

<u>Document Location</u> (name/type/location)	<u>Document</u> <u>Date</u>	<u>Document Name</u>	<u>Author</u>	Descripiton of Information (type, general subject and PFAS relevance)
Admin records	6/4/1977	Standing Operating Procedure- Stanitary Landfill Management	Directorate of Facilities Engineering, U.S. Army Engineer Center and Fort Belvoir	No relevance to PFAS
Admin records	10/5/1979	Army Pollution Abatement Program Land Disposal Study	United States Army Environmental Hygiene Agency	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0192.pdf?csf=1&e=BXVg7s		Installation Assessment of U.S. Army Engineer Center and Fort Belvoir, Virginia	Chemical Systems Laboratory	Describes use and storage of pesticide/herbicide/fertilizers, as well as a pesticide inventory
General Documents	11/1/1982	Plating Wastes Survey	U.S. Army Mobility Equipment Research and Development Command, Fort Belvoir, Virginia	Describes specific plating and metal finishing operations, as well as wastewater flows and treatment. No plating activities listed for Fort Belvoir.
https://arcadiso365.sharepoint.com/:b:/r/sit es/USAEC_PFOS_PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 0Region%205/FTBELVOIR0106.pdf?csf=1 &e=bkT7Bp		Ground-Water Contamination Migration Study (Building 324)	United States Army Environmental Hygiene Agency	No relevance to PFAS
	11/13/1988	Phase II RCRA Facility Assessment of the U.S. Army Engineer Center and Fort Belvoir, Fort Belvoir, Virginia	A.T. Kearney, Inc.	Contains information on a former electroplating facility at Ft. Belvoir.
Admin records	3/16/1990	Geohydrologic Study No. 38-26-K845-90	United States Army Environmental Hygiene Agency	No relevance to PFAS



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From Site Visit - CERCLA Admin Record - CERCLA	9/1/1990	Environmental Baseline Study for the Engineering Proving Ground Vol. 1	USATHAMA	Provides information on installation background, environmental, geologial, hydrological, etc. conditions. Mentions several dumps. Septic Tank and Leach Fields listed. Wash Rack mentioned - building 2014
From Site Visit - CERCLA Admin Record - CERCLA	9/1/1990	Environmental Baseline Study for the Engineering Proving Ground Vol. 2	USATHAMA	Sampling at possibly contaminated sites - including the hydrocarbon spil area (M-26).
Admin records	1/1/1992	Groundwater Monitoring and Sampling and Analysis Plan	U.S. Army Fort Belvoir Directorate of Engineering and Housing	Description of sampling procedures for the FTA
Admin records	3/1/1992	Final USATHAMA Delivery Order 10 Preliminary Assessment Report Addendum	Roy F. Weston, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0140.pdf?csf=1&e=wMrdXP	7/1/1992	Solid Waste Management Unit Study	CH2M Hill	Mention of "Fire Control Training Area" and "EPG Inactive Fire Equipment Test Area", as well as pesticide mixing rooms and storage, and Building 363, Room B114 - Former Electroplating Room
From Site Visit - CERCLA Admin Record - CERCLA	7/1/1992	Solid Waste management Study	CH2M Hill	Landfills, hazardous waste storage, wash racks, FTAs listed (K-1 - 5), silver recovery units etc. OWS from former Fta mentioned - has not been in use since 1990 since FTA activities ceased. Sewage treatment plant #1 - unit presently acts as the lift station for 60 percent of the bases sewage. Sewage treatment plant #2 - 40% of the sewage from the base flows through the comminutor on its way to the POTW
Admin records	10/13/1992	Underground Storage Tank Management Plan and Initial Remedial Action Plan	Applied Ordnance Technology, Inc.	No relevance to PFAS
Admin records	10/16/1992	BRDEC UST Inventory Form and Photo Log	Applied Ordnance Technology, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0155.pdf?csf=1&e=Fzx4c7	5/1/1993	Closure Plan- Underground Storage Tanks at Buildings 181, 324, 714	Department of the Army	No relevance to PFAS
Admin records	3/4/1994	Site Characterization Report (Building 325)	Law Engineering and Environmental Services, Inc.	No relevance to PFAS



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Admin records	4/5/1994	Petroleum Hydrocarbons Site Assessment Report	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	9/7/1994	RE: Contract No. DACW41-89-D-0122- Water Quality Testing for NPDES Permit No. 0002411	Dames & Moore, Inc.	No relevance to PFAS
Admin records	12/5/1994	Case Closed (Building 2201)	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin Records	12/21/1994	Installation Range Procedures and Utilization of Training Areas	United States Department of the Army	No relevance to PFAS
Admin records	10/6/1995	Operation and Maintenance Manual- Repair Fuel Storage Facility (Building 1124)	Superior Management Services, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 0Region%205/FTBELVOIR0069.pdf?csf=1 &e=waueFC		Groundwater Investigation: Compound 300 - Totten Road	Vista Technology, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0104.pdf?csf=1&e=XB1qVu	12/24/1996	Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of DAA and DRMO)	Environmental Restoration Company	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 ORegion%205/FTBELVOIR0105.pdf?csf=1 &e=35Uxir	1/7/1997	Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of DAA)	Environmental Restoration Company	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 0Region%205/FTBELVOIR0101.pdf?csf=1 &e=WkYha6		Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of SWMU M-18 and DAA)	Environmental Restoration Company	No relevance to PFAS
Admin records	2/14/1997	Quality Control Reports PAHs	Environmental Testing & Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0102.pdf?csf=1&e=Qc4g18	2/17/1997	Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of DAA)	Environmental Restoration Company	No relevance to PFAS



