--	--	--	--	--
Total PFAS		--	--	--	--	--	< 20 *	20 to < 40 *	40 to < 159 *	≥ 159 *	--

Please see notes at end of table.

Table B-11
Fish Tissue Guidance Values for PFAS - Human Consumption

Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Michigan[6]								Minnesota[7]
		Screening Level								Protective Values
		Fish Consumption								Fish Consumption
		16 Servings Per Month	12 Servings Per Month	8 Servings Per Month	4 Servings Per Month	2 Servings Per Month	1 Serving Per Month	6 Meals Per Year	Do Not Eat	Lake Elmo and Connected Waterbodies
		Concentrations in µg/kg								
PFOA	*Perfluorooctanoic acid* (C8)	--	--	--	--	--	--	--	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	< 9	> 9 to 13	> 13 to 19	> 19 to 38	> 38 to 75	> 75 to 150	> 150 to 300	> 300	0.37
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--
Total PFAS		--	--	--	--	--	--	--	--	--

Please see notes at end of table.

Table B-11
Fish Tissue Guidance Values for PFAS - Human Consumption

Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		New Jersey[8]									
		Draft Preliminary Fish Consumption Advisory Triggers									
		General Population						High Risk Population			
		Unlimited Consumption	Weekly Consumption	Monthly Consumption	Once Per 3 Months	Yearly Consumption	Do Not Eat	Unlimited Consumption	Weekly Consumption	Monthly Consumption	Do Not Eat
		Concentrations in µg/kg									
PFOA	*Perfluorooctanoic acid* (C8)	0.62	4.3	18.6	57	226	> 226	0.62	4.3	18.6	> 18.6
PFOS	*Perfluorooctanesulfonic acid* (C8)	0.56	3.9	17	51	204	> 204	0.56	3.9	17	> 17
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	0.23	1.6	6.9	21	84	> 84	0.23	1.6	6.9	> 6.9
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--	--	--
Total PFAS		--	--	--	--	--	--	--	--	--	--

Please see notes at end of table.

Table B-11
Fish Tissue Guidance Values for PFAS - Human Consumption

Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Oregon[9]	Great Lakes Consortium for Fish Consumption Advisories (member states include IL, IN, MI, MN, NY, OH, PA)[10]					Washington[13]	
			Fish Consumption					Department of Health	
		Screening Value for Fish Consumption Advisory	Unrestricted	2 Meals Per Week	1 Meal Per Week	1 Meal Per Month	Do Not Eat	Fish Consumption	
								High Consumer Population Screening Level	General Population Screening Level
		Concentrations in µg/kg							
PFOA	*Perfluorooctanoic acid* (C8)	200	--	--	--	--	--	8	23
PFOS	*Perfluorooctanesulfonic acid* (C8)	200	≤ 10	> 10 to 20	> 20 to 50	> 50 to 200	> 200	8	23
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--	--	--	--	--
Total PFAS		--	--	--	--	--	--	--	--

Please see notes at end of table.

Table B-11
Fish Tissue Guidance Values for PFAS - Human Consumption

Fire Training Facilities
Portland International Airport
Portland, Oregon
Last Completed: June 28, 2022

		Canada[11] Ontario Ministry of the Environment Fish Consumption			European Food Safety Authority[12]
		General Population - Consumption Restriction	Sensitive Populations - Consumption Restriction	Do Not Eat	Weekly Intake
		Concentrations in µg/kg			
PFOA	*Perfluorooctanoic acid* (C8)	--	--	--	--
PFOS	*Perfluorooctanesulfonic acid* (C8)	640	160	80	--
PFBS	*Perfluorobutanesulfonic acid* (C4)	--	--	--	--
PFBA	*Perfluorobutanoic acid* (C4)	--	--	--	--
PFNA	*Perfluorononaoic acid* (C9)	--	--	--	--
PFPeA	*Perfluoropentanoic acid* (C5)	--	--	--	--
PFHxA	*Perfluorohexanoic acid* (C6)	--	--	--	--
PFHxS	*Perfluorohexanesulfonoic acid* (C6)	--	--	--	--
PFHpA	*Perfluoroheptanoic acid* (C7)	--	--	--	--
PFOSA	*Perfluorooctane sulfonamide (C8)*	--	--	--	--
PFUnA	*Perfluoroundecanoic acid* (C11)	--	--	--	--
PFDoA	*Perfluorododecanoic acid* (C12)	--	--	--	--
PFDA	*Perfluorodecanoic acid* (C10)	--	--	--	--
PFDS	*Perfluorodecanesulfonic acid* (C10)	--	--	--	--
PFTeDA	*Perfluorotetradecanoic acid* (C14)	--	--	--	--
PFTrDA	*Perfluorotridecanoic acid* (C13)	--	--	--	--
PFNS	*Perfluorononane sulfonic acid (C9)*	--	--	--	--
MeFOSAA	*Methyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
EtFOSAA	*Ethyl perfluorooctanesulfonamidoacetic acid* (C8)	--	--	--	--
4:2 FTS	*Fluorotelomer sulfonate* (C4)	--	--	--	--
6:2 FTS	*Fluorotelomer sulfonate* (C6)	--	--	--	--
8:2 FTS	*Fluorotelomer sulfonate* (C8)	--	--	--	--
11Cl-Pf3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)	--	--	--	--
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)	--	--	--	--
ADONA	*4,8-Dioxa-3H-perfluorononanoate*	--	--	--	--
HFPO-DA	*2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (Gen X)*	--	--	--	--
Total PFAS		--	--	--	0.0044 /kg of bodyweight

Notes:

1. Standards and guidance values in µg/kg (micrograms per kilogram), parts per billion (ppb)
2. * Connecticut screening levels are sum of all detected PFAS in fish tissue.
3. United States Environmental Protection Agency (EPA). Reference doses from *Technical Fact Sheet - PFOS and PFOA* and *Draft Toxicity Assessments for GenX Chemicals and PFBS.* Accessed August 29, 2021.
4. Alabama Department of Public Health. *Perfluoralkyl sulfonate (PFOS) & Fish Consumption Advisory Fact Sheet* . Accessed June 21, 2022.
5. Connecticut Department of Public Health. *Health Consultation. Public Health Evaluation of Fish Tissue from O'Sullivan's Island Site, Derby CT.* January 23, 2018. Accessed June 21, 2022.
6. Michigan Department of Environmental Quality (DEQ). *Fish Tissue PFAS Sampling Guidance* . January 2019. State of Michigan *Michigan Fish Consumption Advisory Program Guidance Document.* September 14, 2016. Accessed June 21, 2022.
7. Minnesota Pollution Control Agency. *Water-quality criteria development for PFAS* . Accessed June 21, 2022.
8. New Jersey Department of Environmental Protection (DEP). *Investigation of Levels of Perfluorinated Compounds in New Jersey Fish, Surface Water, and Sediment* . June 18, 2018. Accessed June 21, 2022.
9. Oregon Health Authority. *Standard Operating Guidance, Target Analytes for Oregon's Fish Advisory Program* . December 30, 2013. Accessed June 21, 2022.
10. Great Lakes Consortium for Fish Consumption Advisories. *Best Practice for Perfluorooctane Sulfonate (PFOS) Guidelines.* November 2019. Accessed June 21, 2022.
11. Ontario Ministry of the Environment. *Guide to Eating Ontario Sport Fish 2013-2014* . Page 18. Accessed June 21, 2022.
12. European Food Safety Authority. *PFAS in Food: EFSA Assesses Risks and Sets Tolerable Intake* . September 17, 2020. Accessed June 21, 2022.
13. Washington Department of Health. *Per- and Polyfluoroalkyl Substances Draft Chemical Action Plan* . October 2020. Accessed June 21, 2022.
14. Maine Department of Environmental Protection, *Maine PFAS Screening Levels,* June 2021. Accessed June 21, 2022.

Appendix C

Field Procedures

Appendix C – Field Procedures

1.0 First Quarter 2022 Groundwater Monitoring Preparatory Activities

Property Access. Apex provided notification to Port personnel and Port Airfield Operations (OPS) to coordinate access to the Site at PDX. The notifications were submitted to OPS in advance and included the following: Port project manager contact information; Apex project manager and PDX field staff contact information; summary of field work; site plan depicting work locations; ingress and egress locations for Apex; and work schedule. Airside OPS were notified of Apex's arrival and departure.

Flagging/Barricading. For select areas, work areas were delineated with cones, barricades, and vehicles with amber flashing beacons. During field investigation activities, airside OPS notifications were completed in accordance with Port requirements.

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) was prepared for the activities. The HASP was prepared in general accordance with the Occupational Safety and Health Administration (OSHA) and the Oregon Administrative Rules (OAR). A copy of the HASP was reviewed and signed by all field staff and maintained on-Site during the field activities. Prior to performing on-Site work, Apex prepared a Job Safety Analysis (JSA) guiding Site- and project-specific activities, risks, and risk mitigation measures. Safety topics were refreshed daily using a daily tailgate safety meeting, conducted by Apex's Site Supervisor or Site Safety Officer.

Due to the COVID-19 pandemic, additional safety measures were implemented during the field activities. Apex followed a prepared COVID-19 Awareness JSA and the March 31, 2020 Port of Portland COVID-19 requirements letter. The following steps were taken to reduce or eliminate the spread of COVID-19:

- Personnel committed to staying home and away from the job site if they were exhibiting symptoms of COVID-19 as described by the Centers for Disease Control and Prevention (CDC);
- If personnel on the job site began to have symptoms, they were asked to leave immediately;
- Social distancing protocols were followed, with spacing greater than 6 feet. Enforcement was handled by the Site Safety Officer as presented in the HASP;
- Common areas and areas of high "hand traffic" were cleaned and disinfected regularly;
- Tools, pens, and paperwork were not shared;
- Personnel washed their hands regularly and thoroughly, and used hand sanitizer if soap and water were not available;
- Nitrile gloves were used and changed once they contacted a potentially contaminated surface; and
- All personnel wore cloth face coverings.

2.0 PFAS-Specific Sampling Procedures

To reduce the chance of inadvertent PFAS contamination of samples, Apex sampling personnel and subcontractors avoided using PFAS-containing items during the sampling process. Items commonly used in sampling processes that may contain PFAS include polytetrafluoroethylene (PTFE, also known as Teflon), low density polyethylene (LDPE), and polypropylene. Other common items that may contain PFAS include aluminum foil, post-it notes, waterproof field books, markers, chemical ice packs (e.g. blue ice), certain decontamination soaps, and certain product packaging (e.g. such as that found on pre-wrapped foods and snacks). Similarly, many clothing items contain PFAS, such as those coated with Teflon or incorporating a Gore-Tex membrane. Clothing items worn by Apex field staff had been washed at least six times and known PFAS-containing products were avoided during sample collection. In addition, field personnel avoided the use of PFAS-containing products such as cosmetics, moisturizers, insect repellant, sunscreen, and hand cream. Nitrile gloves were used during all sample collection activities, including equipment set-up, sample collection, and the sealing of containers. PFAS contamination prevention protocols were reviewed daily during the field activities.

3.0 Groundwater Monitoring Field Procedutes

For the sampling event, the well caps were removed and water levels allowed to equilibrate before the measurements were taken. The depth to groundwater, free product, and/or sheen were measured in each well to the nearest 0.01 foot using an electronic oil-water interface probe.

Low-flow purging methods were used for sampling the monitoring wells, and parameters (pH, oxidation-reduction potential [ORP], dissolved oxygen [DO], specific conductivity, and temperature) were measured during the purge process using a water quality meter and a flow cell connected to the discharge tubing of the sample pump. The turbidity of the water was monitored visually, and the clarity of the water was recorded on the sampling data sheet. Purging was considered complete when the water was visually clear and field parameters had stabilized to within 10 percent of the previous measurement for three consecutive three-minute intervals.

Appendix D

Historical Groundwater Elevation Data

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-1	04/26/94	7.55	--	--	10.06
(17.61)	08/08/94	8.76	--	--	8.85
	11/08/94	6.76	--	--	10.85
	02/20/95	5.26	--	--	12.35
	05/12/95	6.61	--	--	11.00
	09/18/95	8.73	--	--	8.88
	12/28/95	6.27	--	--	11.34
	02/29/96	5.39	--	--	12.22
	04/23/96	6.09	--	--	11.52
	05/30/96	6.10	--	--	11.51
	06/25/96	6.90	--	--	10.71
	12/11/96	6.37	--	--	11.24
	04/11/97	7.15	--	--	10.46
	10/27/97	8.39	--	--	9.22
	04/23/98	8.23	--	--	9.38
	04/06/99	7.38	--	--	10.23
	04/28/00	7.89	--	--	9.72
	05/07/01	8.86	--	--	8.75
	05/31/02	8.23	--	--	9.38
	06/04/03	7.98	--	--	9.63
	05/21/04	8.67	--	--	8.94
	08/25/05	9.62	--	--	7.99
	08/10/06	9.15	--	--	8.46
	09/06/07	9.65	--	--	7.96
	04/20/17	6.81	--	--	10.80
	09/26/17	9.24	--	--	8.37
	01/31/19	8.60	--	--	9.01
	02/28/19	8.37	--	--	9.24
	03/22/19	8.47	--	--	9.14
	04/29/19	7.96	--	--	9.65
	05/31/19	8.37	--	--	9.24
	06/28/19	8.96	--	--	8.65
	07/30/19	9.25	--	--	8.36
	08/29/19	9.52	--	--	8.09
	09/27/19	9.52	--	--	8.09
	10/28/19	9.56	--	--	8.05
	12/02/19	9.75	--	--	7.86
	12/30/19	9.35	--	--	8.26
	06/04/20	8.25	--	--	9.36
	09/21/20	9.52	--	--	8.09
	12/14/20	9.23	--	--	8.38
	03/22/21	8.11	--	--	9.50
	01/03/22	7.81	--	--	9.80
	03/22/22	7.93	--	--	9.68
	05/31/22	7.77	--	--	9.84

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-2	04/26/94	9.23	--	--	8.61
(17.84)	08/08/94	9.83	--	--	8.01
	11/08/94	9.11	--	--	8.73
	02/20/95	8.38	--	--	9.46
	05/12/95	9.06	--	--	8.78
	09/18/95	9.77	--	--	8.07
	12/28/95	8.82	--	--	9.02
	02/29/96	7.83	--	--	10.01
	04/23/96	8.57	--	--	9.27
	05/30/96	8.51	--	--	9.33
	06/25/96	8.82	--	--	9.02
	12/11/96	9.17	--	--	8.67
	04/11/97	9.69	--	--	8.15
	10/27/97	10.27	--	--	7.57
	04/23/98	9.50	--	--	8.34
	04/06/99	9.57	--	--	8.27
	04/28/00	9.76	--	--	8.08
	05/07/01	10.79	--	--	7.05
	05/31/02	10.08	--	--	7.76
	06/04/03	10.04	--	--	7.80
	05/21/04	10.43	--	--	7.41
	08/25/05	10.86	--	--	6.98
	08/10/06	10.44	--	--	7.40
	09/06/07	10.74	--	--	7.10
	04/20/17	9.08	--	--	8.76
	09/26/17	10.60	--	--	7.24
	01/31/19	10.24	--	--	7.60
	02/28/19	10.15	--	--	7.69
	03/22/19	10.19	--	--	7.65
	04/29/19	9.85	--	--	7.99
	05/31/19	10.01	--	--	7.83
	06/28/19	10.40	--	--	7.44
	07/30/19	10.55	--	--	7.29
	08/29/19	10.69	--	--	7.15
	09/27/19	10.70	--	--	7.14
	10/28/19	10.67	--	--	7.17
	12/02/19	10.75	--	--	7.09
	12/30/19	10.53	--	--	7.31
	06/04/20	9.88	--	--	7.96
	09/21/20	10.67	--	--	7.17
	12/14/20	10.41	--	--	7.43
	03/22/21	10.02	--	--	7.82
	01/03/22	9.76	--	--	8.08
	03/22/22	9.78	--	--	8.06
	05/31/22	9.67	--	--	8.17

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-3 (17.59)	04/26/94	6.77	--	--	10.82
	08/08/94	8.50	--	--	9.09
	11/08/94	3.93	--	--	13.66
	02/20/95	3.74	--	--	13.85
	05/12/95	5.08	--	--	12.51
	09/18/95	6.91	--	--	10.68
	12/28/95	4.30	--	--	13.29
	02/29/96	3.41	--	--	14.18
	04/23/96	4.89	--	--	12.70
	05/30/96	4.76	--	--	12.83
	06/25/96	5.42	--	--	12.17
	12/11/96	3.96	--	--	13.63
	04/11/97	6.15	--	--	11.44
	10/27/97	7.95	--	--	9.64
	04/23/98	6.79	--	--	10.80
	04/06/99	6.07	--	--	11.52
	04/28/00	6.56	--	--	11.03
	05/07/01	7.61	--	--	9.98
	05/31/02	7.8	--	--	9.79
	06/04/03	6.82	--	--	10.77
	05/21/04	8.25	--	--	9.34
	08/25/05	9.42	--	--	8.17
	08/10/06	8.85	--	--	8.74
	09/06/07	9.59	--	--	8.00
	04/20/17	6.70	--	--	10.89
	09/26/17	Not measured; unable to remove well cover.			
	01/31/19	9.30	--	--	8.29
	02/28/19	8.19	--	--	9.40
	03/22/19	8.65	--	--	8.94
	04/29/19	7.86	--	--	9.73
	05/31/19	8.39	--	--	9.20
	06/28/19	9.20	--	--	8.39
	07/30/19	9.71	--	--	7.88
	08/29/19	10.00	--	--	7.59
	09/27/19	9.85	--	--	7.74
	10/28/19	9.95	--	--	7.64
	12/02/19	10.00	--	--	7.59
	12/30/19	9.30	--	--	8.29
	06/04/20	8.23	--	--	9.36
	09/21/20	9.95	--	--	7.64
	12/14/20	9.19	--	--	8.40
	03/22/21	8.32	--	--	9.27
	01/06/22	7.71	--	--	9.88
	03/22/22	8.03	--	--	9.56
	05/31/22	7.67	--	--	9.92

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-4	04/26/94	8.14	--	--	9.86
(18.00)	08/08/94	9.26	--	--	8.74
	11/08/94	6.58	--	--	11.42
	02/20/95	5.63	--	--	12.37
	05/12/95	7.57	--	--	10.43
	09/18/95	9.24	--	--	8.76
	12/28/95	6.55	--	--	11.45
	02/29/96	5.94	--	--	12.06
	04/23/96	7.05	--	--	10.95
	05/30/96	6.89	--	--	11.11
	06/25/96	7.92	--	--	10.08
	12/11/96	5.58	--	--	12.42
	04/11/97	7.26	--	--	10.74
	10/27/97	8.00	--	--	10.00
	04/23/98	7.95	--	--	10.05
	04/06/99	7.30	--	--	10.70
	04/28/00	7.67	--	--	10.33
	05/07/01	8.29	--	--	9.71
	05/31/02	8.21	--	--	9.79
	06/04/03	7.79	--	--	10.21
	05/21/04	8.48	--	--	9.52
	08/25/05	9.28	--	--	8.72
	08/10/06	8.77	--	--	9.23
	09/06/07	9.44	--	--	8.56
	04/20/17	7.08	--	--	10.92
	09/26/17	9.52	--	--	8.48
	01/31/19	8.48	--	--	9.52
	02/28/19	8.11	--	--	9.89
	03/22/19	8.45	--	--	9.55
	04/29/19	8.01	--	--	9.99
	05/31/19	8.45	--	--	9.55
	06/28/19	9.00	--	--	9.00
	07/30/19	9.34	--	--	8.66
	08/29/19	9.61	--	--	8.39
	09/27/19	9.45	--	--	8.55
	10/28/19	9.50	--	--	8.50
	12/02/19	9.65	--	--	8.35
	12/30/19	8.94	--	--	9.06
	06/04/20	8.41	--	--	9.59
	09/21/20	9.55	--	--	8.45
	12/14/20	9.20	--	--	8.80
	03/22/21	8.20	--	--	9.80
	01/03/22	7.85	--	--	10.15
	03/22/22	8.01	--	--	9.99
	06/01/22	7.80	--	--	10.20

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-5	04/26/94	11.19	--	--	8.69
(19.88)	08/08/94	11.72	--	--	8.16
	11/08/94	9.96	--	--	9.92
	02/20/95	7.67	--	--	12.21
	05/12/95	10.71	--	--	9.17
	09/18/95	11.69	--	--	8.19
	12/28/95	9.16	--	--	10.72
	02/29/96	8.61	--	--	11.27
	04/23/96	10.15	--	--	9.73
	05/30/96	10.13	--	--	9.75
	06/25/96	10.77	--	--	9.11
	12/11/96	8.96	--	--	10.92
	04/11/97	8.46	--	--	11.42
	10/27/97	10.17	--	--	9.71
	04/23/98	9.84	--	--	10.04
	04/06/99	9.29	--	--	10.59
	04/28/00	9.62	--	--	10.26
	05/07/01	10.19	--	--	9.69
	05/31/02	9.88	--	--	10.00
	06/04/03	9.58	--	--	10.30
	05/21/04	10.13	--	--	9.75
	08/25/05	10.74	--	--	9.14
	08/10/06	10.31	--	--	9.57
	09/06/07	10.69	--	--	9.19
	04/20/17	10.65	--	--	9.23
	09/26/17	11.12	--	--	8.76
	01/31/19	10.82	--	--	9.06
	02/28/19	10.40	--	--	9.48
	03/22/19	10.85	--	--	9.03
	04/29/19	10.83	--	--	9.05
	05/31/19	10.95	--	--	8.93
	06/28/19	11.06	--	--	8.82
	07/30/19	11.00	--	--	8.88
	08/29/19	11.00	--	--	8.88
	09/27/19	11.05	--	--	8.83
	10/28/19	11.08	--	--	8.80
	12/02/19	11.11	--	--	8.77
	12/30/19	10.97	--	--	8.91
	06/04/20	10.91	--	--	8.97
	09/21/20	11.01	--	--	8.87
	12/14/20	11.01	--	--	8.87
	03/22/21	8.00	--	--	11.88
	01/06/22	8.50	--	--	11.38
	03/22/22	6.90	--	--	12.98
	06/01/22	10.76	--	--	9.12

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-6	04/26/94	8.36	--	--	9.72
(18.08)	08/08/94	9.21	--	--	8.87
	11/08/94	7.11	--	--	10.97
	02/20/95	5.04	--	--	13.04
	05/12/95	7.07	--	--	11.01
	09/18/95	9.15	--	--	8.93
	12/28/95	6.71	--	--	11.37
	02/29/96	5.65	--	--	12.43
	04/23/96	6.76	--	--	11.32
	05/30/96	6.58	--	--	11.50
	06/25/96	7.83	--	--	10.25
	12/11/96	5.97	--	--	12.11
	04/11/97	7.00	--	--	11.08
	10/27/97	8.48	--	--	9.60
	04/23/98	7.66	--	--	10.42
	04/06/99	6.70	--	--	11.38
	04/28/00	8.54	--	--	9.54
	05/07/01	8.99	--	--	9.09
	05/31/02	8.51	--	--	9.57
	06/04/03	8.22	--	--	9.86
	05/21/04	8.98	--	--	9.10
	08/25/05	9.68	--	--	8.40
	08/10/06	9.22	--	--	8.86
	09/06/07	9.82	--	--	8.26
	04/20/17	5.80	--	--	12.28
	09/26/17	8.93	--	--	9.15
	01/31/19	7.48	--	--	10.60
	02/28/19	6.65	--	--	11.43
	03/22/19	7.07	--	--	11.01
	04/29/19	6.91	--	--	11.17
	05/31/19	7.57	--	--	10.51
	06/28/19	8.36	--	--	9.72
	07/30/19	8.51	--	--	9.57
	08/29/19	9.38	--	--	8.70
	09/27/19	9.47	--	--	8.61
	10/28/19	9.57	--	--	8.51
	12/02/19	9.73	--	--	8.35
	12/30/19	8.85	--	--	9.23
	06/04/20	8.19	--	--	9.89
	09/21/20	9.56	--	--	8.52
	12/14/20	9.05	--	--	9.03
	03/22/21	6.76	--	--	11.32
	01/03/22	5.79	--	--	12.29
	03/22/22	7.49	--	--	10.59
	06/01/22	7.64	--	--	10.44

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-7	04/26/94	8.97	--	--	8.64
(17.61)	08/08/94	9.76	--	--	7.85
	11/08/94	8.21	--	--	9.40
	02/20/95	7.14	--	--	10.47
	05/12/95	8.43	--	--	9.18
	09/18/95	9.54	--	--	8.07
	12/28/95	7.93	--	--	9.68
	02/29/96	7.62	--	--	9.99
	04/23/96	8.19	--	--	9.42
	05/30/96	8.23	--	--	9.38
	06/25/96	8.70	--	--	8.91
	12/11/96	8.00	--	--	9.61
	04/11/97	9.41	--	--	8.20
	10/27/97	9.68	--	--	7.93
	04/23/98	9.75	--	--	7.86
	04/06/99	9.48	--	--	8.13
	04/28/00	9.69	--	--	7.92
	05/07/01	10.06	--	--	7.55
	05/31/02	10.01	--	--	7.60
	06/04/03	9.61	--	--	8.00
	05/21/04	9.74	--	--	7.87
	08/25/05	10.58	--	--	7.03
	08/10/06	10.35	--	--	7.26
	09/06/07	10.86	--	--	6.75
	04/20/17	8.98	--	--	8.63
	09/26/17	10.78	--	--	6.83
	01/31/19	9.63	--	--	7.98
	02/28/19	9.27	--	--	8.34
	03/22/19	9.58	--	--	8.03
	04/29/19	9.45	--	--	8.16
	05/31/19	9.76	--	--	7.85
	06/28/19	10.25	--	--	7.36
	07/30/19	10.51	--	--	7.10
	08/29/19	10.70	--	--	6.91
	09/27/19	10.46	--	--	7.15
	10/28/19	10.56	--	--	7.05
	12/02/19	10.75	--	--	6.86
	12/30/19	9.71	--	--	7.90
	06/04/20	9.85	--	--	7.76
	09/21/20	10.95	--	--	6.66
	12/14/20	10.11	--	--	7.50
	03/22/21	9.55	--	--	8.06
	01/03/22	9.12	--	--	8.49
	03/22/22	9.44	--	--	8.17
	06/01/22	9.36	--	--	8.25

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-8	04/26/94	9.47	--	--	8.68
(18.15)	08/08/94	9.99	--	--	8.16
	11/08/94	9.56	--	--	8.59
	02/20/95	7.91	--	--	10.24
	05/12/95	8.41	--	--	9.74
	09/18/95	9.96	--	--	8.19
	12/28/95	7.98	--	--	10.17
	02/29/96	6.82	--	--	11.33
	04/23/96	7.40	--	--	10.75
	05/30/96	7.23	--	--	10.92
	06/25/96	7.82	--	--	10.33
	12/11/96	6.97	--	--	11.18
	04/11/97	7.90	--	--	10.25
	10/27/97	9.39	--	--	8.76
	04/23/98	8.97	--	--	9.18
	04/06/99	7.70	--	--	10.45
	04/28/00	7.95	--	--	10.20
	05/07/01	9.60	--	--	8.55
	05/31/02	8.49	--	--	9.66
	06/04/03	8.11	--	--	10.04
	05/21/04	9.05	--	--	9.10
	08/25/05	9.96	--	--	8.19
	08/10/06	9.53	--	--	8.62
	09/06/07	10.15	--	--	8.00
	04/20/17	7.18	--	--	10.97
	09/26/17	9.72	--	--	8.43
	01/31/19	9.17	--	--	8.98
	02/28/19	8.80	--	--	9.35
	03/22/19	9.10	--	--	9.05
	04/29/19	8.16	--	--	9.99
	05/31/19	8.55	--	--	9.60
	06/28/19	9.36	--	--	8.79
	07/30/19	9.85	--	--	8.30
	08/29/19	10.10	--	--	8.05
	09/27/19	10.05	--	--	8.10
	10/28/19	10.00	--	--	8.15
	12/02/19	9.88	--	--	8.27
	12/30/19	9.30	--	--	8.85
	06/04/20	9.13	--	--	9.02
	09/21/20	10.13	--	--	8.02
	12/14/20	10.07	--	--	8.08
	03/22/21	9.80	--	--	8.35
	01/03/22	9.51	--	--	8.64
	03/22/22	9.90	--	--	8.25
	05/31/22	9.97	--	--	8.18

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-9	08/08/94	6.70	--	--	10.39
(17.07)	11/08/94	4.11	--	--	12.98
	02/20/95	2.93	--	--	14.16
	05/12/95	4.95	--	--	12.14
	09/18/95	6.34	--	--	10.75
	12/28/95	4.02	--	--	13.07
	02/29/96	3.61	--	--	13.48
	04/23/96	3.88	--	--	13.21
	05/30/96	4.19	--	--	12.90
	06/25/96	4.87	--	--	12.20
	12/11/96	2.77	--	--	14.30
	04/11/97	4.25	--	--	12.82
	10/27/97	5.40	--	--	11.67
	04/23/98	4.74	--	--	12.33
	04/06/99	4.26	--	--	12.81
	04/28/00	4.62	--	--	12.45
	05/07/01	5.06	--	--	12.01
	05/31/02	5.03	--	--	12.04
	06/04/03	4.83	--	--	12.24
	05/21/04	5.32	--	--	11.75
	08/25/05	5.98	--	--	11.09
	08/10/06	5.72	--	--	11.35
	09/06/07	6.33	--	--	10.74
	04/20/17	4.76	--	--	12.31
	09/26/17	8.13	--	--	8.94
	01/31/19	5.40	--	--	11.67
	02/28/19	4.65	--	--	12.42
	03/22/19	5.80	--	--	11.27
	04/29/19	5.68	--	--	11.39
	05/31/19	6.14	--	--	10.93
	06/28/19	6.61	--	--	10.46
	07/30/19	7.31	--	--	9.76
	08/29/19	7.87	--	--	9.20
	09/27/19	7.40	--	--	9.67
	10/28/19	7.52	--	--	9.55
	12/02/19	7.79	--	--	9.28
	12/30/19	5.96	--	--	11.11
	06/04/20	6.38	--	--	10.69
	09/21/20	7.88	--	--	9.19
	12/14/20	6.29	--	--	10.78
	03/22/21	5.60	--	--	11.47
	01/03/22	3.92	--	--	13.15
	03/22/22	5.51	--	--	11.56
	06/01/22	5.30	--	--	11.77

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-10A	02/29/96	3.69	--	--	13.55
(17.24)	04/23/96	4.41	--	--	12.83
	05/30/96	4.58	--	--	12.66
	06/25/96	5.12	--	--	12.12
	12/11/96	3.41	--	--	13.83
	04/11/97	5.71	--	--	11.53
	10/27/97	5.30	--	--	11.94
	04/23/98	5.07	--	--	12.17
	04/06/99	4.58	--	--	12.66
	04/28/00	5.09	--	--	12.15
	05/07/01	5.22	--	--	12.02
	05/31/02	5.24	--	--	12.00
	06/04/03	5.27	--	--	11.97
	05/21/04	5.66	--	--	11.58
	08/25/05	6.28	--	--	10.96
	08/10/06	6.06	--	--	11.18
	09/06/07	6.54	--	--	10.70
	04/20/17	4.96	--	--	12.28
	09/26/17	7.21	--	--	10.03
	01/31/19	5.46	--	--	11.78
	02/28/19	5.12	--	--	12.12
	03/22/19	5.76	--	--	11.48
	04/29/19	5.71	--	--	11.53
	05/31/19	6.07	--	--	11.17
	06/28/19	6.36	--	--	10.88
	07/30/19	6.71	--	--	10.53
	08/29/19	6.99	--	--	10.25
	09/27/19	6.73	--	--	10.51
	10/28/19	6.93	--	--	10.31
	12/02/19	7.06	--	--	10.18
	12/30/19	5.96	--	--	11.28
	06/04/20	6.32	--	--	10.92
	09/21/20	7.25	--	--	9.99
	12/14/20	5.95	--	--	11.29
	03/22/21	5.66	--	--	11.58
	01/03/22	4.55	--	--	12.69
	03/22/22	5.12	--	--	12.12
	06/01/22	5.58	--	--	11.66

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-11	02/29/96	4.51	--	--	12.84
(17.35)	04/23/96	4.88	--	--	12.47
	05/30/96	5.00	--	--	12.35
	06/25/96	5.41	--	--	11.94
	12/11/96	4.00	--	--	13.35
	04/11/97	5.18	--	--	12.17
	10/27/97	5.72	--	--	11.63
	04/23/98	5.47	--	--	11.88
	04/06/99	5.11	--	--	12.24
	04/28/00	5.48	--	--	11.87
	05/07/01	5.50	--	--	11.85
	05/31/02	5.64	--	--	11.71
	06/04/03	5.55	--	--	11.80
	05/21/04	5.77	--	--	11.58
	08/25/05	6.22	--	--	11.13
	08/10/06	6.13	--	--	11.22
	09/06/07	6.55	--	--	10.80
	04/20/17	5.33	--	--	12.02
	09/26/17	8.95	8.85	0.10	8.48
	01/31/19	6.50	6.49	0.01	10.86
	02/28/19	6.16	6.15	0.01	11.20
	03/22/19	6.80	6.75	0.05	10.59
	04/29/19	6.51	6.50	0.01	10.85
	05/31/19	7.02	6.90	0.12	10.43
	06/28/19	7.54	7.46	0.08	9.87
	07/30/19	8.21	8.20	0.01	9.15
	08/29/19	8.90	8.70	0.20	8.61
	09/27/19	8.61	8.60	0.01	8.75
	10/28/19	8.90	8.75	0.15	8.57
	12/02/19	8.89	8.88	0.01	8.47
	12/30/19	7.12	sheen	sheen	10.23
	06/04/20	7.06	7.05	0.01	10.30
	09/21/20	9.15	8.90	0.25	8.40
	12/14/20	6.14	6.13	0.01	11.22
	03/22/21	5.95	sheen	sheen	11.40
	01/04/22	4.78	sheen	sheen	12.57
	03/22/22	5.78	5.74	0.04	11.60
	06/01/22	6.53	6.34	0.19	10.97

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-12	02/29/96	7.04	--	--	12.67
(19.71)	04/23/96	9.35	--	--	10.36
	05/30/96	9.37	--	--	10.34
	06/25/96	10.32	--	--	9.39
	12/11/96	5.91	--	--	13.80
	04/11/97	7.22	7.14	0.08	12.56
	10/27/97	10.11	9.83	0.28	9.84
	04/23/98	8.99	8.96	0.03	10.75
	04/06/99	7.38	--	--	12.33
	04/28/00	8.90	--	--	10.81
	05/07/01	9.62	--	--	10.09
	05/31/02	9.18	--	--	10.53
	06/04/03	8.47	--	--	11.24
	05/21/04	8.96	--	--	10.75
	08/25/05	10.63	--	--	9.08
	08/10/06	10.11	--	--	9.60
	09/06/07	10.68	--	--	9.03
	04/20/17	6.59	6.44	0.15	13.24
	09/26/17	10.52	10.40	0.12	9.29
	01/31/19	9.25	9.00	0.25	10.66
	02/28/19	8.69	8.50	0.19	11.17
	03/22/19	8.62	8.41	0.21	11.26
	04/29/19	8.37	8.14	0.23	11.52
	05/31/19	8.77	8.50	0.27	11.16
	06/28/19	9.07	8.80	0.27	10.86
	07/30/19	10.00	9.81	0.19	9.86
	08/29/19	10.66	10.53	0.13	9.15
	09/27/19	10.80	10.62	0.18	9.05
	10/28/19	10.93	10.86	0.07	8.84
	12/02/19	11.02	10.90	0.12	8.79
	12/30/19	10.61	10.50	0.11	9.19
	06/04/20	8.85	8.69	0.16	10.99
	09/21/20	10.24	10.04	0.20	9.63
	12/14/20	10.55	10.44	0.11	9.25
	03/22/21	7.63	7.56	0.07	12.14
	01/03/22	8.39	--	--	11.32
	03/22/22	7.36	--	--	12.35
	06/01/22	7.37	--	--	12.34

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-13	02/29/96	2.85	--	--	15.68
(18.53)	04/23/96	3.43	--	--	15.10
	05/30/96	4.05	--	--	14.48
	06/25/96	4.82	--	--	13.71
	12/11/96	1.76	--	--	16.77
	04/11/97	3.98	--	--	14.55
	10/27/97	4.94	--	--	13.59
	04/23/98	4.50	--	--	14.03
	04/06/99	3.82	--	--	14.71
	04/28/00	4.63	--	--	13.90
	05/07/01	5.03	--	--	13.50
	05/31/02	5.15	--	--	13.38
	06/30/03	4.80	--	--	13.73
	05/21/04	5.27	--	--	13.26
	08/25/05	5.85	--	--	12.68
	08/10/06	5.55	--	--	12.98
	09/06/07	6.02	--	--	12.51
	04/20/17	3.30	--	--	15.23
	09/26/17	5.49	--	--	13.04
	01/31/19	4.47	--	--	14.06
	02/28/19	4.06	--	--	14.47
	03/22/19	4.60	--	--	13.93
	04/29/19	4.63	--	--	13.90
	05/31/19	4.95	--	--	13.58
	06/28/19	5.24	--	--	13.29
	07/30/19	5.51	--	--	13.02
	08/29/19	5.73	--	--	12.80
	09/27/19	5.61	--	--	12.92
	10/28/19	5.80	--	--	12.73
	12/02/19	5.92	--	--	12.61
	12/30/19	5.10	--	--	13.43
	06/04/20	5.32	--	--	13.21
	09/21/20	5.91	--	--	12.62
	12/14/20	5.21	--	--	13.32
	03/22/21	4.18	--	--	14.35
	01/03/22	2.74	--	--	15.79
	03/22/22	3.75	--	--	14.78
	06/01/22	4.24	--	--	14.29

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-14	02/29/96	2.27	--	--	15.46
(17.73)	04/23/96	2.90	--	--	14.83
	05/30/96	3.36	--	--	14.37
	06/25/96	3.92	--	--	13.81
	12/11/96	1.47	--	--	16.26
	04/11/97	3.30	--	--	14.43
	10/27/97	4.38	--	--	13.35
	04/23/98	3.82	--	--	13.91
	04/06/99	3.09	--	--	14.64
	04/28/00	3.80	--	--	13.93
	05/07/01	4.02	--	--	13.71
	05/31/02	4.28	--	--	13.45
	06/04/03	3.94	--	--	13.79
	05/21/04	4.38	--	--	13.35
	08/25/05	4.98	--	--	12.75
	08/10/06	4.61	--	--	13.12
	09/06/07	5.05	--	--	12.68
	04/20/17	2.51	--	--	15.22
	09/26/17	4.60	--	--	13.13
	01/31/19	3.72	--	--	14.01
	02/28/19	3.30	--	--	14.43
	03/22/19	3.72	--	--	14.01
	04/29/19	3.72	--	--	14.01
	05/31/19	4.03	--	--	13.70
	06/28/19	4.27	--	--	13.46
	07/30/19	4.55	--	--	13.18
	08/29/19	4.79	--	--	12.94
	09/27/19	4.81	--	--	12.92
	10/28/19	4.98	--	--	12.75
	12/02/19	5.13	--	--	12.60
	12/30/19	4.33	--	--	13.40
	06/04/20	4.40	--	--	13.33
	09/21/20	4.95	--	--	12.78
	12/14/20	4.45	--	--	13.28
	03/22/21	3.33	--	--	14.40
	01/03/22	2.81	--	--	14.92
	03/22/22	2.90	--	--	14.83
	06/01/22	3.32	--	--	14.41

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-15	01/31/19	9.71	--	--	15.30
(25.01)	02/28/19	8.40	--	--	16.61
	03/22/19	9.42	--	--	15.59
	04/29/19	8.63	--	--	16.38
	05/31/19	9.11	--	--	15.90
	06/28/19	9.80	--	--	15.21
	07/30/19	10.66	--	--	14.35
	08/29/19	11.40	--	--	13.61
	09/27/19	11.95	--	--	13.06
	10/28/19	12.37	--	--	12.64
	12/02/19	12.65	--	--	12.36
	12/30/19	11.34	--	--	13.67
	06/04/20	9.78	--	--	15.23
	09/21/20	11.37	--	--	13.64
	12/14/20	10.69	--	--	14.32
	03/22/21	8.14	--	--	16.87
	01/04/22	5.55	--	--	19.46
	03/21/22	7.76	--	--	17.25
	06/01/22	7.73	--	--	17.28
MW-16	01/31/19	5.15	--	--	17.41
(22.56)	02/28/19	4.58	--	--	17.98
	03/22/19	5.08	--	--	17.48
	04/29/19	5.05	--	--	17.51
	05/31/19	5.47	--	--	17.09
	06/28/19	5.72	--	--	16.84
	07/30/19	5.97	--	--	16.59
	08/29/19	6.21	--	--	16.35
	09/27/19	6.46	--	--	16.10
	10/28/19	6.69	--	--	15.87
	12/02/19	6.91	--	--	15.65
	12/30/19	6.20	--	--	16.36
	06/10/20	5.20	--	--	17.36
	09/21/20	6.00	--	--	16.56
	12/14/20	4.86	--	--	17.70
	03/22/21	4.50	--	--	18.06
	01/03/22	4.58	--	--	17.98
	03/21/22	5.00	--	--	17.56
	06/01/22	5.16	--	--	17.40

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-17	01/31/19	5.51	--	--	17.06
(22.57)	02/28/19	4.98	--	--	17.59
	03/22/19	5.72	--	--	16.85
	04/29/19	5.68	--	--	16.89
	05/31/19	6.09	--	--	16.48
	06/28/19	6.52	--	--	16.05
	07/30/19	7.09	--	--	15.48
	08/29/19	7.52	--	--	15.05
	09/27/19	7.56	--	--	15.01
	10/28/19	7.82	--	--	14.75
	12/02/19	7.99	--	--	14.58
	12/30/19	6.59	--	--	15.98
	06/10/20	5.68	--	--	16.89
	09/21/20	7.36	--	--	15.21
	12/14/20	5.86	--	--	16.71
	03/22/21	5.60	--	--	16.97
	01/03/22	2.67	--	--	19.90
	03/21/22	5.10	--	--	17.47
	06/01/22	5.49	--	--	17.08
MW-18	01/31/19	5.70	--	--	17.39
(23.09)	02/28/19	4.93	--	--	18.16
	03/22/19	5.51	--	--	17.58
	04/29/19	5.73	--	--	17.36
	05/31/19	6.15	--	--	16.94
	06/28/19	6.75	--	--	16.34
	07/30/19	7.35	--	--	15.74
	08/29/19	7.84	--	--	15.25
	09/27/19	7.60	--	--	15.49
	10/28/19	7.82	--	--	15.27
	12/02/19	8.10	--	--	14.99
	12/30/19	6.29	--	--	16.80
	06/04/20	6.56	--	--	16.53
	09/21/20	8.00	--	--	15.09
	12/14/20	5.98	--	--	17.11
	03/22/21	5.41	--	--	17.68
	01/03/22	3.53	--	--	19.56
	03/21/22	4.95	--	--	18.14
	06/01/22	5.49	--	--	17.60

Please refer to notes at end of table.

Appendix D
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Fire Training Facilities
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-19	01/31/19	2.20	--	--	14.83
(17.03)	02/28/19	1.60	--	--	15.43
	03/22/19	2.45	--	--	14.58
	04/29/19	2.60	--	--	14.43
	05/31/19	3.38	--	--	13.65
	06/28/19	3.82	--	--	13.21
	07/30/19	4.23	--	--	12.80
	08/29/19	4.58	--	--	12.45
	09/27/19	4.52	--	--	12.51
	10/28/19	4.50	--	--	12.53
	12/02/19	4.45	--	--	12.58
	12/30/19	2.77	--	--	14.26
	06/04/20	3.68	--	--	13.35
	09/21/20	4.68	--	--	12.35
	12/14/20	3.01	--	--	14.02
	03/22/21	2.49	--	--	14.54
	01/03/22	0.00	--	--	17.03
	03/21/22	0.58	--	--	16.45
	06/01/22	2.55	--	--	14.48
MW-20	01/31/19	3.18	--	--	18.68
(21.86)	02/28/19	2.60	--	--	19.26
	03/22/19	3.26	--	--	18.60
	04/29/19	3.25	--	--	18.61
	05/31/19	3.75	--	--	18.11
	06/28/19	4.45	--	--	17.41
	07/30/19	4.97	--	--	16.89
	08/29/19	5.48	--	--	16.38
	09/27/19	5.19	--	--	16.67
	10/28/19	5.62	--	--	16.24
	12/02/19	6.09	--	--	15.77
	12/30/19	4.05	--	--	17.81
	06/04/20	4.47	--	--	17.39
	09/21/20	6.10	--	--	15.76
	12/14/20	4.31	--	--	17.55
	03/22/21	3.34	--	--	18.52
	01/04/22	1.68	--	--	20.18
	03/21/22	2.98	--	--	18.88
	05/31/22	3.29	--	--	18.57

Please refer to notes at end of table.

Appendix D
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-21	01/31/19	6.24	--	--	15.68
(21.92)	02/28/19	3.76	--	--	18.16
	03/22/19	5.74	--	--	16.18
	04/29/19	5.94	--	--	15.98
	05/31/19	7.65	--	--	14.27
	06/28/19	8.62	--	--	13.30
	07/30/19	9.52	--	--	12.40
	08/29/19	10.17	--	--	11.75
	09/27/19	10.58	--	--	11.34
	10/28/19	11.00	--	--	10.92
	12/02/19	11.29	--	--	10.63
	12/30/19	9.94	--	--	11.98
	06/04/20	8.53	--	--	13.39
	09/21/20	10.45	--	--	11.47
	12/14/20	10.23	--	--	11.69
	03/22/21	5.32	--	--	16.60
	01/04/22	0.95	--	--	20.97
	03/22/22	3.55	--	--	18.37
	06/01/22	5.01	--	--	16.91
MW-22	01/31/19	6.74	--	--	15.12
(21.86)	02/28/19	3.48	--	--	18.38
	03/22/19	4.97	--	--	16.89
	04/29/19	5.10	--	--	16.76
	05/31/19	6.69	--	--	15.17
	06/28/19	7.96	--	--	13.90
	07/30/19	9.04	--	--	12.82
	08/29/19	9.78	--	--	12.08
	09/27/19	10.25	--	--	11.61
	10/28/19	10.66	--	--	11.20
	12/02/19	10.95	--	--	10.91
	12/30/19	10.14	--	--	11.72
	06/04/20	7.93	--	--	13.93
	09/21/20	10.03	--	--	11.83
	12/14/20	10.14	--	--	11.72
	03/22/21	4.05	--	--	17.81
	01/04/22	0.60	--	--	21.26
	03/22/22	2.68	--	--	19.18
	06/01/22	3.91	--	--	17.95

Please refer to notes at end of table.

Appendix D
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Fire Training Facilities
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-23	01/31/19	9.45	--	--	12.87
(22.32)	02/28/19	7.65	--	--	14.67
	03/22/19	9.61	--	--	12.71
	04/29/19	8.20	--	--	14.12
	05/31/19	8.99	--	--	13.33
	06/28/19	10.29	--	--	12.03
	07/30/19	11.86	--	--	10.46
	08/29/19	12.53	--	--	9.79
	09/27/19	12.72	--	--	9.60
	10/28/19	13.13	--	--	9.19
	12/02/19	12.85	--	--	9.47
	12/30/19	11.06	--	--	11.26
	06/04/20	8.68	--	--	13.64
	09/21/20	12.81	--	--	9.51
	12/14/20	11.13	--	--	11.19
	03/22/21	9.68	--	--	12.64
	01/04/22	5.45	--	--	16.87
	03/21/22	8.55	--	--	13.77
	06/01/22	7.95	--	--	14.37
MW-24	01/31/19	17.88	--	--	10.00
(27.88)	02/28/19	15.88	--	--	12.00
	03/22/19	16.33	--	--	11.55
	04/29/19	13.28	--	--	14.60
	05/31/19	Well not found			
	06/28/19	Well not found			
	07/30/19	Well not found			
	08/29/19	18.65	--	--	9.23
	09/27/19	19.41	--	--	8.47
	10/28/19	19.43	--	--	8.45
	12/02/19	18.70	--	--	9.18
	12/30/19	18.30	--	--	9.58
	06/04/20	12.57	--	--	15.31
	09/21/20	18.75	--	--	9.13
	12/14/20	17.88	--	--	10.00
	03/22/21	16.17	--	--	11.71
	01/03/22	13.14	--	--	14.74
	03/21/22	14.41	--	--	13.47
	05/31/22	12.23	--	--	15.65

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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-25	01/31/19	16.99	--	--	9.72
(26.71)	02/28/19	15.30	--	--	11.41
	03/22/19	15.73	--	--	10.98
	04/29/19	12.11	--	--	14.60
	05/31/19	Well not found			
	06/28/19	16.40	--	--	10.31
	07/30/19	17.38	--	--	9.33
	08/29/19	17.85	--	--	8.86
	09/27/19	18.54	--	--	8.17
	10/28/19	18.60	--	--	8.11
	12/02/19	17.82	--	--	8.89
	12/30/19	17.32	--	--	9.39
	06/04/20	11.04	--	--	15.67
	09/21/20	17.88	--	--	8.83
	12/14/20	17.00	--	--	9.71
	03/22/21	15.77	--	--	10.94
	01/03/22	11.55	--	--	15.16
	03/21/22	13.79	--	--	12.92
	05/31/22	11.32	--	--	15.39
MW-26	01/31/19	10.76	--	--	10.85
(21.61)	02/28/19	7.51	--	--	14.10
	03/22/19	8.50	--	--	13.11
	04/29/19	7.10	--	--	14.51
	05/31/19	Well not found			
	06/28/19	9.33	--	--	12.28
	07/30/19	10.70	--	--	10.91
	08/29/19	11.60	--	--	10.01
	09/27/19	12.10	--	--	9.51
	10/28/19	12.33	--	--	9.28
	12/02/19	12.01	--	--	9.60
	12/30/19	9.93	--	--	11.68
	06/04/20	7.68	--	--	13.93
	09/21/20	11.62	--	--	9.99
	12/14/20	10.94	--	--	10.67
	03/22/21	8.46	--	--	13.15
	01/03/22	5.72	--	--	15.89
	03/21/22	6.72	--	--	14.89
	05/31/22	6.48	--	--	15.13

Please refer to notes at end of table.

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Historical Groundwater Elevations
Fire Training Facilities
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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-27	01/31/19	8.70	--	--	16.67
(25.37)	02/28/19	7.07	--	--	18.30
	03/22/19	7.46	--	--	17.91
	04/29/19	7.42	--	--	17.95
	05/31/19	Well not found			
	06/28/19	8.79	--	--	16.58
	07/30/19	10.23	--	--	15.14
	08/29/19	11.27	--	--	14.10
	09/27/19	11.85	--	--	13.52
	10/28/19	12.22	--	--	13.15
	12/02/19	12.50	--	--	12.87
	12/30/19	11.62	--	--	13.75
	06/04/20	8.00	--	--	17.37
	09/21/20	11.62	--	--	13.75
	12/14/20	11.95	--	--	13.42
	03/22/21	6.90	--	--	18.47
	01/04/22	5.83	--	--	19.54
	03/21/22	6.62	--	--	18.75
	05/31/22	6.74	--	--	18.63
MW-28	01/31/19	4.61	--	--	15.50
(20.11)	02/28/19	4.95	--	--	15.16
	03/22/19	5.79	--	--	14.32
	04/29/19	4.19	--	--	15.92
	05/31/19	Well not found			
	06/28/19	7.08	--	--	13.03
	07/30/19	8.01	--	--	12.10
	08/29/19	8.45	--	--	11.66
	09/27/19	8.24	--	--	11.87
	10/28/19	8.20	--	--	11.91
	12/02/19	8.85	--	--	11.26
	12/30/19	5.94	--	--	14.17
	06/04/20	4.70	--	--	15.41
	09/21/20	7.95	--	--	12.16
	12/14/20	6.14	--	--	13.97
	03/22/21	5.25	--	--	14.86
	01/04/22	4.13	--	--	15.98
	03/21/22	4.94	--	--	15.17
	06/01/22	Well not found			

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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-29	01/31/19	4.31	--	--	16.13
(20.44)	02/28/19	3.83	--	--	16.61
	03/22/19	4.46	--	--	15.98
	04/29/19	4.52	--	--	15.92
	05/31/19	4.89	--	--	15.55
	06/28/19	5.11	--	--	15.33
	07/30/19	5.34	--	--	15.10
	08/29/19	5.54	--	--	14.90
	09/27/19	5.65	--	--	14.79
	10/28/19	5.80	--	--	14.64
	12/02/19	5.94	--	--	14.50
	12/30/19	5.05	--	--	15.39
	06/04/20	4.80	--	--	15.64
	09/21/20	5.59	--	--	14.85
	12/14/20	5.25	--	--	15.19
	03/22/21	4.12	--	--	16.32
	01/04/22	2.81	--	--	17.63
	03/22/22	3.91	--	--	16.53
	06/01/22	4.15	--	--	16.29
MW-30	01/31/19	15.62	--	--	9.79
(25.41)	02/28/19	14.99	--	--	10.42
	03/22/19	14.76	--	--	10.65
	04/29/19	10.88	--	--	14.53
	05/31/19	11.22	--	--	14.19
	06/28/19	14.29	--	--	11.12
	07/30/19	15.96	--	--	9.45
	08/29/19	16.18	--	--	9.23
	09/27/19	17.33	--	--	8.08
	10/28/19	17.34	--	--	8.07
	12/02/19	16.55	--	--	8.86
	12/30/19	16.01	--	--	9.40
	06/04/20	9.62	--	--	15.79
	09/21/20	16.31	--	--	9.10
	12/14/20	15.81	--	--	9.60
	03/22/21	14.19	--	--	11.22
	01/04/22	11.74	--	--	13.67
	03/21/22	13.17	--	--	12.24
	05/31/22	9.90	--	--	15.51

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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-31	01/31/19	10.20	--	--	13.44
(23.64)	02/28/19	8.73	--	--	14.91
	03/22/19	10.91	--	--	12.73
	04/29/19	8.22	--	--	15.42
	05/31/19	8.92	--	--	14.72
	06/28/19	12.00	--	--	11.64
	07/30/19	13.47	--	--	10.17
	08/29/19	14.26	--	--	9.38
	09/27/19	14.66	--	--	8.98
	10/28/19	14.92	--	--	8.72
	12/02/19	14.54	--	--	9.10
	12/30/19	12.87	--	--	10.77
	06/04/20	8.50	--	--	15.14
	09/21/20	14.18	--	--	9.46
	12/14/20	12.93	--	--	10.71
	03/22/21	9.23	--	--	14.41
	01/04/22	5.20	--	--	18.44
	03/21/22	7.15	--	--	16.49
	05/31/22	7.41	--	--	16.23
MW-32	01/31/19	15.80	--	--	9.82
(25.62)	02/28/19	15.44	--	--	10.18
	03/22/19	15.59	--	--	10.03
	04/29/19	11.45	--	--	14.17
	05/31/19	11.44	--	--	14.18
	06/28/19	15.42	--	--	10.20
	07/30/19	16.59	--	--	9.03
	08/29/19	16.98	--	--	8.64
	09/27/19	17.66	--	--	7.96
	10/28/19	17.66	--	--	7.96
	12/02/19	16.85	--	--	8.77
	12/30/19	16.21	--	--	9.41
	06/04/20	8.88	--	--	16.74
	09/21/20	16.87	--	--	8.75
	12/14/20	16.08	--	--	9.54
	03/22/21	15.71	--	--	9.91
	01/04/22	11.76	--	--	13.86
	03/21/22	14.24	--	--	11.38
	05/31/22	10.10	--	--	15.52

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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-33	01/31/19	15.11	--	--	10.23
(25.34)	02/28/19	14.51	--	--	10.83
	03/22/19	14.77	--	--	10.57
	04/29/19	10.70	--	--	14.64
	05/31/19	11.01	--	--	14.33
	06/28/19	14.41	--	--	10.93
	07/30/19	15.90	--	--	9.44
	08/29/19	16.40	--	--	8.94
	09/27/19	17.06	--	--	8.28
	10/28/19	17.12	--	--	8.22
	12/02/19	16.75	--	--	8.59
	12/30/19	15.78	--	--	9.56
	06/04/20	9.08	--	--	16.26
	09/21/20	16.30	--	--	9.04
	12/14/20	15.38	--	--	9.96
	03/22/21	14.62	--	--	10.72
	01/04/22	10.97	--	--	14.37
	03/21/22	13.14	--	--	12.20
	05/31/22	9.82	--	--	15.52
MW-34	06/04/20	8.67	--	--	16.84
(25.51)	09/21/20	16.75	--	--	8.76
	12/14/20	15.95	--	--	9.56
	03/22/21	15.71	--	--	9.80
	01/04/22	11.74	--	--	13.77
	03/21/22	14.38	--	--	11.13
	05/31/22	9.85	--	--	15.66
MW-35	06/04/20	8.00	--	--	17.42
(25.42)	09/21/20	16.80	--	--	8.62
	12/14/20	15.84	--	--	9.58
	03/22/21	16.24	--	--	9.18
	01/04/22	11.48	--	--	13.94
	03/21/22	14.48	--	--	10.94
	05/31/22	9.44	--	--	15.98
MW-36	01/03/22	10.81	--	--	13.98
(24.79)	03/21/22	13.98	--	--	10.81
	05/31/22	8.78	--	--	16.01
MW-37	01/03/22	12.83	--	--	17.96
(30.79)	03/21/22	13.10	--	--	17.69
	05/31/22	11.60	--	--	19.19

Please refer to notes at end of table.

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Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
DW-1	07/19/18	14.00	--	--	9.47
(23.47)	01/31/19	14.06	--	--	9.41
	03/22/19	12.73	--	--	10.74
	04/29/19	9.97	--	--	13.50
	05/31/19	9.45	--	--	14.02
	06/28/19	14.25	--	--	9.22
	07/30/19	14.87	--	--	8.60
	08/29/19	14.31	--	--	9.16
	09/27/19	15.89	--	--	7.58
	10/28/19	15.44	--	--	8.03
	12/02/19	14.60	--	--	8.87
	12/30/19	14.04	--	--	9.43
	06/04/20	6.77	--	--	16.70
	09/21/20	14.68	--	--	8.79
	12/14/20	13.77	--	--	9.70
	03/22/21	13.94	--	--	9.53
	01/04/22	9.82	--	--	13.65
	03/21/22	12.62	--	--	10.85
	05/31/22	7.75	--	--	15.72
DW-2	07/19/18	10.95	--	--	9.81
(20.76)	01/31/19	10.92	--	--	9.84
	03/22/19	9.81	--	--	10.95
	04/29/19	7.20	--	--	13.56
	05/31/19	6.86	--	--	13.90
	06/28/19	11.03	--	--	9.73
	07/30/19	12.01	--	--	8.75
	08/29/19	11.85	--	--	8.91
	09/27/19	12.85	--	--	7.91
	10/28/19	12.48	--	--	8.28
	12/02/19	11.64	--	--	9.12
	12/30/19	11.18	--	--	9.58
	06/04/20	4.37	--	--	16.39
	09/21/20	11.83	--	--	8.93
	12/14/20	10.70	--	--	10.06
	03/22/21	10.93	--	--	9.83
	01/03/22	7.79	--	--	12.97
	03/22/22	9.19	--	--	11.57
	05/31/22	5.65	--	--	15.11

Please refer to notes at end of table.

Appendix D
Historical Groundwater Elevations
Fire Training Facilities
Portland International Airport
Portland, Oregon

Monitoring Well (Elevation in Feet MSL)[1]	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
DW-3	07/19/18	10.71	--	--	9.70
(20.41)	01/31/19	10.61	--	--	9.80
	03/22/19	9.54	--	--	10.87
	04/29/19	6.96	--	--	13.45
	05/31/19	6.67	--	--	13.74
	06/28/19	10.74	--	--	9.67
	07/30/19	11.56	--	--	8.85
	08/29/19	11.50	--	--	8.91
	09/27/19	12.50	--	--	7.91
	10/28/19	12.08	--	--	8.33
	12/02/19	11.45	--	--	8.96
	12/30/19	10.89	--	--	9.52
	06/04/20	4.20	--	--	16.21
	09/21/20	11.52	--	--	8.89
	12/14/20	10.37	--	--	10.04
	03/22/21	10.70	--	--	9.71
	01/04/22	6.95	--	--	13.46
	03/22/22	8.96	--	--	11.45
	05/31/22	5.05	--	--	15.36
PDX QTA	07/18/18	16.90	--	--	--
(N/A)	06/10/20	10.48	--	--	--
	01/05/22	11.50	--	--	--
	03/23/22	13.00	--	--	--
	05/31/22	9.63	--	--	--

Notes:

1. feet MSL = Feet above mean sea level (NAVD88)
2. Casing elevations and groundwater data prior to December 1996 are from a Draft Quarterly Groundwater Monitoring Report dated December 12, 1996, and prepared by Geraghty & Miller.
3. Groundwater data prior to August 2005 were identified from previous report tables and could not be verified by field logs.
4. NM = Water level not measured.
5. -- = No product.
6. N/A = Well survey information is not available.
7. Elevation was corrected in wells with the presence of measurable separate-phase petroleum hydrocarbons using the following equation and assuming a specific gravity for gasoline product of 0.8 gram per cubic centimeter (Merck, 1989):

$$h_w = \frac{p_g\, h_g}{p_w}$$

water-level elevation = top of casing elevation + $[h_w - d_w]$

where:

h_w = depth to groundwater correction
d_w = depth to groundwater measuring point
p_g = density of separate-phase hydrocarbons
p_w = density of water
h_g = product thickness

Reference: Merck Index 1989, An Encyclopedia of Chemicals, Drugs and Biologicals, Merck and Company, Rahway, New Jersey.

Appendix E

Groundwater Sampling Logs

APEX
3015 SW 1st Ave
Portland, OR 97201
503-924-6357

PROJECT NUMBER 320001264-00
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 5/31/22

PROJECT PDX Fire Training Facilities
LOCATION PDX Airport, Portland, OR
CLIENT Port of Portland
PURPOSE OF OBSERVATIONS Groundwater monitoring
APEX REPRESENTATIVE Robert Schettler
APEX PROJECT MANAGER Kelsi Evans

ARRIVAL TIME 0830
DEPARTURE TIME 1820
CONTRACTOR

0830- Arrive on site
0837- Call PDX Air Duty Manager and let him know I am on site. Head to PFFC Jet fuel Storage area.
0850- Head to MW-27 to begin gaging wells.
0900- Note - gate access will be needed for sampling of MW-27 in the future. The only access is through a hole in the gate.
1041 - Note: MW-27 took over 30 min to find. The area is completely overgrown by H. blackberry and grass in excess of 5 feet. The well was completely covered.
1419 - Call Blake to coordinate access to QTA well.
1455 - Receive text from Blake - QTA well access scheduled for 1530.
1530- Arrive at QTA well for gaging.
1815- Complete gaging for day - several wells were very difficult to find due to overgrown vegetation as well as being covered by debris.
1818 - Call PDX Airfield Duty Manager to inform him of my departure.
1820 - Off Site

BY
APEX REPRESENTATIVE

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, send sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

APEX
3015 SW 1st Ave
Portland, OR 97201
503-924-6357

PROJECT NUMBER 320001264-00
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 6/1/22

PROJECT PDX Fire Training Facilities
LOCATION PDX Airport, Portland, OR
CLIENT Port of Portland
PURPOSE OF OBSERVATIONS Groundwater monitoring
APEX REPRESENTATIVE Robert Schettler
ARRIVAL TIME 0830
DEPARTURE TIME 1815
CONTRACTOR
APEX PROJECT MANAGER Kelsi Evans

0830 - Arrive on site
0835 - Call PDX Airfield Duty Manager - no answer. 3 calls before I get an answer. Contact at 0849 to inform of my arrival.
0850 - Request escort to MW-15. begin sampling / finish gaging after I arrive at location
1038 - Call Kelsi to inform that I was having difficulty finding wells in overgrown vegetation. Several wells have been obscured by 5-6' tall grass, H. blackberry, and tall thistles. The ground can not be seen through the dense vegetation.
1535 - Call Larry Curran for access to MW-16 and MW-14 in construction zone - No answer.
1550 - Locate Larry in person and get permission for entry.
1810 - Sampling / gaging complete for the day.
1813 - Call PDX Airfield Duty Manager to announce departure.
1815 - Off site.

BY
APEX REPRESENTATIVE

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, send sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

APEX
3015 SW 1st Ave
Portland, OR 97201
503-924-6357

PROJECT NUMBER 320001264-00
FIELD REPORT NUMBER
PAGE 1 OF 1
DATE 6/2/22

PROJECT PDX Fire Training Facilities
LOCATION PDX Airport, Portland, OR
CLIENT Port of Portland
PURPOSE OF OBSERVATIONS Groundwater monitoring
APEX REPRESENTATIVE Robert Schettler
ARRIVAL TIME 0925
DEPARTURE TIME 1632
CONTRACTOR
APEX PROJECT MANAGER Kelsi Evans

0925 - On site
0928 - C.A PDX Airfield Duty Manager to inform I'm on site.
0930 - Prep for sampling
1545 - Sampling complete
1554 - IDW disposal begins. I will send Kelsi an update with volumes of IDW created and space in drums.
1625 - IDW disposed of, Kelsi notified.
1630 - C.A PDX Airfield Duty Manager to announce departure
1632 - Off site.

BY
APEX REPRESENTATIVE

Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representative do not relieve any contractor from its obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods, operations, send sequence of construction. Unless signed by the Ash Creek Associates Project Manager, this report is preliminary. A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those included in a preliminary report.

WELL GAGING DATA SHEET

APEX

		Job Number:	
Client:	Port of Portland	Date:	5/31/2022
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Partly Cloudy	Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-1	1750		7.77				
MW-2	1745		9.67				
MW-3	1800		7.67				
MW-4 6/1	1425		7.80				
MW-5 6/1	1418		10.76				Under water in past
MW-6 6/1	1432		7.69				
MW-7 6/1	1440		9.36				
MW-8	1740		9.97				
MW-9 6/1	1449		5.30				
MW-10A 6/1	1455		5.58				
MW-11 6/1	1505	6.34	6.53				Product Product in past
MW-12 6/1	1404		7.37				
MW-13 6/1	1745		4.24				
MW-14 6/1	1735		3.32				
MW-15 6/1	0921		7.70				Escort
MW-16 6/1	1610		5.16				Escort, located between TJ & TL in manhole
MW-17 6/1	1637		5.49				Escort other side of fence -overgrown thistle
MW-18 6/1	1614		5.49				Escort
MW-19 6/1	1634		2.55				Escort
MW-20	1109		3.29				
MW-21 6/1	1132		5.01				possible escort
MW-22 6/1	1305		3.91				possible escort
MW-23 6/1	1316		7.95				
MW-24	1136		12.23				Overgrown
MW-25	1051		11.32				Over grown
MW-26	1625		6.48				Overgrown
MW-27	0940		6.74				Overgrown H.B.B/grass 5'
MW-28 6/1							over grown not found
MW-29 6/1	1528		4.15				
MW-30	1235		9.90				ant hill
MW-31	1800		7.41				
MW-32	1312		10.10				

WELL GAGING DATA SHEET

APEX

		Job Number:	
Client:	Port of Portland	Date:	5/31/2022
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:		Time In/Out:	

WATER LEVEL DATA

Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
MW-33	1410		9.82				
MW-34	1255		9.85				
MW-35	1325		9.44				
MW-36	1340		8.78				
MW-37	1352		11.60				
DW-1	1227		7.75				
DW-2	1201		5.65				
DW-3	1215		5.05				
QTA	1531		9.63				

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-15	Job Number:	
Client:	Port of Portland	Date:	8/1/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Partially cloudy	Time In/Out:	0921

WELL DATA

Well Depth:	18	Well Diameter:		Water Height	
Depth to Water:	7.73	Screened Interval:	8-18	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow			Pump Intake Depth:						Comments	
Sampling Method:	P. Pump			Tubing Type:		HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
0929			8.27		6.56	13.9	361.0	0.43	-94.5		C
0932			8.36		6.52	13.8	366.1	0.36	-124.8		C
0935			8.38		6.56	13.7	366.4	0.35	-140.8		C
0938			8.41		6.60	13.7	373.3	0.28	-156.6		C
0941			8.42		6.62	13.8	373.9	0.26	-165.2		C
0944			8.43		6.63	13.8	377.9	0.25	-171.1		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-15	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	0945	Final Depth to Water:	8.44	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Split Sample - some orange clumps that appeared to be biological
came up @ 0933

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-17	Job Number:	
Client:	Port of Portland	Date:	5/1/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Partially Cloudy	Time In/Out:	~~1459~~ 1459 / 1639

WELL DATA

Well Depth:	16	Well Diameter:		Water Height	
Depth to Water:	5.49	Screened Interval:	6-16	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:					Comments	
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1653			6.79		6.47	14.1	202.3	1.47	93.4		C
1656			7.57		6.38	14.0	200.8	1.37	85.5		C
1659			8.28		6.32	13.9	200.5	1.26	77.5		C
1702			8.30		6.39	14.0	201.2	1.14	69.1		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-17	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1705	Final Depth to Water:	8.32	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

EB-1 taken

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-19	Job Number:	
Client:	Port of Portland	Date:	6/1/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	P. Cloudy, Cloudy	Time In/Out:	1056

WELL DATA

Well Depth:	15	Well Diameter:		Water Height	
Depth to Water:	2.55	Screened Interval:	5-15	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:					Comments	
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1046			3.13		6.45	13.1	252.3	0.63	-34.1		C
1049			3.18		6.36	13.1	250.8	0.29	-66.9		C
1052			3.19		6.37	13.1	248.3	0.22	-78.3		C
1055			3.19		6.40	13.0	243.2	0.18	-86.8		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-19	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1058	Final Depth to Water:	3.19	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-21	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Overcast	Time In/Out:	1307

WELL DATA

Well Depth:	18	Well Diameter:		Water Height	
Depth to Water:	5.15	Screened Interval:	8-18	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow	Pump Intake Depth:	
Sampling Method:	P. Pump	Tubing Type:	HDPE

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1319			5.54		6.36	13.6	260.1	0.30	66.2		C
1322			5.59		6.31	12.9	260.5	0.21	49.8		C
1325			5.61		6.27	12.9	259.4	0.18	43.7		C
1328			5.63		6.30	13.0	259.9	0.16	34.5		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-21	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1330	Final Depth to Water:	5.65	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Dup-01

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-23	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Slightly cloudy	Time In/Out:	1220

WELL DATA

Well Depth:	19	Well Diameter:		Water Height	
Depth to Water:	7.96	Screened Interval:	9-19	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:						Comments
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1228			8.31		6.51	12.8	185.1	4.26	159.4		C
1231			8.34		6.38	12.5	185.0	4.06	149.4		C
1234			8.35		6.35	12.5	185.1	4.21	145.1		C
1237			8.36		6.36	12.5	184.8	4.22	163.2		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-23	Sampling Flow Rate	0.2	Analytical Laboratory:		
Sample Time:	1240	Final Depth to Water:	8.37	Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Dup -02 taken

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-24	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Overcast	Time In/Out:	0557

WELL DATA

Well Depth:	22	Well Diameter:	2-22ss	Water Height	
Depth to Water:	12.24	Screened Interval:	7-22	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:					Comments	
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1000			13.40		6.25	12.3	220.6	5.64	242.6		C
1003			13.71		6.24	12.3	221.0	5.43	209.0		C
1006			13.93		6.24	12.3	221.4	5.16	185.3		C
1009			14.18		6.26	12.3	221.8	4.67	172.7		C
1012			14.36		6.26	12.3	223.5	3.25	148.3		C
1015			14.49		6.27	12.4	227.3	2.05	112.3		C
1018			14.55		6.28	12.6	229.6	1.84	100.1		C
1021			14.61		6.28	12.6	231.3	1.56	92.4		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	~~1022~~ MW-24 DS	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1022	Final Depth to Water:	14.72	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-30	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Overcast	Time In/Out:	1057

WELL DATA

Well Depth:	22	Well Diameter:		Water Height	
Depth to Water:	9.54	Screened Interval:	12-22	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow			Pump Intake Depth:						Comments	
Sampling Method:	P. Pump			Tubing Type:		HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1103			9.65		6.34	13.3	229.6	1.82	137.7		C
1106			9.66		6.28	13.1	229.1	2.03	134.8		C
1109			9.66		6.30	13.2	228.2	1.97	129.8		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-30	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1112	Final Depth to Water:	9.66	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Split Sample
EB-2 taken

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-34	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:		Time In/Out:	1135

WELL DATA

Well Depth:	20	Well Diameter:		Water Height	
Depth to Water:	9.39	Screened Interval:	10-20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:					Comments	
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1146			9.40		6.24	14.3	227.1	5.11	149.7		C
1149			9.40		6.20	14.2	227.3	5.13	149.8		C
1152			9.40		6.21	14.1	226.5	4.73	147.7		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-34	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1155	Final Depth to Water:	9.40	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-35	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Overcast	Time In/Out:	1354

WELL DATA

Well Depth:	20	Well Diameter:		Water Height	
Depth to Water:	8.93	Screened Interval:	10-20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow				Pump Intake Depth:					Comments	
Sampling Method:	P. Pump				Tubing Type:		HDPE				
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1405			8.94		6.34	13.9	226.4	8.65	101.8		C
1408			8.94		6.30	13.9	227.1	8.03	102.5		C
1411			8.94		6.26	13.9	227.0	7.81	103.8		C
1414			8.94		6.32	13.9	227.9	7.78	102.7		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-35	Sampling Flow Rate	0.2	Analytical Laboratory:		
Sample Time:	1415	Final Depth to Water:	8.95	Did Well Dewater?		
# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-36	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Overcast	Time In/Out:	1430

WELL DATA

Well Depth:	20	Well Diameter:		Water Height	
Depth to Water:	8.29	Screened Interval:	10 - 20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow			Pump Intake Depth:						Comments	
Sampling Method:	P. Pump			Tubing Type:		HDPE					
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1441			8.29		6.32	13.5	244.4	6.23	102.4		C
1444			8.30		6.28	13.4	243.9	5.91	104.3		C
1447			8.30		6.28	13.5	244.1	6.01	106.0		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-36	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1450	Final Depth to Water:	8.30	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-37	Job Number:	
Client:	Port of Portland	Date:	6/2/22
Project:	PDX Fire Training Facilities	Sampler:	Robert Schettler
Weather:	Partially cloudy	Time In/Out:	1515

WELL DATA

Well Depth:	20	Well Diameter:		Water Height	
Depth to Water:	11.45	Screened Interval:	10-20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	Low Flow	Pump Intake Depth:		Comments	
Sampling Method:	P. Pump	Tubing Type:	HDPE		

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1528			12.33		6.36	14.3	288.9	4.75	102.7		C
1531			12.46		6.29	14.2	288.9	4.57	102.4		C
1534			12.53		6.28	14.0	288.3	4.50	102.2		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-37	Sampling Flow Rate	0.2	Analytical Laboratory:	
Sample Time:	1535	Final Depth to Water:	12.57	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Appendix F

Laboratory Quality Assurance/Quality Control Review and Analytical Laboratory Reports

Appendix F – Analytical Laboratory Reports and Quality Assurance / Quality Control Review

1.0 Introduction

This appendix documents the results of a quality assurance/quality control (QA/QC) review of the analytical data for water samples collected at the Portland International Airport Fire Training Facilities, Portland, Oregon. Samples from the Site were analyzed by Vista Analytical Laboratory (Vista) of El Dorado Hills, California. Copies of the analytical laboratory reports are included in this appendix and referenced in Table 1 as follows.

Table 1: Analytical Laboratory Reports

Report	Report Date	Sampling Event
2206034	June 27, 2022	Second Quarter 2022 Groundwater Sampling

2.0 Data Validation

The QA review outlines the applicable quality control criteria utilized during the data review process, as well as any deviations from those criteria. Examination and validation of the laboratory summary reports include:

- Analytical preparation and quantitation methods;
- Analytical method holding times;
- Field and sampling procedures;
- Sample management;
- Chain of custody handling;
- Detection and reporting limits;
- Analyte identification and quantitation;
- Method blank and equipment blank detections;
- On-going precision and recovery (OPR) to assess laboratory accuracy; and
- Field duplicates to assess sampling and laboratory precision.

The QA/QC review did not include a review of raw data.

This QA/QC review documents the relationship between analytical findings and data quality objectives based on precision and accuracy. It also summarizes possible error or bias and the effect on data quality and usability.

The laboratory quality control (QC) samples provided in data packages were used to evaluate laboratory contamination or background interferences, sample preparation efficiency, instrumentation performance and sample matrix interferences. The QC samples provided by the analytical laboratories include method blanks and ongoing precision and recovery (OPR). Surrogates and labeled standards were also analyzed to assess sample preparation efficiency and matrix interferences.

2.1 Data Qualifiers

Any data that is found to have possible bias or error is qualified and flagged. No data were flagged in this QA/QC review and data tables.

3.0 Analytical Methods

The samples were extracted and analyzed for a select list of per- and polyfluorinated alkyl substances (PFAS) using the PFAS Isotope Dilution Method (formerly Modified EPA Method 537) by Vista Analytical of El Dorado Hills, California. Vista is certified for the Isotope Dilution Method by the National Environmental Laboratory Accreditation Program (NELAP) (under Modified EPA Method 537). The analytical list included the following 24 PFAS as developed by EPA:

- Perfluorobutane sulfonic acid (PFBS);
- Perfluorobutanoic acid (PFBA);
- Perfluoropentane sulfonic acid (PFPeS);
- Perfluoroheptane sulfonic acid (PFHpS);
- Perfluoropentanoic acid (PFPeA);
- Perfluoroheptanoic acid (PFHpA);
- Perfluorohexane sulfonic acid (PFHxS);
- Perfluorohexanoic acid (PFHxA);
- Perfluorooctane sulfonic acid (PFOS);
- Perfluorooctanoic acid (PFOA);
- Perfluorotetradecanoic acid (PFTeDA);
- Perfluorononaoic acid (PFNA);
- Perfluorodecanoic acid (PFDA);
- Perfluorononane sulfonic acid (PFNS);
- Perfluorodecane sulfonic acid (PFDS);

- Perfluoroundecanoic acid (PFUdA);
- Perfluorododecanoic acid (PFDoA);
- Perfluorotridecanoic acid (PFTrDA);
- N-Ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA);
- N-Methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA);
- Perfluorooctane sulfonamide (PFOSA); and
- Fluorotelomer sulfonate (C4; 4:2 FTS; C6, 6:2 FTS; and C8, 8:2 FTS).

The results for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA include both linear and branched isomers. Results for all other PFAS include linear isomers only.

Analyses also included the following compounds:

- Hexafluoropropylene oxide dimer acid (HFPO-DA);
- Dodecafluoro-3H-4,8-dioxanonanoate (ADONA);
- 9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9C1-PF3ONS); and
- 11-Chloroeicosafluoro-3- oxaundecane-1-sulfonic acid (11C1-PF3OUdS).

4.0 Data Quality Assurance Review

The general QA objectives for this project were to develop and implement procedures for obtaining, evaluating, and confirming the usability of data of a specified quality. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

Reporting limits and analytical results were compared to cleanup and screening levels for each parameter in the matrix of concern. Precision, accuracy, completeness, and comparability parameters used to indicate data quality are defined below.

4.1 Field and Sampling Procedures

Apex collected groundwater samples from select overbank deposit (OD) wells and upper Columbia River Sand Aquifer (CRSA) wells in accordance with the low-flow sampling techniques. Groundwater samples were collected using dedicated PFAS-free tubing (e.g. high-density polyethylene [HDPE]) and a peristaltic pump). Groundwater was purged prior to sampling and groundwater field parameters were measured for pH,

oxidation-reduction potential (ORP), dissolved oxygen (DO), specific conductance, and temperature using a flow cell connected to the discharge tubing of the sample pump. Turbidity of the water was monitored visually with color and clarity being recorded on the sampling data sheet. Purging was considered complete when the water quality parameters stabilized to within ten (10) percent and the water was visually clear for three consecutive three-minute intervals.

To prevent cross-contamination between sampling events, clean, dedicated sampling equipment (e.g., groundwater sampling tubing) was used for each sampling event and was discarded after use. Cleaning of non-disposable items (i.e., field meter, telescoping swing sampler, and water level probe) consisted of washing in a detergent (Alconox®) solution and rinsing with tap water, followed by a PFAS-free water rinse.

Samples were collected in two 250 milliliter (mL) HDPE containers per sample location. Container lids were also constructed out of HDPE. All sample containers were provided by the laboratory and certified PFAS-free. Labels containing the sample identification, sample date, and sample time were affixed to containers. This same identification information was recorded on the chain of custody document. After collection, sample containers were placed within one Ziploc® bag per sample location and chilled on wet ice.

To avoid PFAS contamination, sampling personnel avoided using items containing polytetrafluoroethylene (PTFE, also known as Teflon), low-density polyethylene (LDPE) or polypropylene as well as other items that contain PFAS, such as aluminum foil, post-it notes, waterproof field books, markers, chemical ice packs (e.g., blue ice), certain decontamination soaps, and certain product packaging (e.g., such as that found on pre-wrapped foods and snacks). Similarly, many clothing items contain PFAS, such as those coated with Teflon or incorporating a Gore-Tex membrane. Clothing items were only worn if they had been washed at least six times. Field personnel avoided the use of cosmetics, moisturizers, and hand cream. Insect repellant and sunscreen were avoided and alternative skins barriers (e.g., long sleeve clothing, wide-brimmed hats, etc.) were used. PFAS contamination prevention protocols were reviewed with subcontractors and personnel daily during the field activities. Before any samples were collected, the sample handler washed their hands and wore nitrile gloves while collecting and sealing sample containers

4.2 Sample Management

Chain of custody documents were implemented for handling and managing samples. The chain of custody documents were appropriately filled out with sample identification, sample date, sample time, analysis to be performed, and were relinquished by the Apex Companies sampler and received by Vista. Samples were shipped to Vista via FedEx and were packed with wet ice in one ice chest. Upon receipt by the laboratory, sample temperature was recorded as 0.6 degrees Celsius (ºC). The laboratory noted that sample MW-19 contained a brown tint. Additionally, a note was received with the shipment generally correcting sample labels that had been mistakenly listed as collected in May (i.e., 5/1 & 5/2) instead of June (i.e., 6/1 & 6/2). There

were otherwise no significant discrepancies between sample container labels and information documented on the chain of custody.

Upon receipt, the laboratory noted particulate matter in groundwater collected from wells MW-19 (noted by lab as having a brown tint), MW-21, MW-24, and DUP-01 that required centrifuging prior to extraction. Centrifuging is a standard practice when extracting PFAS samples since particulates will clog the solid-phase extraction (SPE) cartridge. If SPE cartridges are clogged, it interferes with the extraction process and lowers the recoveries of the internal standards. The solids from the centrifuging are also rinsed in methanol, which is included in the extraction. The PFAS reported by the laboratory are almost exclusively found in the aqueous portion of the samples. The longer carbon chain PFAS will sorb more to the particulate; however, this will also result in lower recoveries for longer-chain internal standards.

4.3 Holding Times

The holding time is the minimum amount of time the sample can be stored before analytes start to degrade and are not representative of initial sampling concentrations. Based on time-based studies performed by the EPA, water samples collected in HDPE containers can be stored at ≤6ºC for 28 days before preparation and 30 days from preparation to analysis. The samples were extracted and analyzed within the recommended hold times.

4.4 Reporting Limits

Reporting limits are the lowest concentration an instrument is capable of accurately detecting an analyte. They are determined by the laboratory and are based on instrumentation capabilities, the matrix of field samples, sample preparation procedures and EPA suggested reporting limits. Reporting limits for PFAS were consistent with historical data and below promulgated screening values.

4.5 Analyte Identification and Quantitation

For analysis of PFAS, the recoveries of labeled standards were within control limits. Labeled standards are spiked directly into samples before preparation to determine matrix interferences and concentration of analytes. Recovery of these labeled standards automatically corrects sample concentration due to isotope dilution. Data quality is not considered affected if the signal-to-noise ratio is greater than 10:1, which was achieved. No data are flagged in the data table.

Ion ratios help to identify compounds in complex matrices. When ion ratios are exceeded, the positive identification for the analyte is not confirmed, and the analyte is only suspected as being present in the sample. Such results are 'Q' flagged in the table as analytes that are suspected to be present, but the identification could not be confirmed with ion ratios. Ion ratios for this data set were within control limits and no data were flagged.

4.6 Method Blanks

A method – or laboratory – blank is a quality control sample prepared by the laboratory from an analyte-free matrix and analyzed in an analytical batch along with environmental and other QC samples. It is used to assess laboratory contamination or background interferences. PFAS were not detected in analytical batch method blanks.

4.7 Equipment Blank

An equipment blank is a sample of analyte-free water poured over or through decontaminated field sampling equipment during a sampling event. Equipment blanks assess contamination from the total sampling, sample preparation, and measurement process when decontaminated sampling equipment is used to collect samples.

Two equipment blanks were analyzed and PFAS were not detected.

4.8 Accuracy

Accuracy compares the accepted reference concentration of an analyte to the concentration determined analytically. Accuracy is measured as a percent recovery. This recovery must be within a certain range – or control limit – for the data in an analytical batch to be considered acceptable. The analytical laboratory provides quality control samples and surrogates to help determine the accuracy and acceptability of the data reported. These quality control samples and surrogates are discussed below.

4.8.1 Ongoing Precision and Recovery (OPR)

Ongoing precision and recovery (OPR) quality control samples were analyzed in place of LCS/LCSDs for PFAS analysis. Laboratory control samples (LCS) and laboratory control duplicate samples (LCSD) were analyzed by the laboratory to assess the accuracy of the analytical methods. The LCS and LCSD are prepared from an analyte-free matrix that is spiked with known levels of compounds of concern. The concentrations are measured and compared to the known spiked levels, expressed as a percent recovery. This percent recovery must be within method or laboratory defined control limits for data to be considered acceptable. Analytes were recovered within OPR quality control limits.

4.9 Precision

Precision is measured by how close values of duplicate analyses are to each other. These duplicate analyses are prepared from separate aliquots of the same sample and are analyzed at the same (or similar) time. Precision in the field ensures that samples taken are representative of field concentrations; this is demonstrated by field duplicates. Analytical precision is the ability of the laboratory to reproduce results that

are similar to each other; this is measured through duplicate analysis of environmental and batch QC samples. Precision is estimated by the relative percent difference (RPD) between the original analysis and the duplicate analysis.

4.9.1 Field Duplicate

A field duplicate is a second field sample collected from a selected sample location. Field duplicate samples serve as a check on laboratory precision and sampling quality, as well as potential variability of the sample matrix. The field duplicate is analyzed and compared to the original sample to assess precision. This comparison can be expressed by the RPD between the original and duplicate samples. Field duplicate samples are controlled if the reported result is greater than five times the reporting limit.

Field duplicate samples were collected from wells MW-21 and MW-23. Except for PFHxS results for sample MW-23 duplicate (Dup-02), detected results were less than five times the reporting limit and their differences were within two times the reporting limit. The RPD for the PFHxS results was within acceptable control limits. No data were qualified.

5.0 Conclusion

In conclusion, the QA objectives have been met and the data are of sufficient quality for use in this project.

June 27, 2022

Vista Work Order No. 2206034

Ms. Kelsi Evans
Apex Companies, LLC
3015 SW First Avenue
Portland, OR 97201

Dear Ms. Evans,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on June 04, 2022 under your Project Name '320001264'.

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

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

Sincerely,

Jamie Fox
Laboratory Director

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

Vista Work Order No. 2206034
Case Narrative

Sample Condition on Receipt:

Fifteen groundwater samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The samples were received in good condition and within the recommended temperature requirements.

Analytical Notes:

PFAS Isotope Dilution Method

The following samples contained particulate and were centrifuged prior to extraction:

Laboratory ID	Sample Name
2206034-03	MW-19
2206034-04	MW-21
2206034-06	MW-24
2206034-14	Dup-01

The samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the hold times.

Quality Control

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

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2206034-01	MW-15	01-Jun-22 09:45	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-02	MW-17	01-Jun-22 17:05	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-03	MW-19	01-Jun-22 10:58	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-04	MW-21	02-Jun-22 13:30	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-05	MW-23	02-Jun-22 12:40	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-06	MW-24	02-Jun-22 10:22	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-07	MW-30	02-Jun-22 11:12	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-08	MW-34	02-Jun-22 11:55	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-09	MW-35	02-Jun-22 14:15	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-10	MW-36	02-Jun-22 14:50	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-11	MW-37	02-Jun-22 15:35	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-12	EB-1	01-Jun-22 17:05	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-13	EB-2	02-Jun-22 11:20	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-14	Dup-01	02-Jun-22 13:30	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2206034-15	Dup-02	02-Jun-22 12:40	04-Jun-22 09:47	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank — **PFAS Isotope Dilution Method**

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Aqueous

Laboratory Data

Lab Sample: B22F054-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFPeA	2706-90-3	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFBS	375-73-5	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
4:2 FTS	757124-72-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFHxA	307-24-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFPeS	2706-91-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
HFPO-DA	13252-13-6	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFHpA	375-85-9	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
ADONA	919005-14-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFHxS	355-46-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
6:2 FTS	27619-97-2	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFOA	335-67-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFHpS	375-92-8	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFNA	375-95-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFOSA	754-91-6	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFOS	1763-23-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
9Cl-PF3ONS	756426-58-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFDA	335-76-2	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
8:2 FTS	39108-34-4	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFNS	68259-12-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
MeFOSAA	2355-31-9	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
EtFOSAA	2991-50-6	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFUnA	2058-94-8	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFDS	335-77-3	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
11Cl-PF3OUdS	763051-92-9	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFDoA	307-55-1	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFTrDA	72629-94-8	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
PFTeDA	376-06-7	ND	2.00		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C3-PFPeA	IS	53.6	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C3-PFBS	IS	77.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-4:2 FTS	IS	81.5	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-PFHxA	IS	71.3	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C3-HFPO-DA	IS	75.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C4-PFHpA	IS	83.7	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C3-PFHxS	IS	79.6	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-6:2 FTS	IS	71.4	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1

Sample ID: Method Blank — **PFAS Isotope Dilution Method**

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Aqueous

Laboratory Data

Lab Sample: B22F054-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	75.0	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C5-PFNA	IS	62.2	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C8-PFOSA	IS	40.5	10 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C8-PFOS	IS	65.7	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-PFDA	IS	61.5	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-8:2 FTS	IS	61.1	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
d3-MeFOSAA	IS	61.0	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
d5-EtFOSAA	IS	56.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-PFUnA	IS	60.0	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-PFDoA	IS	52.6	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1
13C2-PFTeDA	IS	50.5	20 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 05:59	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: OPR

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Aqueous

Laboratory Data

Lab Sample: B22F054-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	41.2	40.0	103	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFPeA	2706-90-3	44.3	40.0	111	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFBS	375-73-5	42.1	40.0	105	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
4:2 FTS	757124-72-4	37.3	40.0	93.1	60 - 145		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFHxA	307-24-4	43.5	40.0	109	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFPeS	2706-91-4	33.6	40.0	84.0	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
HFPO-DA	13252-13-6	41.3	40.0	103	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFHpA	375-85-9	35.2	40.0	88.0	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
ADONA	919005-14-4	38.6	40.0	96.6	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFHxS	355-46-4	43.0	40.0	107	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
6:2 FTS	27619-97-2	41.8	40.0	105	60 - 140		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFOA	335-67-1	43.0	40.0	108	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFHpS	375-92-8	41.2	40.0	103	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFNA	375-95-1	45.4	40.0	113	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFOSA	754-91-6	42.1	40.0	105	65 - 140		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFOS	1763-23-1	40.1	40.0	100	65 - 140		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
9Cl-PF3ONS	756426-58-1	42.5	40.0	106	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFDA	335-76-2	41.3	40.0	103	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
8:2 FTS	39108-34-4	44.6	40.0	112	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFNS	68259-12-1	37.9	40.0	94.8	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
MeFOSAA	2355-31-9	42.9	40.0	107	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
EtFOSAA	2991-50-6	36.6	40.0	91.6	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFUnA	2058-94-8	41.0	40.0	102	65 - 140		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFDS	335-77-3	34.7	40.0	86.8	50 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
11Cl-PF3OUdS	763051-92-9	40.4	40.0	101	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFDoA	307-55-1	37.6	40.0	94.1	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFTrDA	72629-94-8	42.2	40.0	106	60 - 140		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
PFTeDA	376-06-7	42.5	40.0	106	65 - 135		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	116	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C3-PFPeA	IS	58.8	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C3-PFBS	IS	76.7	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-4:2 FTS	IS	92.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFHxA	IS	78.2	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C3-HFPO-DA	IS	84.3	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Aqueous

Laboratory Data

Lab Sample: B22F054-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C4-PFHpA	IS	95.1	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C3-PFHxS	IS	87.3	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-6:2 FTS	IS	72.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFOA	IS	81.1	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C5-PFNA	IS	65.9	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C8-PFOSA	IS	40.5	10 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C8-PFOS	IS	67.6	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFDA	IS	68.8	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-8:2 FTS	IS	64.0	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
d3-MeFOSAA	IS	63.8	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
d5-EtFOSAA	IS	65.1	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFUnA	IS	62.3	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFDoA	IS	53.6	25 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1
13C2-PFTeDA	IS	53.1	20 - 150		B22F054	21-Jun-22	0.250 L	23-Jun-22 06:09	1

Sample ID: MW-15

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 09:45

Laboratory Data

Lab Sample: 2206034-01
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	22.1	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFPeA	2706-90-3	87.1	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFBS	375-73-5	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
4:2 FTS	757124-72-4	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFHxA	307-24-4	59.5	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFPeS	2706-91-4	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
HFPO-DA	13252-13-6	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFHpA	375-85-9	39.4	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
ADONA	919005-14-4	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFHxS	355-46-4	11.6	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
6:2 FTS	27619-97-2	10.6	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFOA	335-67-1	49.3	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFHpS	375-92-8	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFNA	375-95-1	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFOSA	754-91-6	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFOS	1763-23-1	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
9Cl-PF3ONS	756426-58-1	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFDA	335-76-2	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
8:2 FTS	39108-34-4	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFNS	68259-12-1	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
MeFOSAA	2355-31-9	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
EtFOSAA	2991-50-6	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFUnA	2058-94-8	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFDS	335-77-3	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
11Cl-PF3OUdS	763051-92-9	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFDoA	307-55-1	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFTrDA	72629-94-8	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
PFTeDA	376-06-7	ND	2.03		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	112	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C3-PFPeA	IS	50.2	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C3-PFBS	IS	71.7	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-4:2 FTS	IS	94.2	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFHxA	IS	69.8	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C3-HFPO-DA	IS	73.6	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C4-PFHpA	IS	78.8	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C3-PFHxS	IS	84.0	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1

Sample ID: MW-15

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 09:45

Laboratory Data

Lab Sample: 2206034-01
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	71.3	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFOA	IS	74.0	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C5-PFNA	IS	63.5	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C8-PFOSA	IS	54.0	10 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C8-PFOS	IS	67.1	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFDA	IS	71.2	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-8:2 FTS	IS	73.1	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
d3-MeFOSAA	IS	68.0	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
d5-EtFOSAA	IS	71.8	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFUnA	IS	68.1	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFDoA	IS	69.2	25 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1
13C2-PFTeDA	IS	70.4	20 - 150		B22F054	21-Jun-22	0.247 L	23-Jun-22 06:19	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-17

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 17:05

Laboratory Data

Lab Sample: 2206034-02
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFPeA	2706-90-3	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFBS	375-73-5	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
4:2 FTS	757124-72-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFHxA	307-24-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFPeS	2706-91-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
HFPO-DA	13252-13-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFHpA	375-85-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
ADONA	919005-14-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFHxS	355-46-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
6:2 FTS	27619-97-2	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFOA	335-67-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFHpS	375-92-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFNA	375-95-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFOSA	754-91-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFOS	1763-23-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
9Cl-PF3ONS	756426-58-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFDA	335-76-2	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
8:2 FTS	39108-34-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFNS	68259-12-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
MeFOSAA	2355-31-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
EtFOSAA	2991-50-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFUnA	2058-94-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFDS	335-77-3	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
11Cl-PF3OUdS	763051-92-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFDoA	307-55-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFTrDA	72629-94-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
PFTeDA	376-06-7	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	110	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C3-PFPeA	IS	55.3	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C3-PFBS	IS	79.9	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-4:2 FTS	IS	95.6	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFHxA	IS	75.7	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C3-HFPO-DA	IS	78.4	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C4-PFHpA	IS	87.1	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C3-PFHxS	IS	90.6	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1

Sample ID: MW-17

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 17:05

Laboratory Data

Lab Sample: 2206034-02
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	76.5	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFOA	IS	74.7	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C5-PFNA	IS	63.4	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C8-PFOSA	IS	51.1	10 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C8-PFOS	IS	73.0	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFDA	IS	74.5	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-8:2 FTS	IS	54.2	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
d3-MeFOSAA	IS	71.9	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
d5-EtFOSAA	IS	70.8	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFUnA	IS	71.2	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFDoA	IS	70.4	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1
13C2-PFTeDA	IS	68.6	20 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 06:30	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-19

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 10:58

Laboratory Data

Lab Sample: 2206034-03
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.57	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFPeA	2706-90-3	2.16	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFBS	375-73-5	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
4:2 FTS	757124-72-4	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFHxA	307-24-4	2.06	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFPeS	2706-91-4	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
HFPO-DA	13252-13-6	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFHpA	375-85-9	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
ADONA	919005-14-4	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFHxS	355-46-4	7.87	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
6:2 FTS	27619-97-2	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFOA	335-67-1	3.77	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFHpS	375-92-8	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFNA	375-95-1	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFOSA	754-91-6	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFOS	1763-23-1	11.5	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
9Cl-PF3ONS	756426-58-1	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFDA	335-76-2	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
8:2 FTS	39108-34-4	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFNS	68259-12-1	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
MeFOSAA	2355-31-9	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
EtFOSAA	2991-50-6	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFUnA	2058-94-8	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFDS	335-77-3	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
11Cl-PF3OUdS	763051-92-9	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFDoA	307-55-1	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFTrDA	72629-94-8	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
PFTeDA	376-06-7	ND	1.97		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C3-PFPeA	IS	50.5	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C3-PFBS	IS	65.0	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-4:2 FTS	IS	95.2	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFHxA	IS	69.8	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C3-HFPO-DA	IS	73.0	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C4-PFHpA	IS	81.9	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C3-PFHxS	IS	84.0	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1

Sample ID: MW-19

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 10:58

Laboratory Data

Lab Sample: 2206034-03
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	71.3	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFOA	IS	71.0	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C5-PFNA	IS	59.0	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C8-PFOSA	IS	50.5	10 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C8-PFOS	IS	68.7	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFDA	IS	65.6	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-8:2 FTS	IS	61.4	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
d3-MeFOSAA	IS	70.9	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
d5-EtFOSAA	IS	65.4	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFUnA	IS	64.4	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFDoA	IS	58.2	25 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1
13C2-PFTeDA	IS	44.4	20 - 150		B22F054	21-Jun-22	0.254 L	23-Jun-22 06:40	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-21

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 13:30

Laboratory Data

Lab Sample: 2206034-04
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFPeA	2706-90-3	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFBS	375-73-5	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
4:2 FTS	757124-72-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFHxA	307-24-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFPeS	2706-91-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
HFPO-DA	13252-13-6	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFHpA	375-85-9	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
ADONA	919005-14-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFHxS	355-46-4	5.24	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
6:2 FTS	27619-97-2	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFOA	335-67-1	2.08	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFHpS	375-92-8	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFNA	375-95-1	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFOSA	754-91-6	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFOS	1763-23-1	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
9Cl-PF3ONS	756426-58-1	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFDA	335-76-2	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
8:2 FTS	39108-34-4	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFNS	68259-12-1	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
MeFOSAA	2355-31-9	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
EtFOSAA	2991-50-6	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFUnA	2058-94-8	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFDS	335-77-3	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
11Cl-PF3OUdS	763051-92-9	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFDoA	307-55-1	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFTrDA	72629-94-8	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
PFTeDA	376-06-7	ND	2.03		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C3-PFPeA	IS	48.3	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C3-PFBS	IS	63.2	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-4:2 FTS	IS	89.3	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFHxA	IS	68.1	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C3-HFPO-DA	IS	72.9	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C4-PFHpA	IS	77.8	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C3-PFHxS	IS	79.4	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1

Sample ID: MW-21

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 13:30

Laboratory Data

Lab Sample: 2206034-04
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	70.2	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFOA	IS	71.2	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C5-PFNA	IS	54.8	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C8-PFOSA	IS	45.6	10 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C8-PFOS	IS	65.8	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFDA	IS	62.8	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-8:2 FTS	IS	65.3	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
d3-MeFOSAA	IS	67.3	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
d5-EtFOSAA	IS	61.5	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFUnA	IS	66.2	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFDoA	IS	64.4	25 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1
13C2-PFTeDA	IS	56.0	20 - 150		B22F054	21-Jun-22	0.246 L	23-Jun-22 06:51	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-23

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 12:40

Laboratory Data

Lab Sample: 2206034-05
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFPeA	2706-90-3	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFBS	375-73-5	3.91	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
4:2 FTS	757124-72-4	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFHxA	307-24-4	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFPeS	2706-91-4	3.05	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
HFPO-DA	13252-13-6	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFHpA	375-85-9	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
ADONA	919005-14-4	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFHxS	355-46-4	17.7	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
6:2 FTS	27619-97-2	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFOA	335-67-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFHpS	375-92-8	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFNA	375-95-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFOSA	754-91-6	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFOS	1763-23-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
9Cl-PF3ONS	756426-58-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFDA	335-76-2	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
8:2 FTS	39108-34-4	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFNS	68259-12-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
MeFOSAA	2355-31-9	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
EtFOSAA	2991-50-6	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFUnA	2058-94-8	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFDS	335-77-3	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
11Cl-PF3OUdS	763051-92-9	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFDoA	307-55-1	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFTrDA	72629-94-8	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
PFTeDA	376-06-7	ND	1.93		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	108	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C3-PFPeA	IS	56.1	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C3-PFBS	IS	76.7	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-4:2 FTS	IS	107	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFHxA	IS	74.2	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C3-HFPO-DA	IS	76.6	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C4-PFHpA	IS	84.8	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C3-PFHxS	IS	91.2	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1

Sample ID: MW-23

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 12:40

Laboratory Data

Lab Sample: 2206034-05
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	75.3	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFOA	IS	78.1	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C5-PFNA	IS	67.1	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C8-PFOSA	IS	48.6	10 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C8-PFOS	IS	75.0	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFDA	IS	68.9	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-8:2 FTS	IS	70.7	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
d3-MeFOSAA	IS	76.3	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
d5-EtFOSAA	IS	75.6	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFUnA	IS	68.1	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFDoA	IS	71.0	25 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1
13C2-PFTeDA	IS	69.2	20 - 150		B22F054	21-Jun-22	0.259 L	23-Jun-22 07:01	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-24

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 10:22

Laboratory Data

Lab Sample: 2206034-06
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFPeA	2706-90-3	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFBS	375-73-5	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
4:2 FTS	757124-72-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFHxA	307-24-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFPeS	2706-91-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
HFPO-DA	13252-13-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFHpA	375-85-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
ADONA	919005-14-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFHxS	355-46-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
6:2 FTS	27619-97-2	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFOA	335-67-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFHpS	375-92-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFNA	375-95-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFOSA	754-91-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFOS	1763-23-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
9Cl-PF3ONS	756426-58-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFDA	335-76-2	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
8:2 FTS	39108-34-4	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFNS	68259-12-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
MeFOSAA	2355-31-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
EtFOSAA	2991-50-6	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFUnA	2058-94-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFDS	335-77-3	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
11Cl-PF3OUdS	763051-92-9	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFDoA	307-55-1	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFTrDA	72629-94-8	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
PFTeDA	376-06-7	ND	1.94		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	102	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C3-PFPeA	IS	51.5	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C3-PFBS	IS	68.6	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-4:2 FTS	IS	98.8	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFHxA	IS	71.6	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C3-HFPO-DA	IS	78.9	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C4-PFHpA	IS	86.7	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C3-PFHxS	IS	85.1	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1

Sample ID: MW-24

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 10:22

Laboratory Data

Lab Sample: 2206034-06
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	69.1	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFOA	IS	73.9	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C5-PFNA	IS	62.6	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C8-PFOSA	IS	50.1	10 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C8-PFOS	IS	64.5	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFDA	IS	64.8	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-8:2 FTS	IS	69.9	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
d3-MeFOSAA	IS	69.2	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
d5-EtFOSAA	IS	69.0	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFUnA	IS	64.8	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFDoA	IS	64.0	25 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1
13C2-PFTeDA	IS	59.9	20 - 150		B22F054	21-Jun-22	0.258 L	23-Jun-22 07:11	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-30

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:12

Laboratory Data

Lab Sample: 2206034-07
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFPeA	2706-90-3	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFBS	375-73-5	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
4:2 FTS	757124-72-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFHxA	307-24-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFPeS	2706-91-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
HFPO-DA	13252-13-6	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFHpA	375-85-9	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
ADONA	919005-14-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFHxS	355-46-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
6:2 FTS	27619-97-2	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFOA	335-67-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFHpS	375-92-8	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFNA	375-95-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFOSA	754-91-6	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFOS	1763-23-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
9Cl-PF3ONS	756426-58-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFDA	335-76-2	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
8:2 FTS	39108-34-4	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFNS	68259-12-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
MeFOSAA	2355-31-9	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
EtFOSAA	2991-50-6	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFUnA	2058-94-8	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFDS	335-77-3	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
11Cl-PF3OUdS	763051-92-9	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFDoA	307-55-1	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFTrDA	72629-94-8	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
PFTeDA	376-06-7	ND	1.91		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	108	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C3-PFPeA	IS	58.8	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C3-PFBS	IS	75.3	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-4:2 FTS	IS	96.9	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFHxA	IS	76.0	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C3-HFPO-DA	IS	79.6	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C4-PFHpA	IS	95.9	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C3-PFHxS	IS	94.3	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1

Sample ID: MW-30

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:12

Laboratory Data

Lab Sample: 2206034-07
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	82.6	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFOA	IS	79.8	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C5-PFNA	IS	64.6	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C8-PFOSA	IS	56.4	10 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C8-PFOS	IS	78.7	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFDA	IS	74.9	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-8:2 FTS	IS	72.0	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
d3-MeFOSAA	IS	73.9	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
d5-EtFOSAA	IS	76.2	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFUnA	IS	78.9	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFDoA	IS	76.8	25 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1
13C2-PFTeDA	IS	75.9	20 - 150		B22F054	21-Jun-22	0.262 L	23-Jun-22 07:53	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-34

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:55

Laboratory Data

Lab Sample: 2206034-08
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFPeA	2706-90-3	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFBS	375-73-5	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
4:2 FTS	757124-72-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFHxA	307-24-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFPeS	2706-91-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
HFPO-DA	13252-13-6	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFHpA	375-85-9	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
ADONA	919005-14-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFHxS	355-46-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
6:2 FTS	27619-97-2	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFOA	335-67-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFHpS	375-92-8	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFNA	375-95-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFOSA	754-91-6	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFOS	1763-23-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
9Cl-PF3ONS	756426-58-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFDA	335-76-2	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
8:2 FTS	39108-34-4	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFNS	68259-12-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
MeFOSAA	2355-31-9	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
EtFOSAA	2991-50-6	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFUnA	2058-94-8	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFDS	335-77-3	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
11Cl-PF3OUdS	763051-92-9	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFDoA	307-55-1	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFTrDA	72629-94-8	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
PFTeDA	376-06-7	ND	1.98		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	100	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C3-PFPeA	IS	57.6	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C3-PFBS	IS	73.3	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-4:2 FTS	IS	93.7	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFHxA	IS	74.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C3-HFPO-DA	IS	77.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C4-PFHpA	IS	88.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C3-PFHxS	IS	88.7	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1

Sample ID: MW-34

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:55

Laboratory Data

Lab Sample: 2206034-08
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	68.8	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFOA	IS	76.0	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C5-PFNA	IS	59.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C8-PFOSA	IS	51.9	10 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C8-PFOS	IS	72.2	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFDA	IS	68.3	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-8:2 FTS	IS	72.0	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
d3-MeFOSAA	IS	72.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
d5-EtFOSAA	IS	71.6	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFUnA	IS	73.4	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFDoA	IS	68.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1
13C2-PFTeDA	IS	67.9	20 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:03	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-35

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 14:15

Laboratory Data

Lab Sample: 2206034-09
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.17	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFPeA	2706-90-3	5.97	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFBS	375-73-5	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
4:2 FTS	757124-72-4	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFHxA	307-24-4	4.50	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFPeS	2706-91-4	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
HFPO-DA	13252-13-6	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFHpA	375-85-9	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
ADONA	919005-14-4	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFHxS	355-46-4	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
6:2 FTS	27619-97-2	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFOA	335-67-1	7.58	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFHpS	375-92-8	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFNA	375-95-1	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFOSA	754-91-6	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFOS	1763-23-1	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
9Cl-PF3ONS	756426-58-1	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFDA	335-76-2	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
8:2 FTS	39108-34-4	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFNS	68259-12-1	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
MeFOSAA	2355-31-9	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
EtFOSAA	2991-50-6	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFUnA	2058-94-8	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFDS	335-77-3	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
11Cl-PF3OUdS	763051-92-9	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFDoA	307-55-1	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFTrDA	72629-94-8	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
PFTeDA	376-06-7	ND	1.99		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C3-PFPeA	IS	55.7	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C3-PFBS	IS	71.1	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-4:2 FTS	IS	92.0	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFHxA	IS	73.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C3-HFPO-DA	IS	75.1	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C4-PFHpA	IS	87.6	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C3-PFHxS	IS	88.7	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1

Sample ID: MW-35

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 14:15

Laboratory Data

Lab Sample: 2206034-09
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	59.6	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFOA	IS	74.1	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C5-PFNA	IS	63.0	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C8-PFOSA	IS	53.4	10 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C8-PFOS	IS	71.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFDA	IS	75.6	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-8:2 FTS	IS	68.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
d3-MeFOSAA	IS	75.2	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
d5-EtFOSAA	IS	69.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFUnA	IS	68.5	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFDoA	IS	69.9	25 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1
13C2-PFTeDA	IS	63.4	20 - 150		B22F054	21-Jun-22	0.252 L	23-Jun-22 08:14	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-36

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 14:50

Laboratory Data

Lab Sample: 2206034-10
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFPeA	2706-90-3	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFBS	375-73-5	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
4:2 FTS	757124-72-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFHxA	307-24-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFPeS	2706-91-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
HFPO-DA	13252-13-6	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFHpA	375-85-9	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
ADONA	919005-14-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFHxS	355-46-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
6:2 FTS	27619-97-2	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFOA	335-67-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFHpS	375-92-8	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFNA	375-95-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFOSA	754-91-6	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFOS	1763-23-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
9Cl-PF3ONS	756426-58-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFDA	335-76-2	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
8:2 FTS	39108-34-4	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFNS	68259-12-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
MeFOSAA	2355-31-9	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
EtFOSAA	2991-50-6	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFUnA	2058-94-8	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFDS	335-77-3	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
11Cl-PF3OUdS	763051-92-9	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFDoA	307-55-1	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFTrDA	72629-94-8	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
PFTeDA	376-06-7	ND	1.93		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	101	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C3-PFPeA	IS	57.0	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C3-PFBS	IS	78.2	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-4:2 FTS	IS	85.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFHxA	IS	72.0	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C3-HFPO-DA	IS	73.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C4-PFHpA	IS	84.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C3-PFHxS	IS	87.8	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1

Sample ID: MW-36

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 14:50

Laboratory Data

Lab Sample: 2206034-10
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	63.6	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFOA	IS	74.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C5-PFNA	IS	62.5	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C8-PFOSA	IS	47.0	10 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C8-PFOS	IS	69.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFDA	IS	68.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-8:2 FTS	IS	66.1	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
d3-MeFOSAA	IS	74.8	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
d5-EtFOSAA	IS	73.9	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFUnA	IS	70.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFDoA	IS	70.4	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1
13C2-PFTeDA	IS	68.4	20 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:24	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: MW-37

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 15:35

Laboratory Data

Lab Sample: 2206034-11
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFPeA	2706-90-3	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFBS	375-73-5	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
4:2 FTS	757124-72-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFHxA	307-24-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFPeS	2706-91-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
HFPO-DA	13252-13-6	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFHpA	375-85-9	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
ADONA	919005-14-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFHxS	355-46-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
6:2 FTS	27619-97-2	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFOA	335-67-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFHpS	375-92-8	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFNA	375-95-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFOSA	754-91-6	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFOS	1763-23-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
9Cl-PF3ONS	756426-58-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFDA	335-76-2	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
8:2 FTS	39108-34-4	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFNS	68259-12-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
MeFOSAA	2355-31-9	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
EtFOSAA	2991-50-6	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFUnA	2058-94-8	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFDS	335-77-3	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
11Cl-PF3OUdS	763051-92-9	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFDoA	307-55-1	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFTrDA	72629-94-8	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
PFTeDA	376-06-7	ND	1.92		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	107	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C3-PFPeA	IS	53.8	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C3-PFBS	IS	75.4	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-4:2 FTS	IS	90.9	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFHxA	IS	72.1	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C3-HFPO-DA	IS	77.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C4-PFHpA	IS	82.2	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C3-PFHxS	IS	85.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1

Sample ID: MW-37

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 15:35

Laboratory Data

Lab Sample: 2206034-11
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	73.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFOA	IS	78.0	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C5-PFNA	IS	62.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C8-PFOSA	IS	48.4	10 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C8-PFOS	IS	71.0	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFDA	IS	67.7	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-8:2 FTS	IS	62.8	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
d3-MeFOSAA	IS	71.6	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
d5-EtFOSAA	IS	64.4	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFUnA	IS	70.3	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFDoA	IS	65.2	25 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1
13C2-PFTeDA	IS	65.6	20 - 150		B22F054	21-Jun-22	0.260 L	23-Jun-22 08:34	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: EB-1

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 17:05

Laboratory Data

Lab Sample: 2206034-12
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFPeA	2706-90-3	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFBS	375-73-5	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
4:2 FTS	757124-72-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFHxA	307-24-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFPeS	2706-91-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
HFPO-DA	13252-13-6	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFHpA	375-85-9	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
ADONA	919005-14-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFHxS	355-46-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
6:2 FTS	27619-97-2	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFOA	335-67-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFHpS	375-92-8	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFNA	375-95-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFOSA	754-91-6	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFOS	1763-23-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
9Cl-PF3ONS	756426-58-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFDA	335-76-2	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
8:2 FTS	39108-34-4	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFNS	68259-12-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
MeFOSAA	2355-31-9	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
EtFOSAA	2991-50-6	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFUnA	2058-94-8	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFDS	335-77-3	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
11Cl-PF3OUdS	763051-92-9	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFDoA	307-55-1	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFTrDA	72629-94-8	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
PFTeDA	376-06-7	ND	1.91		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	100	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C3-PFPeA	IS	59.1	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C3-PFBS	IS	76.6	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-4:2 FTS	IS	72.7	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFHxA	IS	76.3	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C3-HFPO-DA	IS	82.3	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C4-PFHpA	IS	86.8	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C3-PFHxS	IS	87.9	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1

Sample ID: EB-1

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 01-Jun-22 17:05

Laboratory Data

Lab Sample: 2206034-12
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	77.4	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFOA	IS	79.3	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C5-PFNA	IS	66.8	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C8-PFOSA	IS	43.4	10 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C8-PFOS	IS	70.2	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFDA	IS	69.0	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-8:2 FTS	IS	69.8	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
d3-MeFOSAA	IS	69.9	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
d5-EtFOSAA	IS	62.7	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFUnA	IS	71.2	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFDoA	IS	65.2	25 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1
13C2-PFTeDA	IS	63.4	20 - 150		B22F054	21-Jun-22	0.261 L	23-Jun-22 08:45	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: EB-2

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:20

Laboratory Data

Lab Sample: 2206034-13
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFPeA	2706-90-3	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFBS	375-73-5	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
4:2 FTS	757124-72-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFHxA	307-24-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFPeS	2706-91-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
HFPO-DA	13252-13-6	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFHpA	375-85-9	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
ADONA	919005-14-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFHxS	355-46-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
6:2 FTS	27619-97-2	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFOA	335-67-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFHpS	375-92-8	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFNA	375-95-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFOSA	754-91-6	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFOS	1763-23-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
9Cl-PF3ONS	756426-58-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFDA	335-76-2	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
8:2 FTS	39108-34-4	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFNS	68259-12-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
MeFOSAA	2355-31-9	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
EtFOSAA	2991-50-6	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFUnA	2058-94-8	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFDS	335-77-3	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
11Cl-PF3OUdS	763051-92-9	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFDoA	307-55-1	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFTrDA	72629-94-8	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
PFTeDA	376-06-7	ND	1.95		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.3	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C3-PFPeA	IS	59.8	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C3-PFBS	IS	78.8	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-4:2 FTS	IS	103	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFHxA	IS	77.4	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C3-HFPO-DA	IS	81.3	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C4-PFHpA	IS	85.7	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C3-PFHxS	IS	89.0	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1

Sample ID: EB-2

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 11:20

Laboratory Data

Lab Sample: 2206034-13
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	70.0	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFOA	IS	76.1	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C5-PFNA	IS	69.0	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C8-PFOSA	IS	40.2	10 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C8-PFOS	IS	69.9	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFDA	IS	69.2	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-8:2 FTS	IS	69.9	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
d3-MeFOSAA	IS	66.7	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
d5-EtFOSAA	IS	62.8	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFUnA	IS	67.0	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFDoA	IS	64.1	25 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1
13C2-PFTeDA	IS	58.1	20 - 150		B22F054	21-Jun-22	0.256 L	23-Jun-22 08:55	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: Dup-01

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 13:30

Laboratory Data

Lab Sample: 2206034-14
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFPeA	2706-90-3	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFBS	375-73-5	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
4:2 FTS	757124-72-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFHxA	307-24-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFPeS	2706-91-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
HFPO-DA	13252-13-6	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFHpA	375-85-9	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
ADONA	919005-14-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFHxS	355-46-4	5.04	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
6:2 FTS	27619-97-2	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFOA	335-67-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFHpS	375-92-8	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFNA	375-95-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFOSA	754-91-6	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFOS	1763-23-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
9Cl-PF3ONS	756426-58-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFDA	335-76-2	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
8:2 FTS	39108-34-4	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFNS	68259-12-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
MeFOSAA	2355-31-9	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
EtFOSAA	2991-50-6	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFUnA	2058-94-8	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFDS	335-77-3	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
11Cl-PF3OUdS	763051-92-9	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFDoA	307-55-1	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFTrDA	72629-94-8	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
PFTeDA	376-06-7	ND	2.06		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C3-PFPeA	IS	49.8	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C3-PFBS	IS	63.9	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-4:2 FTS	IS	81.4	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFHxA	IS	66.1	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C3-HFPO-DA	IS	72.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C4-PFHpA	IS	77.9	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C3-PFHxS	IS	73.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1

Sample ID: Dup-01

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 13:30

Laboratory Data

Lab Sample: 2206034-14
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	65.0	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFOA	IS	72.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C5-PFNA	IS	54.0	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C8-PFOSA	IS	45.6	10 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C8-PFOS	IS	64.7	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFDA	IS	61.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-8:2 FTS	IS	63.1	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
d3-MeFOSAA	IS	62.6	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
d5-EtFOSAA	IS	63.7	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFUnA	IS	61.0	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFDoA	IS	61.1	25 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1
13C2-PFTeDA	IS	51.4	20 - 150		B22F054	21-Jun-22	0.243 L	23-Jun-22 09:06	1

RL - Reporting limit

Results reported to RL.

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

Sample ID: Dup-02

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 12:40

Laboratory Data

Lab Sample: 2206034-15
Date Received: 04-Jun-22 09:47
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFPeA	2706-90-3	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFBS	375-73-5	4.06	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
4:2 FTS	757124-72-4	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFHxA	307-24-4	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFPeS	2706-91-4	2.92	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
HFPO-DA	13252-13-6	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFHpA	375-85-9	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
ADONA	919005-14-4	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFHxS	355-46-4	16.3	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
6:2 FTS	27619-97-2	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFOA	335-67-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFHpS	375-92-8	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFNA	375-95-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFOSA	754-91-6	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFOS	1763-23-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
9Cl-PF3ONS	756426-58-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFDA	335-76-2	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
8:2 FTS	39108-34-4	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFNS	68259-12-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
MeFOSAA	2355-31-9	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
EtFOSAA	2991-50-6	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFUnA	2058-94-8	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFDS	335-77-3	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
11Cl-PF3OUdS	763051-92-9	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFDoA	307-55-1	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFTrDA	72629-94-8	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
PFTeDA	376-06-7	ND	1.99		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C3-PFPeA	IS	60.4	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C3-PFBS	IS	80.5	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-4:2 FTS	IS	97.4	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFHxA	IS	77.2	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C3-HFPO-DA	IS	82.6	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C4-PFHpA	IS	87.3	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C3-PFHxS	IS	94.3	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1

Sample ID: Dup-02

PFAS Isotope Dilution Method

Client Data

Name: Apex Companies, LLC
Project: 320001264
Matrix: Groundwater
Date Collected: 02-Jun-22 12:40

Laboratory Data

Lab Sample: 2206034-15
Date Received: 04-Jun-22 09:47
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	75.5	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFOA	IS	79.8	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C5-PFNA	IS	64.4	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C8-PFOSA	IS	52.4	10 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C8-PFOS	IS	71.8	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFDA	IS	73.2	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-8:2 FTS	IS	57.7	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
d3-MeFOSAA	IS	72.5	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
d5-EtFOSAA	IS	70.6	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFUnA	IS	70.0	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFDoA	IS	70.9	25 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1
13C2-PFTeDA	IS	71.5	20 - 150		B22F054	21-Jun-22	0.251 L	23-Jun-22 09:16	1

RL - Reporting limit

Results reported to RL.

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

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Massachusetts Department of Environmental Protection	M-CA413
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Pennsylvania Department of Environmental Protection	018
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p- Dioxins & Polychlorinated Dibenzofurans	EPA 23
Polychlorinated Dibenzodioxins in Ambient Air by GC/HRMS	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	PFAS Isotope Dilution
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613/1613B
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	PFAS Isotope Dilution
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537.1
Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry	EPA 533
Perfluorooctanesulonate (PFOS) and Perfluorooctanoate (PFOA) - Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	PFAS Isotope Dilution
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	PFAS Isotope Dilution
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2206034 Temp: 0.6 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☒ No ☐

Project ID: 320001264 PO#: _____ Sampler: Robert Schettler (name)

TAT (check one): Standard: ☒ 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify: _____

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Robert Schettler	6/3/22	1300	Sarah Hegenbart	06/04/22	0949
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date 2022	Time	Location/ Sample Description	Container(s) Quantity	Type	Matrix	PFAS by Isotope Dilution: PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List: 14 or 18 (Circle One)	EPA Draft List of 24	OTHER: Please attach analyte list see coming	EPA Method 537 (DW only): PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List of 14	537.1 List of 18	Comments
MW-15	6/1	0945		2	P	GW				X						GenX, ADONA, F53-B
MW-17	6/1	1705		2	P	GW				X						
MW-19	6/1	1059		2	P	GW				X						
MW-21	6/2	1330		2	P	GW				X						
MW-23	6/2	1240		2	P	GW				X						
MW-24	6/2	1022		2	P	GW				X						
MW-30	6/2	1112		2	P	GW				X						
MW-34	6/2	1155		2	P	GW				X						
MW-35	6/2	1415		2	P	GW				X						
MW-36	6/2	1450		2	P	GW				X						

Special Instructions/Comment
Invoice to Kelsi Evans, Apex Companies
3015 SW 1st Ave Portland, OR 97201 503-593-8881
Email results: Kelsi.evans@apexcos.com

SEND DOCUMENTATION AND RESULTS TO:
Name: Kelsi Evans
Company: Apex Companies
Address: 3015 SW 1st Ave, Portland OR 97201
City: Portland State: OR Zip: 97201
Phone: 503-593-8881 503-924-4704
Email: Kelsi.evans@apexcos.com

Container Types: P = HDPE, PJ = HDPE Jar, PY = Polypropylene, O= Other _____

Bottle Preservation Type: TZ= Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other GW= Ground water

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2206034 Temp: 0.6 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☒ No ☐

Project ID: 320001264 PO#: _____ Sampler: Robert Schettler (name)

TAT (check one): Standard: ☒ 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify: _____

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Robert Schettler	6/3/22	1300	Sarah Hegenbart	06/04/22	0947
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date 2022	Time	Location/ Sample Description	Container(s) Quantity	Type	Matrix	PFAS by Isotope Dilution: PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List: 14 or 18 (Circle One)	EPA Draft List of 24	OTHER: Please attach analyte list See Comments	EPA Method 537 (DW only): PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List of 14	537.1 List of 18	Comments
MW-37	6/2	1535		2	P	GW				X						Gen X, ADONA, F53-B
EB-1	6/1	1705		2	P	GW				X						
EB-2	6/2	1120		2	P	GW				X						
Dup-01	6/2	1330		2	P	GW				X						
Dup-02	6/2	1240		2	P	GW				X						

Special Instructions/Comment

SEND DOCUMENTATION AND RESULTS TO:

Name: _____
Company: _____
Address: _____
City: _____ State: ___ Zip: _____
Phone: _____
Email: _____

Container Types: P = HDPE, PJ = HDPE Jar, PY = Polypropylene, O= Other _____

Bottle Preservation Type: TZ= Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other _____

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2206034 TAT Std

Samples Arrival:	Date/Time: 06/04/22 0949	Initials: SH	Location: WR-2 Shelf/Rack: NA

Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Techni Ice	Dry Ice	None

Temp °C: 0.7 (uncorrected)	Probe used: Y / (N)	Thermometer ID: IR-3
Temp °C: 0.6 (corrected)		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill ——— Trk # 2739 1176 7815	✓		
Shipping Documentation Present?	✓		
Shipping Container: (Vista) Client (Retain) Return Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	Date/Time: 06/06/22 10:42	Initials: IK	Location: R-13, WR-2 Shelf/Rack: A-7, E-4

COC Anomaly/Sample Acceptance Form completed?		✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2206034

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2206034-01	A MW-15	☑		01-Jun-22 09:45	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-01	B MW-15	☑		01-Jun-22 09:45	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-02	A MW-17	☑		01-Jun-22 17:05	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-02	B MW-17	☑		01-Jun-22 17:05	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-03	A MW-19	☑		01-Jun-22 10:58	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-03	B MW-19	☑		01-Jun-22 10:58	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-04	A MW-21	☑		02-Jun-22 13:30	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-04	B MW-21	☑		02-Jun-22 13:30	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-05	A MW-23	☑		02-Jun-22 12:40	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-05	B MW-23	☑		02-Jun-22 12:40	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-06	A MW-24	☑		02-Jun-22 10:22	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-06	B MW-24	☑		02-Jun-22 10:22	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-07	A MW-30	☑		02-Jun-22 11:12	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-07	B MW-30	☑		02-Jun-22 11:12	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-08	A MW-34	☑		02-Jun-22 11:55	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-08	B MW-34	☑		02-Jun-22 11:55	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-09	A MW-35	☑		02-Jun-22 14:15	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-09	B MW-35	☑		02-Jun-22 14:15	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-10	A MW-36	☑		02-Jun-22 14:50	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-10	B MW-36	☑		02-Jun-22 14:50	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-11	A MW-37	☑		02-Jun-22 15:35	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-11	B MW-37	☑		02-Jun-22 15:35	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-12	A EB-1	☑		01-Jun-22 17:05	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-12	B EB-1	☑		01-Jun-22 17:05	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-13	A EB-2	☑		02-Jun-22 11:20	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-13	B EB-2	☑		02-Jun-22 11:20	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-14	A Dup-01	☑		02-Jun-22 13:30	☐	HDPE Bottle, 250 mL	Aqueous	
2206034-14	B Dup-01	☑		02-Jun-22 13:30	☐	HDPE Bottle, 250 mL	Aqueous	

2206034-15 A Dup-02	☑	02-Jun-22 12:40	☐ (D)	HDPE Bottle, 250 mL	Aqueous
2206034-15 B Dup-02	☑	02-Jun-22 12:40	☐ (D)	HDPE Bottle, 250 mL	Aqueous

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 (None) Other

Comments: (A) Sample contains brown tint.
(D) Per client note received with shipping.
s/1 = 6/1/22
s/2 = 6/2/22
Sample label ~~date time~~ listed month May.
KA 06/06/22

Verifed by/Date: KA 06/06/22

2206034

Sampling was done 5/31 - 6/2.

Some samples may have mistakenly been labeled for May (5) instead of June (6).

See below for clarification. Sorry for the inconvenience!

5/1 = 6/1/22

5/2 = 6/2/22

Thanks!

Appendix G

Historical Groundwater Analytical Results

Table G-1
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (ºC)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-1	6/8/2020	6.44	14.3	209.5	0.32	-105.7
MW-3	6/8/2020	6.45	14.5	306.1	0.36	-96.3
	1/6/2022	6.33	15.6	380.2	0.11	-66.6
MW-4	6/8/2020	6.39	14.3	352.2	0.30	-140.0
	1/6/2022	6.44	15.6	407.4	0.11	-108.5
MW-8	6/8/2020	6.21	14.9	633	0.38	-121.8
MW-10A	6/8/2020	6.16	14.3	164.6	0.31	-101.4
MW-14	6/8/2020	6.32	14.1	70.1	2.33	-92.3
MW-15	6/8/2020	6.62	14.4	416.2	0.41	-115.6
	9/23/2020	6.39	16.1	476.1	0.13	152.4
	12/15/2020	6.65	14.7	436.0	1.50	54.6
	3/23/2021	6.53	12.8	376.7	0.51	6.4
	1/4/2022	6.57	15.1	396.5	0.16	53.6
	3/21/2022	6.70	12.6	454.2	0.19	41.7
	6/1/2022	6.63	13.8	377.9	0.25	-171.1
MW-16	6/10/2020	6.13	15.5	281.7	0.61	-178.8
	9/23/2020	6.25	17.4	139.5	0.08	152.8
	12/14/2020	5.92	13.9	203.8	0.60	77.2
	3/22/2021	6.03	11.7	230.1	0.82	49.4
	1/3/2022	6.54	9.2	47.3	7.22	347.1
MW-17	6/10/2020	5.84	15.7	185.7	4.38	-20.4
	9/22/2020	6.24	16.4	165.1	0.21	199.7
	12/16/2020	6.42	12.7	163.4	3.40	67.5
	3/23/2021	6.68	12.1	142	3.66	55.2
	1/3/2022	6.64	11.3	229.9	2.65	382.5
	3/21/2022	6.62	11.5	216.5	3.20	88
	6/1/2022	6.39	14.0	201.2	1.14	69.1
MW-18	6/5/2020	5.84	13.3	170.0	1.15	89.7
	9/22/2020	6.02	15.6	113.3	0.67	115.0
	12/14/2020	5.94	13.4	106.0	0.72	88.6
	3/22/2021	6.14	11.2	95.1	3.02	172.3
MW-19	6/5/2020	6.27	13.3	270.4	0.68	-120.1
	9/22/2020	6.35	16.6	225.0	0.11	28.7
	12/14/2020	6.2	12.9	239.5	0.64	-18.0
	3/22/2021	6.14	10.9	198.2	0.66	65.2
	1/3/2022	6.49	9.9	220.2	0.19	100.8
	3/21/2022	6.49	10.1	213.6	0.16	28.0
	6/1/2022	6.40	13.0	243.2	0.18	-86.8
MW-20	6/5/2020	6.68	15.0	145.0	4.19	-99.8
	9/22/2020	6.54	17.4	98.7	4.76	91.1
	12/15/2020	6.83	14.1	76.6	5.5	65.1
	3/23/2021	7.03	12.4	95.3	3.85	57.5
	1/6/2022	6.83	11.7	44.3	9.74	30.2

Please see notes at end of table.

Table G-1
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (ºC)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-21	6/5/2020	6.16	13.1	248.9	0.44	-163.7
	9/22/2020	6.27	14.0	289.7	0.15	77.6
	12/15/2020	6.42	13.0	258.5	0.54	33.7
	3/23/2021	6.52	12.4	248.4	0.52	11.3
	1/6/2022	6.33	12.9	304.3	0.2	-41.5
	3/22/2022	6.35	11.8	311.2	0.17	-38.4
	6/2/2022	6.30	13.0	259.9	0.16	34.5
MW-22	6/5/2020	6.34	13.4	192.6	0.41	-210.3
	9/22/2020	6.36	14.6	223.6	0.11	82.4
	12/15/2020	6.46	12.7	223.6	0.42	22.6
	3/24/2021	6.47	10.8	198.6	0.52	-81.3
MW-23	6/5/2020	6.39	13.3	146.3	0.39	-234.8
	9/22/2020	6.23	14.9	187.2	2.95	134.4
	12/15/2020	6.42	12.8	173.2	5.81	57.9
	3/24/2021	6.57	10.9	161.3	2.78	-64.8
	1/7/2022	6.44	12.6	285.1	7.71	285.3
	3/22/2022	6.39	12.3	206.6	5.73	109.2
	6/2/2022	6.36	12.5	184.8	4.22	163.2
MW-24	6/5/2020	5.90	12.7	108.0	3.51	28.3
	9/22/2020	6.25	14.3	271.1	2.52	158.2
	12/15/2020	6.33	11.4	252.8	2.26	51.7
	3/23/2021	6.39	12.8	256.1	0.98	12.4
	1/7/2022	6.28	12.7	328.5	4.54	342
	3/22/2022	6.28	12.8	335.2	4.97	5.5
	6/2/2022	6.28	12.6	231.3	1.56	92.4
MW-25	6/5/2020	6.33	13.2	193.9	0.53	-134.4
	9/22/2020	6.20	14.0	230.0	0.51	163.0
	12/15/2020	6.32	11.7	204.3	1.01	51.3
	3/23/2021	6.43	12.5	171.4	1.28	37.8
	1/7/2022	6.28	12.7	348.9	4.45	209.9
MW-26	6/5/2020	6.43	13.3	595	1.52	-150.8
	9/22/2020	6.35	15.3	706	0.38	195.6
	12/15/2020	6.38	12.4	598	1.12	70.2
	3/23/2021	6.60	12.8	619	1.26	9.0
	1/7/2022	6.65	12.9	1195	3.32	208.5
MW-27	6/8/2020	6.21	14.6	329.7	1.68	-42.9
	9/22/2020	6.10	16.3	359.4	0.24	45.2
	12/15/2020	6.31	14.4	419.5	0.70	-36.3
	3/23/2021	6.18	13.0	348.8	0.71	-41.4
	1/7/2022	6.38	14.8	689	0.14	110.6

Please see notes at end of table.

Table G-1
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (ºC)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-28	6/5/2020	6.41	13.5	1,386	0.66	-163.0
MW-29	6/9/2020	6.47	13.9	73.8	0.26	-82.8
	9/23/2020	6.64	16.7	125.9	0.06	-8.6
	12/16/2020	6.59	12.8	87.4	0.80	24.7
	3/24/2021	6.77	11	73.5	0.71	-65.1
MW-30	6/9/2020	6.12	13.3	186.7	1.40	21.9
	9/23/2020	6.30	14.4	224.4	3.44	53.6
	12/16/2020	6.37	12.3	197.8	1.32	37.2
	3/24/2021	6.54	11.4	195.7	1.37	-19.3
	1/5/2022	6.54	12.9	256.7	0..34	2.1
	3/22/2022	6.38	12.8	249.1	7.11	90.7
	6/2/2022	6.30	13.2	228.2	1.97	129.8
MW-31	6/9/2020	6.08	13.9	270.1	0.86	-4.8
	9/23/2020	6.19	15.0	283.0	0.51	93.2
	12/16/2020	6.13	13.4	261.8	1.71	76.0
	3/24/2021	6.28	12.1	246.2	1.34	-22.3
	1/7/2022	6.3	13.6	402.7	2.23	192.6
MW-32	6/9/2020	6.10	13.1	215.7	6.12	151.5
	9/23/2020	6.24	14.5	251.6	5.43	86.1
	12/16/2020	6.14	13.0	232.1	4.85	69.9
	3/24/2021	6.44	12.7	220.4	2.12	24.1
MW-33	6/8/2020	6.09	13.4	145.8	0.68	-40.0
	9/21/2020	6.04	14.8	156.2	2.45	172.2
	12/15/2020	6.12	12.4	144.1	2.08	32.4
	3/23/2021	6.44	13.3	136.5	2.52	-4.5
	1/6/2022	6.09	14.0	161.6	3.5	-61.8
MW-34	6/9/2020	6.01	13.2	191.4	1.48	65.8
	9/23/2020	6.18	14.6	223.9	4.38	74.0
	12/16/2020	6.22	12.9	206.3	2.88	51.9
	3/24/2021	6.41	12.5	194.8	2.10	2.5
	1/6/2022	6.22	14.3	225.2	4.96	30.9
	3/22/2022	6.26	13.9	253.3	6.51	69.4
	6/2/2022	6.21	14.1	226.5	4.73	147.7
MW-35	6/8/2020	6.23	13.5	212.4	5.51	-7.2
	9/21/2020	6.16	15.3	260.1	7.67	162.3
	12/16/2020	6.05	13.2	233.7	5.46	89.9
	3/23/2021	6.24	12.7	227.4	4.28	35.8
	1/6/2022	6.27	14.3	241.4	6.27	-0.2
	3/23/2022	6.29	13.5	250.5	5.44	180.8
	6/2/2022	6.32	13.9	227.9	7.78	102.7

Please see notes at end of table.

Table G-1
Groundwater Field Parameters
Fire Training Facilities
Portland International Airport
Portland, Oregon

Well ID	Sampling Date	pH	Temp (ºC)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)
MW-36	1/6/2022	6.30	13.6	247.2	5.12	-6.4
	3/23/2022	6.30	13.4	245.8	5.77	191.2
	6/2/2022	6.28	13.5	224.1	6.01	106.0
MW-37	1/6/2022	6.29	13.9	285.0	2.41	-18.0
	3/23/2022	6.30	13.6	284.3	4.51	136.5
	6/2/2022	6.28	14.0	288.3	4.50	102.2
DW-1	6/9/2020	6.30	13.3	485.1	0.73	-94.5
	9/23/2020	6.43	14.4	502.0	0.10	-19.2
	12/16/2020	6.37	11.7	454.3	0.36	-25.2
	3/24/2021	6.45	11.9	417.5	0.48	-69.9
	1/5/2022	6.75	12.7	496.8	0.13	-114.1
DW-2	6/9/2020	6.34	14.6	469.2	0.46	-119.4
	9/23/2020	6.59	15.1	499.4	0.43	-8.1
	12/16/2020	6.56	13.4	464.6	0.34	-46.2
	3/24/2021	6.55	12.8	491.9	0.40	-82.4
	1/5/2022	6.83	13.5	482.0	0.12	-128.2
DW-3	6/9/2020	6.36	14.2	357.0	0.41	-113.3
	9/23/2020	6.55	14.7	343.7	0.18	-40.1
	12/16/2020	6.51	12.6	431.1	0.41	-40.2
	3/24/2021	6.55	11.9	328.4	0.91	-51.9
	1/5/2022	6.96	12.7	326.4	0.14	-99.6
PDX QTA Well	1/5/2022	8.12	13.4	181.0	0.97	187.9

Notes:

1. °C = Degrees Celsius.
2. µS/cm = Microsiemens per centimeter.
3. ORP = Oxidation-reduction potential.
4. mg/L (ppm) = Milligrams per liter (parts per million).
5. mV = Millivolts.
6. -- = Parameter not recorded.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-1	04/20/17	60.2	--	--	--	1,190	461	--	188	8,680	1,050	--	134	--	15.1	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	--	--	--	--	--	--	--	--
	02/05/19	60.0	--	--	--	1,120	379	--	255	10,100	936	--	150	--	8.20	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/02/19	53.8	--	--	--	1,000	345	--	210	10,600	833	--	127	--	9.77	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/08/19	51.1	116	80.3	345	919	354	80.0	206	8,040	723	9.48	113	<1.06	8.83	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	18.3	<1.06	234	506	--	--	--	--
	11/08/19	50.0	118	78.0	338	778	283	42.0	182	5,340	729	2.20 Q	88.7	<2.05	5.70 Q	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	13.3	<2.05	261	413	--	--	--	--
	06/08/20	65.3	162	85.1	537	970	495	40.6	222	7,500	799	<9.54	99.9	<4.93	5.33	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	14.6	2.60 Q	440	459	--	--	--	--
MW-3	04/20/17	255	--	--	--	4,210	1,640	--	676	23,700	5,820	--	182	--	8.41	<1.82	<1.82	<1.82	<1.82	<1.82	<1.82	--	--	--	--	--	--	--	--
	02/05/19	206	--	--	--	3,740	1,220	--	581	14,900	4,640	--	117	--	12.3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/02/19	116	--	--	--	2,690	4,650	--	1,020	25,200	4,270	--	164	--	24.6	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/08/19	138	508	249	3,200	2,950	2,860	532	861	19,200	4,760	5.54 Q	166	<1.06	21.6	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	1.18	395	67,100 J	1,200	--	--	--	--
	11/08/19	159	1,420	275	9,400	3,230	6,240	442	1,800	17,200	5,450	5.61	170	<2.13	57.1	4.33	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	595	898	1,850	--	--	--	--
	06/08/20	175	825	284	4,020	3,420	5,560	277	1,170	21,400	5,350	<29.1	219	<15.0	31.4	5.60	<1.00	<1.00	<1.00	<1.00	<1.00	4.15	159	12,400	1,570	--	--	--	--
	01/06/22	288	1,030	460	5,090	3,790	3,590	582	1,200	18,300	6,320 D	7.91	259	<1.98	26.0	2.61	<1.98	<1.98	<1.98	<1.98	<1.98	5.28	143	11,300	2,000	<1.98	<1.98	<1.98	<1.98
DUP	01/06/22	269	1,000	483	4,870	5,150	3,630	645	1,170	19,500	9,560 D	8.66	261	<1.98	24.5	2.76	<1.98	<1.98	<1.98	<1.98	<1.98	4.66	124	11,300	2,160	<1.98	<1.98	<1.98	<1.98
MW-4	04/20/17	5,580	--	--	--	23,900	30,400	--	7,130	203,000	9,930	--	<472	--	12.2	<1.84	<1.84	<1.84	<1.84	<1.84	<1.84	--	--	--	--	--	--	--	--
	09/26/17	5,600	--	--	--	24,000	36,000	--	9,500	92,000	10,000	--	<500	--	<500	<500	<500	<500	<500	--	--	--	--	--	--	--	--	--	--
	02/06/19	3,280	--	--	--	13,500	19,700	--	6,720	85,000	10,400	--	360	--	11.8	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DUP	02/06/19	3,580	--	--	--	19,500	15,100	--	637	111,000	6,710	--	370	--	10.8	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/02/19	4,380	--	--	--	18,100	16,600	--	7,870	137,000	7,910	--	334	--	12.9	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DUP	05/02/19	3,610	--	--	--	14,800	17,200	--	8,220	121,000	8,250	--	349	--	11.4	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
	08/08/19	3,440	7,350	5,100	27,800	20,600	32,100	976	8,620	73,600	9,390	<249	346	<249	<249	<249	<249	<249	<249	<249	<249	958	154,000	3,590	<249	<249	<249	<312
DUP	08/08/19	5,690	8,260	8,220	23,400	30,700	22,900	1,030	8,420	110,000	6,370	3.32	310	<1.02	10.7	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	1,550	157,000	5,670	--	--	--	--
	11/08/19	3,600	8,220	5,440	31,300	28,900	11,600	3,770	10,700	36,200	9,940	<2.10	369	<2.10	10.8	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	968	1,400	7,610	--	--	--	--	--
DUP	11/08/19	3,550	8,940	5,290	32,800	25,200	11,700	4,780	11,000	77,400	9,050	109 Q	343	<2.06	10.8	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	974	15,700	6,090	--	--	--	--	--
	06/08/20	7,920	9,800	6,270	30,700	18,700	26,500	299	11,200	97,700	8,460	<38.4	370	<19.8	11.0	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	1,120	12,000	4,570	--	--	--	--	--
DUP	06/08/20	4,460	9,760	4,650	30,200	19,600	28,300	1,930	10,800	91,700	7,960	<39.6	372	<20.5	10.7	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	1,110	11,700	2,930	--	--	--	--	--
	01/06/22	2,670	7,960	3,550	28,800	17,100	22,700	950	8,350	71,400	7,110	<1.97	422	<1.97	14.0	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	842	14,700	7,190 D	<1.97	<1.97	<1.97	<1.97	<1.97
DUP	01/06/22	2,450	8,660	2,980	29,200	17,300	21,500	850	7,580	78,000	8,400	<1.95	426	<1.95	14.3	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	814	14,100	4,570 D	<1.95	<1.95	<1.95	<1.95	<1.95
MW-6	09/26/17	11	--	--	--	459	338	--	240	1,080	383	--	149	--	11.3	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	--	--	--	--
DUP	09/26/17	12.1	--	--	--	456	351	--	249	1,160	439	--	158	--	10.4	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
MW-7	04/20/17	154	--	--	--	495	1,280	--	505	2,710	476	--	76.5	--	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--
DUP	04/20/17	137	--	--	--	589	1,100	--	434	819	568	--	83.9	--	2.27	<1.81	<1.81	<1.81	<1.81	<1.81	<1.81	--	--	--	--	--	--	--	--
MW-8	09/26/17	62.7	--	--	--	66.6	428	--	30.1	130	165	--	9.95	--	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
	02/05/19	46.6	--	--	--	485	390	--	154	263	225	--	39.3	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/02/19	47.2	--	--	--	279	378	--	102	229	215	--	37.4	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
	08/08/19	69.6	197	12.0	248	65.2	486	<1.07	38.4	132	186	<1.07	8.77	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	2.37	15.8	1.95	--	--	--	--	--
	11/08/19	60.4	206	43.1	453	457	373	6.01	163	237	465	<2.03	25.9	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	3.15	44.9	<2.03	--	--	--	--	--
	06/08/20	87.0	267	13.1	322	68.3	635	<2.08	49.0	82.4	224	<2.01	3.78	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	3.47	13.8	<1.07	--	--	--	--	--
MW-9	04/20/17	90.7	--	--	--	1,910	460	--	99.4	1,360	7,880	--	24.8	--	26.8	<1.78	<1.78	<1.78	<1.78	<1.78	<1.78	--	--	--	--	--	--	--	--
MW-10A	04/21/17	35.8	--	--	--	1,040	363	--	193	342	30,900	--	43.7	--	21.8	<1.83	<1.83	<1.83	<1.83	<1.83	<1.83	--	--	--	--	--	--	--	--
	02/05/19	72.5	--	--	--	909	435	--	112	241	5,220	--	12.1	--	11.6	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/02/19	47.0	--	--	--	995	382	--	105	314	5,640	--	18.6	--	11.4	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
	08/08/19	147	143	102	397	1,940	1,010	9.06	196	714	7,290	<1.07	24.1	<1.07	26.0	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	185	2.10	--	--	--	--
	11/08/19	190	122	87.7	337	1,090	766	8.46	154	503	4,810	<2.04	14.3	<2.04	14.9	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	32.9	3.84	--	--	--	--
	06/08/20	58.1	84.2	41.6	240	1,380	469	8.34	133	479	6,820	<2.02	22.7	<1.04	35.7	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	1.34 Q	<1.04	23.2	<1.07	--	--	--	--

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-13	09/26/17	**10.9**	--	--	--	**301**	**750**	--	**475**	**1,040**	**717**	--	**394**	--	**29.5**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
MW-14	09/26/17	**9.26**	--	--	--	**157**	**73.1**	--	**59.5**	**1,710**	**98.8**	--	**66**	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
	02/05/19	**34.4**	--	--	--	**283**	**154**	--	**67.7**	**550**	**95.1**	--	**40.2**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/29/19	**23.2**	--	--	--	**388**	**97.6**	--	**61.1**	**468**	**80.0**	--	**39.7**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/08/19	**16.3**	**70.4**	**31.0**	**147**	**347**	**89.0**	**4.90**	**53.6**	**602**	**95.5**	<1.07	**45.1**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--
	11/08/19	**19.3**	**65.9**	**33.0**	**116**	**346**	**72.8**	**3.11 Q**	**55.7**	**553**	**87.3**	<2.01	**34.7**	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	--	--	--	--
	06/08/20	**20.6**	**66.0**	**34.3**	**143**	**610**	**119**	**3.94**	**77.1**	**773**	**127**	<1.95	**57.7**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
MW-15	02/05/19	**1.64**	--	--	--	**11.4**	**84.2**	--	**42.1**	**4.30**	**63.6**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	**1.69**	--	--	--	**10.9**	**82.3**	--	**40.9**	**2.20 Q**	**64.9**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	**1.54**	**37.6**	<1.11	**112**	**10.6**	**79.8**	<1.11	**39.0**	**4.38 Q**	**57.2**	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	**59.6**	<1.11	--	--	--	--
	11/08/19	<2.07	**41.1**	<2.07	**125**	**13.5**	**86.4**	<2.07	**43.9**	**4.66**	**64.4**	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	**105**	<2.07	--	--	--	--
	06/08/20	**1.84**	**38.6**	<1.23	**116**	**10.6**	**78.9**	<2.03	**40.2**	**1.40**	**54.8**	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**35.0**	<1.05	--	--	--	--
	09/23/20	**1.74**	**36.2**	<1.31	**113**	**13.2**	**79.5**	<1.05	**38.4**	**3.27**	**54.9**	<2.10	<1.05	<2.10	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	**59.7**	<1.10	--	--	--	--
	12/15/20	**1.32**	**37.6**	<1.22	**113**	**12.1**	**83.0**	<1.01	**38.7**	**2.67**	**61.8**	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**53.3**	<1.04	--	--	--	--
	03/23/21	**1.13**	**33.3**	<1.23	**104**	**11.3**	**71.7**	<1.01	**45.1**	**1.15**	**57.3**	<1.96	1.03 Q	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**17.1**	<1.04	--	--	--	--
	01/04/22	<2.02	**25.7**	<2.02	**79.6**	**13.9**	**56.8**	<2.02	**38.8**	<2.02	**54.0**	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	**8.96**	<2.02	<2.02	<2.02	<2.02	<2.02
	03/21/22	**2.26**	**27.2**	<1.95	**70.1**	**12.4**	**61.4**	<1.95	**52.5**	<1.95	**52.4**	<1.95	**2.31**	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	**9.81**	<1.95	<1.95	<1.95	<1.95	<1.95
	06/01/22	<2.03	**22.1**	<2.03	**87.1**	**11.6**	**59.5**	<2.03	**39.4**	<2.03	**49.3**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	**10.6**	<2.03	<2.03	<2.03	<2.03	<2.03
MW-16	02/04/19	**1.26**	--	--	--	**2.30**	**32.1**	--	**21.2**	<1.00	**10.5**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	<1.00	--	--	--	**1.91 Q**	**15.6**	--	**15.5**	<1.00	**12.3**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/08/19	<1.10	**8.48**	<1.10	**27.1**	**1.87**	**21.5**	<1.10	**19.1**	<1.10	**14.4**	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	--	--	--	--
	11/07/19	<2.03	**9.13**	<2.03	**27.0**	**2.60 Q**	**18.4**	<2.03	**19.3**	<2.03	**19.7**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--	--
	06/10/20	<1.02	**2.01**	<1.23	**6.63**	<1.02	**8.21 Q**	<1.02	**3.42**	<1.02	**2.08**	<1.97	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.05	--	--	--	--
	09/23/20	**1.13**	**11.7**	<1.32	**32.5**	<2.11	**23.0**	<1.05	**16.8**	**1.59 Q**	**25.8**	<2.11	<1.05	<2.11	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.11	--	--	--	--
	12/14/20	<1.02	**7.55**	<1.23	**18.6**	1.85	**12.4**	<1.02	**10.4**	**1.07 Q**	**12.7**	<1.97	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.05	--	--	--	--
	03/22/21	<1.01	**7.71**	<1.22	**16.7**	1.36	**15.1**	<1.01	**11.6**	<1.01	**13.0**	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	01/03/22	<1.98	**4.03**	<1.98	**8.64**	<1.98	**6.89**	<1.98	**4.48**	**3.68 Q**	**11.1**	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98
MW-17	02/01/19	<1.00	--	--	--	<1.00	<1.09	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DUP	02/01/19	<1.00	--	--	--	<1.00	<1.05	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/08/19	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--
	11/07/19	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	--	--	--	--
	06/10/20	<0.969	<0.969	<1.17	<0.969	<0.969	<1.06	<0.969	<0.969	<0.969	<0.969	<1.87	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.998	--	--	--	--
	09/22/20	<1.02	<1.02	<1.28	<1.02	<2.05	<1.13	<1.02	<1.02	<1.02	<1.02	<2.05	<1.02	<2.05	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
	12/16/20	<1.04	<1.04	<1.25	<1.04	<1.04	<1.13	<1.04	<1.04	<1.04	<1.04	<2.01	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<2.07	<1.04	<1.07	--	--	--	--
	03/23/21	<1.00	<1.00	<1.21	<1.00	<1.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--
	01/03/22	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98
	03/21/22	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97
	06/01/22	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
MW-18	02/06/19	<1.00	--	--	--	**3.57**	<1.07	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/29/19	<1.00	--	--	--	**2.38**	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	<1.04	<1.04	<1.04	<1.04	**3.14**	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--
	11/07/19	<2.03	<2.03	<2.03	<2.03	**3.26**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--	--
	06/05/20	<0.979	<0.979	<1.22	<0.979	<1.96	<1.08	<1.96	<0.979	<0.979	<0.979	<1.96	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<0.979	<1.03	--	--	--	--
	09/22/20	<1.01	<1.01	<1.26	<1.01	**4.46**	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/14/20	<0.994	<0.994	<1.20	<0.994	**5.21**	<1.08	<0.994	<0.994	<0.994	<0.994	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--
	03/22/21	<0.977	<0.977	<1.18	<0.977	**2.71**	<1.06	<0.977	<0.977	<0.977	<0.977	<1.89	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<0.977	<1.01	--	--	--	--

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-19	02/06/19	<1.00	--	--	--	**9.61**	**2.78**	--	**1.69**	**29.3**	**5.09**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	<1.01	--	--	--	**6.59**	**2.01 Q**	--	**1.30**	**18.7**	**4.18**	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/07/19	**1.18**	**2.36**	**1.48**	**1.97**	**10.9**	**2.06**	<1.06	**2.16 Q**	**30.4**	**3.50**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--
	11/07/19	<2.13	**4.26**	<2.13	**2.96**	**11.3**	**3.64**	<2.13	<2.13	**42.0**	**6.03**	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--
	06/05/20	<1.01	**3.10**	<1.27	**2.29**	**5.41**	**3.11 Q**	<2.03	<1.01	**15.8**	**3.54**	<2.03	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	09/22/20	**1.67**	**5.08**	<1.32	**3.59**	**17.4**	**5.62**	<1.06	**1.86 Q**	**29.9**	**4.61**	<2.12	<1.06	<2.12	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.11	--	--	--	--
	12/14/20	**1.49**	**2.75**	**1.28**	**2.60**	**9.47**	**3.86**	<1.00	**1.52**	**25.9**	**5.45**	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--
	03/22/21	**1.03**	**2.82**	<1.22	**2.24**	**8.47**	**2.06**	<1.01	<1.01	**15.2**	**3.36**	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	01/03/22	<2.02	**2.82**	<2.02	<2.02	**11.1**	**2.12**	<2.02	<2.02	**15.9**	**4.33**	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02
	03/21/22	<2.03	<2.03	<2.03	<2.03	**8.13**	<2.03	<2.03	<2.03	**14.3**	**3.13**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03
	06/01/22	<1.97	**2.57**	<1.97	**2.16**	**7.87**	**2.06**	<1.97	<1.97	**11.5**	**3.77**	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97	<1.97
MW-20	02/04/19	<1.00	--	--	--	**3.79**	<1.08	--	**1.02 Q**	**21.1**	**2.33**	--	**1.37 Q**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	**9.37**	--	--	--	**52.1**	<1.01	--	**1.34 Q**	**9.23**	**3.46**	--	**1.38 Q**	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/07/19	**8.63**	**7.71**	**9.89**	**2.82**	**57.8**	**8.47**	<1.02	**7.38**	**13.6**	**10.6**	<1.02	**1.96**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	--	--	--	--
	11/07/19	**4.21**	**2.64**	**2.46**	<2.03	**15.9**	**2.13 Q**	<2.03	**2.28**	**33.9**	**6.11**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--	--
	06/05/20	**9.80**	**7.08**	**9.85 Q**	**3.18**	**53.9**	**4.59**	<1.99	**4.84**	**16.3**	**5.88**	<1.99	**1.46**	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<1.05	--	--	--	--
	09/22/20	**6.99**	**12.1**	**6.99**	**13.5**	**41.6**	**16.7**	**1.81**	**8.92**	**40.3**	**16.3**	<2.00	**2.51**	<2.00	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	<1.05	--	--	--	--
	12/15/20	**6.34**	**4.40**	**5.83**	**3.11**	**26.7**	**3.03**	<0.982	**2.21**	**26.9**	**5.22**	<1.90	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<0.982	<1.01	--	--	--	--
	03/23/21	**9.67**	**1.84**	**9.82**	<0.994	**47.6**	<1.08	<0.994	<0.994	**15.3**	**2.32**	<1.92	**1.04 Q**	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--
	01/06/22	<1.91	<1.91	<1.91	<1.91	**9.58**	<1.91	<1.91	<1.91	**23.7**	**2.08**	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91
MW-21	02/04/19	**1.40**	--	--	--	**4.77**	<1.11	--	<1.00	**1.65 Q**	**1.93**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	**1.31**	--	--	--	**3.95**	<1.01	--	<1.01	<1.01	**2.32**	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/07/19	**1.36**	<1.07	<1.07	<1.07	**5.27**	<1.07	<1.07	<1.07	**1.15 Q**	**1.45**	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--
	11/07/19	<2.12	<2.12	<2.12	<2.12	**5.14 Q**	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--
	06/05/20	<1.01	<1.01	<1.26	<1.01	**2.55**	<1.11	<2.02	<1.01	**1.05 Q**	**1.33**	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	09/22/20	**1.20**	**1.44**	<1.25	<0.998	**5.28**	<1.10	<0.998	<0.998	**1.03**	**1.37**	<2.00	<0.998	<2.00	<0.998	<0.998	<0.998	<0.998	<0.998	<0.998	<0.998	<0.998	<0.998	<0.998	<1.05	--	--	--	--
	12/15/20	**1.34 Q**	<1.02	<1.24	<1.02	**3.87**	<1.11	<1.02	<1.02	<1.02	**1.21**	<1.98	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.05	--	--	--	--
	03/23/21	**1.26**	<1.00	<1.22	<1.00	**5.66**	<1.09	<1.00	<1.00	<1.00	**2.19**	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--
	01/06/22	<1.96	<1.96	<1.96	<1.96	**4.85**	<1.96	<1.96	<1.96	<1.96	**2.45**	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96
	03/22/22	<1.91	<1.91	<1.91	<1.91	**4.13**	<1.91	<1.91	<1.91	<1.91	**1.92**	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91
DUP	03/22/22	<1.93	<1.93	<1.93	<1.93	**4.58**	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93
	06/02/22	<2.03	<2.03	<2.03	<2.03	**5.24**	<2.03	<2.03	<2.03	<2.03	**2.08**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03
DUP	06/02/22	<2.06	<2.06	<2.06	<2.06	**5.04**	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06
MW-22	02/04/19	<1.00	--	--	--	<1.00	<1.09	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--
	11/07/19	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	--	--	--	--
	06/05/20	<1.01	<1.01	<1.27	<1.01	<2.03	<1.12	<2.03	<1.01	<1.01	<1.01	<2.03	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.07	--	--	--	--
	09/22/20	<1.01	<1.01	<1.26	<1.01	<2.02	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/15/20	<1.00	<1.00	<1.21	<1.00	<1.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.93	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.03	--	--	--	--
	03/24/21	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
MW-23	02/04/19	**4.95**	--	--	--	**26.8**	<1.11	--	<1.00	**9.01 Q**	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	**3.30**	--	--	--	**16.2**	<1.00	--	<1.00	**5.19 Q**	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	**4.40**	<1.05	**5.07**	<1.05	**22.3**	<1.05	<1.05	<1.05	**5.49**	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--
	11/07/19	**5.17**	<2.02	**5.47**	<2.02	**24.5**	<2.02	<2.02	<2.02	**6.98 Q**	**2.35**	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	--	--	--	--
	06/05/20	**3.46**	<0.985	**3.59 Q**	<0.985	**17.3**	<1.08	<1.97	<0.985	**5.14 Q**	<0.985	<1.97	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<1.03	--	--	--	--
	09/22/20	**4.94**	<0.997	**4.29**	<0.997	**24.7**	<1.10	<0.997	<0.997	**7.25**	<0.997	<1.99	<0.997	<1.99	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<1.05	--	--	--	--
	12/15/20	**6.12**	<0.976	**6.35**	<0.976	**33.4**	<1.06	<0.976	<0.976	**9.92**	<0.976	<1.89	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<1.00	--	--	--	--
	03/21/21	**4.43**	<0.969	**4.13**	<0.969	**23.1**	<1.06	<0.969	<0.969	**7.65 Q**	<0.969	<1.87	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.969	<0.998	--	--	--	--
	01/07/22	**5.14**	<1.95	**4.79**	<1.95	**27.0**	<1.95	<1.95	<1.95	**10.7 Q**	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95
	03/22/22	**3.98**	<1.99	**3.99**	<1.99	**18.5**	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99
DUP	03/22/22	**3.97**	<1.94	**4.03**	<1.94	**20.1**	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
	06/02/22	**3.91**	<1.93	**3.05**	<1.93	**17.7**	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93
DUP	06/02/22	**4.06**	<1.99	**2.92**	<1.99	**16.3**	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-24	02/01/19	<1.00	--	--	--	<1.00	<1.08	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	<1.01	--	--	--	<1.01	<1.01	--	<1.01	<1.01	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/09/19	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	--	--	--	--
	11/07/19	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14	--	--	--	--
	06/05/20	<1.02	<1.02	<1.27	<1.02	<2.03	<1.12	<2.03	<1.02	<1.02	<1.02	<2.03	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
	09/22/20	<1.03	<1.03	<1.28	<1.03	<2.06	<1.13	<1.03	<1.03	<1.03	<1.03	<2.06	<1.03	<2.06	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.08	--	--	--	--
	12/15/20	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	03/23/21	<1.00	<1.00	<1.22	<1.00	<1.00	<1.10	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.04	--	--	--	--
	01/07/22	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95	<1.95
	03/22/22	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05
	06/02/22	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
MW-25	02/01/19	<1.00	--	--	--	<1.00	<1.13	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--
	11/06/19	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	--	--	--	--
	06/05/20	<1.02	<1.02	<1.28	<1.02	<2.05	<1.13	<2.05	<1.02	<1.02	<1.02	<2.05	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.08	--	--	--	--
	09/22/20	<1.02	<1.02	<1.28	<1.02	<2.04	<1.12	<1.02	<1.02	<1.02	<1.02	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
	12/15/20	<0.976	<0.976	<1.18	<0.976	<0.976	<1.06	<0.976	<0.976	<0.976	<0.976	<1.89	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<0.976	<1.01	--	--	--	--
	03/23/21	<0.992	<0.992	<1.20	<0.992	<0.992	<1.08	<0.992	<0.992	<0.992	<0.992	<1.92	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<1.02	--	--	--	--
	01/07/22	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01
MW-26	02/01/19	**17.6**	--	--	--	**81.2**	**125**	--	**89.5**	**1.45 Q**	**354**	--	**1.89**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	**21.0**	--	--	--	**110**	**129**	--	**88.4**	<1.00	**292**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/07/19	**22.1**	**49.9**	**16.0**	**147**	**106**	**147**	<1.00	**93.0**	**1.81 Q**	**302**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.25
	11/06/19	**23.7**	**67.3**	**16.7**	**205**	**93.8**	**173**	<2.04	**110**	<2.04	**323**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	--	--	--	--
	06/05/20	**21.6**	**40.5**	**13.7 Q**	**110**	**103**	**109**	<2.05	**66.9**	**1.30 Q**	**221**	<2.05	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.08	--	--	--	--
	09/22/20	**25.9**	**55.3**	**18.2**	**174**	**136**	**176**	<1.02	**117**	**1.15**	**354**	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
DUP	09/22/20	**24.8**	**57.8**	**16.2**	**175**	**126**	**172**	<1.03	**112**	**1.70 Q**	**278**	<2.06	<1.03	<2.06	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.08	--	--	--	--
	12/15/20	**26.4**	**59.4**	**17.3**	**172**	**120**	**165**	<0.981	**102**	**1.12**	**302**	<1.90	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<0.981	<1.01	--	--	--	--
DUP	12/15/20	**27.6**	**51.4**	**17.5**	**165**	**119**	**155**	<1.03	**107**	**1.44 Q**	**363**	<2.00	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<2.06	<2.06	<2.06	<1.06	--	--	--	--
	03/23/21	**31.4**	**45.4**	**20.9**	**128**	**162**	**134**	<0.994	**106**	**1.60 Q**	**288**	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--
DUP	03/23/21	**30.2**	**42.2**	**22.4**	**117**	**149**	**129**	<0.991	**105**	**1.79**	**291**	<1.92	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<0.991	<1.02	--	--	--	--
	01/07/22	**26.4**	**34.1**	**20.5**	**85.8**	**196**	**90.0**	<2.00	**89.2**	**2.59 Q**	**318**	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
MW-27	02/04/19	<1.00	--	--	--	<1.00	<1.14	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/08/19	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--
	11/07/19	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	--	--	--	--
	06/08/20	<1.01	<1.01	<1.23	<1.01	<2.03	<1.11	<2.03	<1.01	**1.18**	<1.01	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**1.18**	<1.04	--	--	--	--
	09/22/20	<1.01	<1.01	<1.26	<1.01	<2.02	<1.11	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<2.02	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/15/20	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	03/23/21	<0.985	<0.985	<1.19	<0.985	<0.985	<1.07	<0.985	<0.985	<0.985	<0.985	<1.91	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<1.01	--	--	--	--
	01/07/22	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	**2.09**	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	**2.87**	<2.01	<2.01	<2.01	<2.01	<2.01
MW-28	02/04/19	**20.0**	--	--	--	**262**	**555**	--	**389**	**11.7 D**	**20,400**	--	**10.6**	--	**1.29**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DUP	02/04/19	**20.1**	--	--	--	**273**	**566**	--	**396**	**28.9 D**	**18,500**	--	**10.0**	--	**1.02**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	**21.8**	--	--	--	**286**	**625**	--	**398**	**7.68**	**20,000**	--	**9.96**	--	**2.19 Q**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DUP	04/30/19	**20.3**	--	--	--	**267**	**616**	--	**398**	**9.81**	**20,400**	--	**10.3**	--	**2.17**	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--	--	--	--	--
	08/07/19	**23.9**	**83.3**	**14.2**	**354**	**304**	**600**	<1.03	**395**	<1.03	**11,700**	<1.03	**9.74**	<1.03	**1.72**	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	**13.5**	<1.03	<1.03	<1.03	<1.03	<1.29
DUP	08/07/19	**23.1**	**79.5**	**13.4**	**320**	**293**	**555**	<1.03	**408**	**8.02**	**17,600**	<1.03	**9.95**	<1.03	**1.74**	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	**12.0**	<1.03	--	--	--	--
	11/06/19	**26.3**	**93.0**	**20.6**	**400**	**330**	**617**	<2.05	**464**	**8.84**	**17,400**	<2.05	**9.77**	<2.05	**2.06**	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	<2.05	**15.5**	<2.05	--	--	--	--
DUP	11/06/19	**29.2**	**89.1**	**20.5**	**402**	**324**	**493**	<2.04	**471**	**11.6 Q**	**18,400**	<2.04	**10.2**	<2.04	**2.17 Q**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	**12.4**	<2.04	--	--	--	--
	06/05/20	**22.1**	**67.2**	**14.7 Q**	**329**	**288**	**560**	<2.01	**394**	**6.52**	**16,900**	<2.01	**8.59**	<1.00	**1.78**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**14.2**	<1.05	--	--	--	--
DUP	06/05/20	**21.5**	**82.9**	**14.1 Q**	**337**	**302**	**590**	<1.97	**407**	**7.68**	**15,900**	<1.97	**9.43**	<0.984	**1.64 Q**	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	**11.8**	<1.03	--	--	--	--

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-29	02/01/19	**436**	--	--	--	**3,080**	**1,510**	--	**656**	**9,430**	**351**	--	**263**	--	**22.4**	**1.02 Q**	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	**537**	--	--	--	**6,050**	**2,510**	--	**1,840**	**6,300**	**822**	--	**318**	--	**26.6**	<1.00	<1.00	<1.00	<1.00	<1.99	<1.00	--	--	--	--	--	--	--	--
	08/06/19	**103**	**282**	**467**	**656**	**3,690**	**907**	**12.7**	**792**	**2,690**	**518**	**10.5 Q**	**205**	<1.01	**11.0**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**1.56**	**1.57**	**666**	**2,330**	--	--	--	--
	11/06/19	**48.6**	**160**	**117**	**410**	**1,660**	**246**	**11.2**	**385**	**3,350**	**307**	**9.31**	**198**	<2.09	**7.38**	<2.09	<2.09	<2.09	<2.09	<2.09	<2.09	**2.27 Q**	<2.09	**347**	**1,880**	--	--	--	--
	06/09/20	**534**	**807**	**1,590**	**2,490**	**12,800**	**3,470**	**53.5**	**3,110**	**14,000**	**3,350**	**14.9**	**405**	<1.01	**26.6**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**2.11**	**4.20**	**2,790**	**4,230**	--	--	--	--
	09/23/20	**126**	**393**	**365**	**1,150**	**6,660**	**1,200**	**25.5**	**1,300**	**7,070**	**1190**	<10.1	**230**	<2.03	**18.6**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**2.43 Q**	**2.30**	**1,340**	**4,250**	--	--	--	--
	12/16/20	**177**	**442**	**273**	**1,170**	**4,170**	**888**	**19.4**	**670**	**6,160**	**825**	**9.39**	**199**	<1.02	**18.5**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**2.59**	**5.18 Q**	**934**	**2,800**	--	--	--	--
	03/24/21	**697**	**1150**	**1010**	**3090**	**5,150**	**2960**	**52.2**	**1610**	**6,130**	**1820**	**11.1**	**419**	<0.999	**23.70**	<0.999	<0.999	<0.999	<0.999	<0.999	<0.999	**1.65 Q**	**5.09**	**1840**	**2,730**	--	--	--	--
MW-30	02/01/19	<1.00	--	--	--	<1.00	<1.05	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	<1.01	--	--	--	<1.01	<1.01	--	<1.01	<1.01	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/06/19	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	11/06/19	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	--	--	--	--
	06/09/20	<0.980	<0.980	<1.19	<0.980	<1.96	<1.07	<1.96	<0.980	<0.980	<0.980	<1.90	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<0.980	<1.01	--	--	--	--
	09/23/20	<1.06	<1.06	<1.33	<1.06	<2.12	<1.17	<1.06	<1.06	<1.06	<1.06	<2.12	<1.06	<2.12	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.11	--	--	--	--
	12/16/20	<1.00	<1.00	<1.19	<1.00	<1.00	<1.07	<1.00	<1.00	<1.00	<1.00	<1.91	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.97	<1.00	<1.02	--	--	--	--
	03/24/21	<0.985	<0.985	<1.19	<0.985	<0.985	<1.07	<0.985	<0.985	<0.985	<0.985	<1.91	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<0.985	<1.01	--	--	--	--
	01/05/22	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
	03/22/22	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96
	06/02/22	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91	<1.91
MW-31	02/04/19	**55.7**	--	--	--	**515**	**392**	--	**286**	**31.7 Q**	**1,130**	--	**8.76**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	**51.3**	--	--	--	**495**	**367**	--	**254**	**29.9**	**1,000**	--	**8.32**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.98	<1.00	--	--	--	--	--	--	--	--
DUP	04/30/19	**50.9**	--	--	--	**490**	**342**	--	**257**	**28.3**	**986**	--	**8.30**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.99	<1.00	--	--	--	--	--	--	--	--
	08/06/19	**25.4 D**	**33.1 D**	**19.2 D**	**154 D**	**228 D**	**173 D**	**1.51 Q**	**115 D**	**13.1 Q, D**	**516 D**	<1.00	**3.25 D**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**27.1 D**	<1.00	<1.00	<1.00	<1.00	<1.25
DUP	08/06/19	**48.3 D**	**61.3 D**	**33.8 D**	**288 D**	**462 D**	**320 D**	**1.03**	**245 D**	**27.4 Q, D**	**919 D**	<1.00	**6.79 D**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**42.9 D**	<1.00	--	--	--	--
	11/06/19	**57.7**	**81.7**	**46.9**	**392**	**542**	**283**	**2.39 Q**	**308**	**26.5**	**1,230**	<2.02	**8.89 Q**	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	**77.6**	<2.02	--	--	--	--
DUP	11/06/19	**60.1**	**79.0**	**53.7**	**383**	**516**	**256**	**2.39**	**273**	**32.5 Q**	**1,200**	<2.04	**7.99**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	**68.0**	<2.04	--	--	--	--
	06/09/20	**54.7**	**64.7**	**38.4**	**304**	**495**	**354**	<2.01	**269**	**21.5**	**922**	<1.95	**6.52**	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	**18.1**	<1.04	--	--	--	--
DUP	06/09/20	**54.9**	**64.5**	**41.7**	**285**	**488**	**368**	<1.98	**263**	**28.3 Q**	**919**	<1.92	**7.01**	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	<0.992	**21.6**	<1.02	--	--	--	--
	09/23/20	**56.4**	**53.9**	**38.1**	**252**	**483**	**294**	**1.90**	**235**	**28.5 Q**	**873**	<1.99	**6.68**	<1.99	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	**14.1**	<1.04	--	--	--	--
DUP	09/23/20	**60.6**	**59.2**	**41.5**	**285**	**480**	**314**	**1.59**	**247**	**24.3 Q**	**816**	<2.04	**6.79**	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**16.5**	<1.07	--	--	--	--
	12/16/20	**56.3**	**62.0**	**48.7**	**295**	**465**	**315**	**1.83**	**251**	**25.9**	**962**	<1.94	**7.54**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	**12.6**	<1.03	--	--	--	--
DUP	12/16/20	**56.5**	**59.3**	**41.1**	**304**	**486**	**334**	**2.13**	**256**	**27.4**	**1,010**	<1.91	**7.61**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.98	<1.98	**12.7**	<1.02	--	--	--	--
	03/24/21	**65.0**	**65.1**	**49.5**	**266**	**620**	**329**	**2.16**	**263**	**30.4 Q**	**1,030**	<1.93	**11.1**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**15.6**	<1.03	--	--	--	--
DUP	03/24/21	**64.4**	**61.7**	**48.7**	**260**	**619**	**309**	**1.59**	**290**	**29.9 Q**	**969**	<1.91	**11.1**	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	<0.988	**14.7**	<1.02	--	--	--	--
	01/07/22	**42.9**	**32.2**	**30.0**	**122**	**383**	**143**	<2.04	**157**	**54.5**	**513**	<2.04	**20.2**	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04	<2.04
MW-32	02/01/19	<1.00	--	--	--	<1.00	<1.04	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	04/30/19	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	08/06/19	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	11/06/19	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	--	--	--	--
	06/09/20	<0.994	<0.994	<1.20	<0.994	<1.99	<1.08	<1.99	<0.994	<0.994	<0.994	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--
	09/23/20	<1.02	<1.02	<1.28	<1.02	<2.04	<1.12	<1.02	<1.02	<1.02	<1.02	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
	12/16/20	<1.00	<1.00	<1.21	<1.00	<2.00	<1.09	<1.00	<1.00	<1.00	<1.00	<1.94	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<2.00	<1.03	--	--	--	--
	03/24/21	<0.986	<0.986	<1.19	<0.986	<0.986	<1.07	<0.986	<0.986	<0.986	<0.986	<1.91	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<0.986	<1.02	--	--	--	--
MW-33	02/04/19	<1.00	--	--	--	**3.60**	**1.62**	--	**1.44 Q**	<1.00	**3.16**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	05/01/19	**1.18**	--	--	--	**7.93**	**2.17**	--	**2.33**	<1.01	**5.69**	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	08/08/19	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	11/07/19	<2.03	**2.55**	<2.03	**3.79**	**10.6**	<2.03	<2.03	**2.38**	<2.03	**6.54**	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	--	--	--	--
	06/08/20	**3.42**	**3.45**	**2.38**	**7.58**	**21.8**	**10.8 Q**	<1.95	**7.84**	**1.38 Q**	**13.7**	<1.88	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<0.974	<1.00	--	--	--	--
	09/21/20	<0.990	<0.990	<1.24	<0.990	<1.98	<1.09	<0.990	<0.990	<0.990	<0.990	<1.98	<0.990	<1.98	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<0.990	<1.04	--	--	--	--
	12/15/20	**1.27**	**1.12**	<1.20	**3.93**	**7.27**	**4.00**	<0.993	**2.34**	<0.993	**3.54**	<1.92	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<1.02	--	--	--	--
	03/23/21	<0.984	<0.984	<1.19	<0.984	<0.984	<1.07	<0.984	<0.984	<0.984	<0.984	<1.90	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<0.984	<1.01	--	--	--	--
	01/06/22	<1.98	<1.98	<1.98	<1.98	**2.50**	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
MW-34	06/09/20	<1.01	<1.01	<1.22	<1.01	<2.01	<1.10	<2.01	<1.01	<1.01	<1.01	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	09/23/20	<1.01	<1.01	<1.27	<1.01	<2.03	<1.11	<1.01	<1.01	<1.01	<1.01	<2.03	<1.01	<2.03	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/16/20	<1.03	<1.03	<1.24	<1.03	<2.06	<1.12	<1.03	<1.03	<1.03	<1.03	<1.99	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<2.06	<2.06	<2.06	<1.06	--	--	--	--
	03/24/21	<0.987	<0.987	<1.19	<0.987	<0.987	<1.08	<0.987	<0.987	<0.987	<0.987	<1.91	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<1.02	--	--	--	--
	01/06/22	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01	<2.01
	03/22/22	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
	06/02/22	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98	<1.98
MW-35	06/08/20	**1.34**	**2.84**	<1.22	**4.02**	**2.86**	**3.64 Q**	<2.02	<1.01	**1.02**	**4.34**	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	09/21/20	**1.15**	**5.07**	<1.27	**15.2**	**3.94**	**11.8**	<1.01	**5.01**	<1.01	**17.3**	<2.03	<1.01	<2.03	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/16/20	<1.03	**5.43**	<1.25	**18.7**	**4.98**	**13.2**	<1.03	**5.34**	**1.75 Q**	**18.6**	<2.00	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.06	--	--	--	--
	03/23/21	<0.989	**3.71**	<1.20	**14.4**	**2.89**	**10.8**	<0.989	**4.81**	<0.989	**19.0**	<1.91	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<0.989	<1.02	--	--	--	--
	01/06/22	<1.96	**2.56**	<1.96	**5.92**	<1.96	**4.17**	<1.96	<1.96	<1.96	**7.42**	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96	<1.96
	03/23/22	<1.89	**3.60**	<1.89	**11.7**	2.53	**9.08**	<1.89	4.46	<1.89	**15.2**	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
	06/02/22	<1.99	**2.17**	<1.99	**5.97**	<1.99	**4.50**	<1.99	<1.99	<1.99	**7.58**	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99	<1.99
MW-36	01/06/22	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94	<1.94
	03/23/22	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
	06/02/22	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93	<1.93
MW-37	01/06/22	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
	03/23/22	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02
	06/02/22	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92	<1.92
B-A-GW	09/27/17	**4.57**	--	--	--	**23.9**	**13.0**	--	**13.3**	**1.70 J+**	**32.9**	--	<1.06	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-B-GW	09/27/17	<1.05	--	--	--	<1.05	<1.05	--	<1.05	**2.29 J+**	**1.31 J+**	--	<1.05	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
B-C-GW	09/27/17	<1.05	--	--	--	<1.05	<1.05	--	<1.05	**3.77 J+**	**1.43 J+**	--	<1.05	--	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05	--	--	--	--	--	--	--	--
B-D-GW	09/27/17	**15.7**	--	--	--	**112**	**38.2**	--	**24.6**	**4.73 J+**	**93.6**	--	**1.87**	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-E-GW	09/27/17	**8.04**	--	--	--	**85.4**	**3,220**	--	**1,310**	**17.2**	**1,020**	--	**208**	--	**1.99**	<1.10	<1.10	<1.10	<1.10	<1.10	<1.10	--	--	--	--	--	--	--	--
B-F-GW	08/29/17	**21.8**	--	--	--	**347 H**	**11,100 H**	--	**5,240**	**138 H**	**5,410**	--	**5,070**	--	**22.7**	<2.17	<2.17	<2.17	<2.17	<2.17	<2.17	--	--	--	--	--	--	--	--
B-G-GW	08/29/17	**27.2**	--	--	--	**200 H**	**14,400 H**	--	**5,860**	**56.2 H**	**5,410**	--	**772**	--	**14.5**	<2.25	<2.25	<2.25	<2.25	<2.25	<2.25	--	--	--	--	--	--	--	--
B-H-GW	09/28/17	<1.11	--	--	--	**18.4**	**3,640**	--	**738**	**34.6**	**8,810**	--	**3.35**	--	**1.23**	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
B-I-GW	09/28/17	**12.7**	--	--	--	**254**	**81.2**	--	**57.3**	**3,150**	**80**	--	**194**	--	**14.3**	**1.52**	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-J-GW	09/28/17	**16.1**	--	--	--	**763**	**377**	--	**282**	**3,330**	**524**	--	**350**	--	**19.6**	**1.51**	<1.07	<1.07	<1.07	<1.07	<1.07	--	--	--	--	--	--	--	--
B-K-GW	09/28/17	**16.7**	--	--	--	**317**	**72**	--	**57.9**	**513**	**221**	--	**33.6**	--	**1.59**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-L-GW	09/28/17	<1.09	--	--	--	<1.09	<1.09	--	**2.32**	**2.01 J+**	**20.7**	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-N-GW	08/29/17	**7.19**	--	--	--	**83.4 H**	**2.75 H**	--	<2.12	**2.84 J+, H**	<2.12	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-O-GW	08/29/17	**5.92**	--	--	--	**67.0 H**	**19.5 H**	--	<2.13	**20.8 H**	**396**	--	<2.13	--	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--	--	--	--	--
B-P-GW	08/28/17	<2.15	--	--	--	**44.5 H**	**17.9 H**	--	**9.78**	**4.87 J+, H**	**149**	--	<2.15	--	<2.15	<2.15	<2.15	<2.15	<2.15	<2.15	<2.15	--	--	--	--	--	--	--	--
B-Q-GW	08/28/17	<2.20	--	--	--	**7.61 H**	**11.1 H**	--	**4.21**	**6.09 J+, H**	**27.2**	--	<2.20	--	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	--	--	--	--	--	--	--	--
B-R-GW	08/28/17	<2.13	--	--	--	**4.82 H**	**3.88 H**	--	<2.13	**18.8 H**	**12.3 J+**	--	<2.13	--	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--	--	--	--	--
B-S-GW	08/28/17	<2.12	--	--	--	**3.90 H**	**6.28 H**	--	<2.12	**2.25 J+, H**	**5.36 J+**	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-T-GW	08/29/17	<2.20	--	--	--	**2.52 H**	**2.75 H**	--	<2.20	**2.69 J+, H**	<2.20	--	<2.20	--	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20	--	--	--	--	--	--	--	--
B-U-GW	08/29/17	<2.12	--	--	--	<2.40 H	**3.02 H**	--	<2.12	**2.51 J+, H**	<2.12	--	<2.12	--	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	<2.12	--	--	--	--	--	--	--	--
B-V-GW	09/29/17	**14.1**	--	--	--	**96.5**	**40.6**	--	**38.4**	**27.5**	**234**	--	**7.55**	--	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	--	--	--	--	--	--	--
B-W-GW	09/29/17	<1.08	--	--	--	<1.08	<1.08	--	<1.08	<1.08	**1.83 J+**	--	<1.08	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-X-GW	09/29/17	**20**	--	--	--	**169**	**114**	--	**106**	**13.7**	**204**	--	**3.46**	--	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	<1.08	--	--	--	--	--	--	--	--
B-1	06/12/18	<1.03	--	--	--	<1.03	<1.03	--	<1.03	**1.39**	**1.38**	--	<1.03	--	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
B-2	06/13/18	**7.2**	--	--	--	**42.7**	**58.2**	--	**33.1**	**3**	**608**	--	**2.61**	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-3	06/12/18	**20.2**	--	--	--	**178**	**191**	--	**136**	**7.71**	**480**	--	**8.18**	--	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	<1.03	--	--	--	--	--	--	--	--
B-4	06/13/18	**23.5**	--	--	--	**226**	**140**	--	**128**	**21**	**1,300**	--	**14.9**	--	**1.74**	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-5	06/18/18	**69.7**	--	--	--	**460**	**1,040**	--	**1,140**	**4.38**	**4,500**	--	**32.4**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
DUP	06/18/18	**62**	--	--	--	**466**	**1,080**	--	**1,120**	**3.50**	**4,410**	--	**33.9**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
B-6	06/18/18	**4.04**	--	--	--	**31.7**	**43.8**	--	**45**	**1.03**	**262**	--	**1.87**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
DUP	06/18/18	**3.93**	--	--	--	**35.3**	**39.6**	--	**42.6**	<1.00	**231**	--	**1.75**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--
B-7	06/12/18	<1.01	--	--	--	**8.75**	**6.77**	--	**4.78**	<1.01	**17**	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
B-8	06/12/18	**2.88**	--	--	--	**52.7**	<1.15	--	<1.15	**25.8**	**6.53**	--	<1.15	--	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	--	--	--	--	--	--	--	--
B-9	06/12/18	**3.48**	--	--	--	**37.4**	**19.1**	--	**14.7**	**28.6**	**55.5**	--	<1.02	--	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	--	--	--	--	--	--	--	--

Please refer to notes at end of table.

Table G-2
Historical Groundwater Analytical Results – Overbank Deposit Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
B-10	06/11/18	<1.00 H	--	--	--	<1.00 H	<1.17 H	--	<1.00 H	<1.00 H	<1.00 H	--	<1.00 H	--	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	<1.00 H	--	--	--	--	--	--	--	--
B-11	06/11/18	<1.06	--	--	--	**2.14**	<1.06	--	<1.06	<1.06	**1.35**	--	<1.06	--	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	<1.06	--	--	--	--	--	--	--	--
B-12	06/11/18	<1.04	--	--	--	**1.86**	<1.04	--	<1.04	<1.04	**1.08**	--	<1.04	--	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	--	--	--	--	--	--	--	--
B-13	06/11/18	<1.09	--	--	--	<1.09	<1.09	--	<1.09	<1.09	<1.09	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-14	06/11/18	<1.09	--	--	--	<1.09	**6.48**	--	**3.71**	<1.09	**3.49**	--	<1.09	--	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	--	--	--	--	--	--	--	--
B-16	06/18/18	**23.7**	--	--	--	**504**	**320**	--	**249**	<1.01	**477**	--	**2.19**	--	<1.01	<1.01	<1.01	<1.01	<1.01	<2.00	<1.01	--	--	--	--	--	--	--	--
DUP	06/18/18	**24.3**	--	--	--	**583**	**324**	--	**264**	<1.00	**481**	--	**2.31**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	--	--	--	--	--	--	--	--

Notes:

1. ng/L = Nanograms per liter (ppt [parts per trillion]).
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. J = The reported concentration is an estimated value.
5. J+ = Data results are estimated and may be biased high.
6. H = Sample was extracted outside of the EPA 537 recommended holding time of 14 days.
7. UJ = The not detected result is estimated due to estimation of reporting limit.
8. D = The RPD between the primary and field duplicate sample exceeded the 30% control limit. Issues with precision are suspected.
9. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.
10. -- = Value not available.
11. Sample locations with 'MW' in the ID are permanent monitoring wells. Sample locations with 'B' in the ID were collected from temporary boring locations.

PFBS *Perfluorobutanesulfonic acid* (C4)
PFBA *Perfluorobutanoic acid* (C4)
PFPeS *Perfluoropentane sulfonic acid* (C5)
PFPeA *Perfluoropentanoic acid* (C5)
PFHxS *Perfluorohexanesulfonoic acid* (C6)
PFHxA *Perfluorohexanoic acid* (C6)
PFHpS *Perfluoroheptane sulfonic acid* (C7)
PFHpA *Perfluoroheptanoic acid* (C7)
PFOS *Perfluorooctanesulfonic acid* (C8)
PFOA *Perfluorooctanoic acid* (C8)
PFNS *Perfluorononane sulfonic acid* (C9)
PFNA *Perfluorononaoic acid* (C9)
PFDS *Perfluorodecane sulfonic acid* (C10)
PFDA *Perfluorodecanoic acid* (C10)
PFUnA *Perfluoroundecanoic acid* (C11)
PFDoA *Perfluorododecanoic acid* (C12)
PFTrDA *Perfluorotridecanoic acid* (C13)
PFTeDA *Perfluorotetradecanoic acid* (C14)
MeFOSAA *Methyl perfluorooctanesulfonamidoacetic acid* (C8)
EtFOSAA *Ethyl perfluorooctanesulfonamidoacetic acid* (C8)
PFOSA *Perfluorooctane sulfonamide* (C8)
4:2 FTS *Fluorotelomer sulfonate* (C4)
6:2 FTS *Fluorotelomer sulfonate* (C6)
8:2 FTS *Fluorotelomer sulfonate* (C8)
11Cl-PF3OUdS *11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)
9Cl-PF3ONS *9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)
ADONA *4,8-Dioxa-3H-perfluorononanoate*
HFPO-DA *2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate* (GenX)

Table G-3
Historical Groundwater Analytical Results – Upper CRSA Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
M-GW-1 (40')	10/3/2017	**61.0**	--	--	--	**268**	**223**	--	**48.2**	**963**	**61.5**	--	**2.50**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
M-GW-2 (61.5')	10/3/2017	**10.1**	--	--	--	**29.0**	**32.3**	--	**6.77**	**60.5**	**9.34**	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
DW-1	7/19/2018	<1.00	--	--	--	<1.00	<1.09	--	<1.00	**1.65**	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	2/1/2019	<1.00	--	--	--	<1.00	<1.04	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/30/2019	<1.00	--	--	--	<1.00	<1.00	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	8/6/2019	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--
	11/6/2019	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	--	--	--	--
	6/9/2020	<0.994	<0.994	<1.20	<0.994	<1.99	<1.08	<1.99	<0.994	<0.994	<0.994	<1.92	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<0.994	<1.02	--	--	--	--
	9/23/2020	<1.01	<1.01	<1.26	<1.01	<2.01	<1.11	<1.01	<1.01	<1.01	<1.01	<2.01	<1.01	<2.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.06	--	--	--	--
	12/16/2020	<1.00	<1.00	<1.20	<1.00	<1.00	<1.08	<1.00	<1.00	<1.00	<1.00	<1.92	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.98	<1.00	<1.02	--	--	--	--
	3/24/2021	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	1/5/2022	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03	<2.03
DW-2	7/19/2018	<1.00	--	--	--	<1.00	<1.05	--	<1.00	<1.00	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	2/5/2019	<1.00	--	--	--	<1.00	<1.04	--	<1.00	**1.14 Q**	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	4/29/2019	<1.01	--	--	--	<1.01	<1.01	--	<1.01	**1.28**	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	--	--	--	--	--	--	--	--
	8/6/2019	<1.00	<1.00	<1.00	**1.28**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--
	11/8/2019	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	<2.06	--	--	--	--
	6/9/2020	<0.997	<0.997	<1.21	<0.997	<1.99	<1.09	<1.99	<0.997	<0.997	<0.997	<1.93	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<0.997	<1.03	--	--	--	--
	9/23/2020	<1.04	<1.04	<1.30	<1.04	<2.08	<1.15	<1.04	<1.04	<1.04	<1.04	<2.08	<1.04	<2.08	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.04	<1.09	--	--	--	--
	12/16/2020	<1.00	<1.00	<1.20	<1.00	<1.00	<1.08	<1.00	<1.00	<1.00	<1.00	<1.92	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.98	<1.00	<1.02	--	--	--	--
	3/24/2021	<0.993	<0.993	<1.20	<0.993	<0.993	<1.08	<0.993	<0.993	<0.993	<0.993	<1.92	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<0.993	<1.02	--	--	--	--
	1/5/2022	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02
DW-3	7/19/2018	<1.00	--	--	--	**2.08**	**1.92**	--	<1.00	**85.5**	**1.85**	--	**1.50**	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	2/1/2019	<1.00	--	--	--	<1.00	<1.06	--	<1.00	**10.8**	<1.00	--	<1.00	--	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--	--	--	--
	5/1/2019	<1.01	--	--	--	<1.01	<1.01	--	<1.01	**3.15**	<1.01	--	<1.01	--	<1.01	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	--	--	--	--	--	--	--	--
	8/6/2019	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**7.18**	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	**1.02**	--	--	--	--
	11/6/2019	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	**3.47**	<2.14	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	<2.13	--	--	--	--
	6/9/2020	<0.987	<0.987	<1.19	<0.987	<0.987	<1.08	<0.987	<0.987	<0.987	<0.987	<1.91	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<0.987	<1.02	--	--	--	--
	9/23/2020	<1.02	<1.02	<1.28	<1.02	<2.04	<1.12	<1.02	<1.02	**2.18**	<1.02	<2.04	<1.02	<2.04	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.02	<1.07	--	--	--	--
	12/16/2020	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.95	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<2.02	<1.01	<1.04	--	--	--	--
	3/24/2021	<1.01	<1.01	<1.22	<1.01	<1.01	<1.10	<1.01	<1.01	<1.01	<1.01	<1.96	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01	<1.04	--	--	--	--
	1/5/2022	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02	<2.02

Notes:

1. ng/L = Nanograms per liter (ppt [parts per trillion]).
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. -- = Value not available.
5. Q = Identification of analyte could not be confirmed. Ion ratio exceeded control limit.

PFBS *Perfluorobutanesulfonic acid* (C4)
PFBA *Perfluorobutanoic acid* (C4)
PFPeS *Perfluoropentane sulfonic acid* (C5)
PFPeA *Perfluoropentanoic acid* (C5)
PFHxS *Perfluorohexanesulfonoic acid* (C6)
PFHxA *Perfluorohexanoic acid* (C6)
PFHpS *Perfluoroheptane sulfonic acid* (C7)
PFHpA *Perfluoroheptanoic acid* (C7)
PFOS *Perfluorooctanesulfonic acid* (C8)
PFOA *Perfluorooctanoic acid* (C8)
PFNS *Perfluorononane sulfonic acid* (C9)
PFNA *Perfluorononaoic acid* (C9)
PFDS *Perfluorodecane sulfonic acid* (C10)
PFDA *Perfluorodecanoic acid* (C10)
PFUnA *Perfluoroundecanoic acid* (C11)
PFDoA *Perfluorododecanoic acid* (C12)
PFTrDA *Perfluorotridecanoic acid* (C13)
PFTeDA *Perfluorotetradecanoic acid* (C14)
MeFOSAA *Methyl perfluorooctanesulfonamidoacetic acid* (C8)
EtFOSAA *Ethyl perfluorooctanesulfonamidoacetic acid* (C8)
PFOSA *Perfluorooctane sulfonamide* (C8)
4:2 FTS *Fluorotelomer sulfonate* (C4)
6:2 FTS *Fluorotelomer sulfonate* (C6)
8:2 FTS *Fluorotelomer sulfonate* (C8)
11Cl-PF3OUdS *11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)
9Cl-PF3ONS *9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)
ADONA *4,8-Dioxa-3H-perfluorononanoate*
HFPO-DA *2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate* (GenX)

Table G-4
Groundwater Analytical Results – Production Wells - PFAS
Fire Training Facilities
Portland International Airport
Portland, Oregon

Sample Location	Sample Date	PFBS	PFBA	PFPeS	PFPeA	PFHxS	PFHxA	PFHpS	PFHpA	PFOS	PFOA	PFNS	PFNA	PFDS	PFDA	PFUnA	PFDoA	PFTrDA	PFTeDA	MeFOSAA	EtFOSAA	PFOSA	4:2 FTS	6:2 FTS	8:2 FTS	11Cl-PF3OUdS	9Cl-PF3ONS	ADONA	HFPO-DA
		Concentrations in ng/L																											
PDX QTA Well	8/24/2017	<2.23	--	--	--	<2.23	<2.23	--	<2.23	<1.05	<2.23	--	<2.23	--	<2.23	<2.23	<2.23	<2.23	<2.23	<2.23	<2.23	--	--	--	--	--	--	--	--
	1/5/2022	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00

Notes:

1. ng/L = Nanograms per liter (ppt [parts per trillion]).
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. -- = Value not available.

PFBS *Perfluorobutanesulfonic acid* (C4)
PFBA *Perfluorobutanoic acid* (C4)
PFPeS *Perfluoropentane sulfonic acid* (C5)
PFPeA *Perfluoropentanoic acid* (C5)
PFHxS *Perfluorohexanesulfonoic acid* (C6)
PFHxA *Perfluorohexanoic acid* (C6)
PFHpS *Perfluoroheptane sulfonic acid* (C7)
PFHpA *Perfluoroheptanoic acid* (C7)
PFOS *Perfluorooctanesulfonic acid* (C8)
PFOA *Perfluorooctanoic acid* (C8)
PFNS *Perfluorononane sulfonic acid* (C9)
PFNA *Perfluorononaoic acid* (C9)
PFDS *Perfluorodecane sulfonic acid* (C10)
PFDA *Perfluorodecanoic acid* (C10)
PFUnA *Perfluoroundecanoic acid* (C11)
PFDoA *Perfluorododecanoic acid* (C12)
PFTrDA *Perfluorotridecanoic acid* (C13)
PFTeDA *Perfluorotetradecanoic acid* (C14)
MeFOSAA *Methyl perfluorooctanesulfonamidoacetic acid* (C8)
EtFOSAA *Ethyl perfluorooctanesulfonamidoacetic acid* (C8)
PFOSA *Perfluorooctane sulfonamide* (C8)
4:2 FTS *Fluorotelomer sulfonate* (C4)
6:2 FTS *Fluorotelomer sulfonate* (C6)
8:2 FTS *Fluorotelomer sulfonate* (C8)
11Cl-PF3OUdS *11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid* (F-53B)
9Cl-PF3ONS *9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid* (F-53B)
ADONA *4,8-Dioxa-3H-perfluorononanoate*
HFPO-DA *2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate* (GenX)