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Admin records	2/17/1997	Underground Storage Tank Activity Report (Building 773)	Sub-Tech Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0103.pdf?csf=1&e=crSMEY		Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of DAA)	Environmental Restoration Company	No relevance to PFAS
Admin records	3/10/1997	Tank Closure Report (Building 1124)	Superior Management Services, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%2		Modifications to the Closure Plan for Davison Army Airfield Fire Training Area		Description of Davison Army Airfield Fire Training Facility and related analyses
Admin records	8/1/1997	Modifications to the Closure Plan Aboveground Storage Tank at Marina Facilities		No relevance to PFAS
Admin records	8/1/1997	Modification to the Closure Plan Battery Acid Treatment Pit at Building 2021		No relevance to PFAS
Admin records	6/20/1997, 8/15/1997, 8/29/1997	Underground Storage Tank Activity Reports (Building 324)	Sub-Tech Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0141.pdf?csf=1&e=oRIRxR		Groundwater Closure Report- Fire Training Area at Davison Army Airfield	Department of the Army	Description of the Fire Training Area (FTA)
Admin Records	3/13/1998	Corrective Action Plan, Building 2217/2209	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0108.pdf?csf=1&e=tGRDbr	4/21/1998	Site Characterization Report (Building 324 Site)	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	7/1/1998	Resonse to VDEQ Comments for 19 RCRA Sites at Fort Belvoir	Dewberry	
Admin records	10/1/1998	Aboveground Storage Tank Report With As Builts	Koester Environmental Services, Inc.	No relevance to PFAS



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https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 0Region%205/FTBELVOIR0018_Site_Characterization_Bldg_1132_and_1133(2).pdf ?csf=1&e=F5Q2Ov		Site Characterization Report (Buildings 1132 and 1133)	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	1/20/1999	Non-Regulated Underground Storage Tank Removal Report (Building 773A)	Koester Environmental Services, Inc.	No relevance to PFAS
Admin records	2/1/1999	Underground Storage Tank Closure Report (Building 773B)	Koester Environmental Services, Inc.	No relevance to PFAS
Admin records	5/21/1999	Case Closed; Ft. Belvoir	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	9/30/1999	RE: Final Closure for Battery Acid Pit at Building 1957	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	Fall 1999	DSERTS on the WEB- Version 4.2.1 Training	U.S. Army Environmental Center	No relevance to PFAS
Admin records	11/1/1999	Operation and Maintenance Manual (Building 390)	Enviro-Industries, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%2	3/20/2000	Site Characterization Report Update	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%2	11/17/2000	RE: U.S. Army Fort Belvoir, Engineering roving Ground	Commonwealth of Virginia, Department of Environmental Quality	Includes a map with Open Burning/Open Detonation Unit at Range T-6A
Admin records	1/18/2001	Site Characterization Report (Building 773- Tank A)		No relevance to PFAS
Admin records	3/13/2001	Case Closed; Forg Belvoir, Building 390 (POL Area)	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	3/22/2001	Installation and Operating Instructions for Gast Hazardous Duty Regenair Blowers	Gast Manufacturing Corporation	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	4/3/2001	Letter - PC#97-3109; Case Closed; Fort Belvoir Buildings 2009 and 2034	VDEQ	



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Admin Records	4/16/2001	U.S. Army Active/Inactive Range Inventory	United States Department of the Army	No relevance to PFAS
Admin records	6/13/2001	Corrective Action Plan Addendum (Building 324)	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%2	12/1/2001	Range Inventory Report for Closed, Transferring, and Transferred Ranges	Malcolm Pirnie, Inc.	Mention of fuels, water purification systems, and paints
Admin records	3/7/2002	Dual-Phase Extraction Operations and Maintenance Manual	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin Records	3/14/2002	Facsimile Transmittal Letter	Department of the Army	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0014_2002_11_24_SCR.pdf?csf=1&e=U7WUxM	3/27/2002	Site Characteriation Report- Building 1124	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	4/1/2002	Closure Plan Site M-27 Waste Ordnanace Pits at Range 1	Dewberry and Davis LLC	
Admin records	4/5/2002	Coverage under the General VPDES Permit for Petroleum Contaminated Sites	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin Recordds	5/16/2002	Report Abstract	United States General Accounting Office	No relevance to PFAS
Admin Records	5/29/2002	Phytoremediation Recommendations Letter	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	5/29/2002	Phytoremediation Recommendations Letter	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	10/1/2002	General Site History and Initial Abatement Measures Plan Hydrocarbon Spill Area, M-26	Dewberry	Repetitive information; soil removal proposed to eliminate petroleum contaminated soils from site. Figures of site provided with soil borings.
Admin records	10/16/2002	Summary of Air Permit Requirements- Building 1199	Mactec Engineering and Consulting, Inc.	No relevance to PFAS



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Admin records	10/24/2002	Ground-Water Gauging Report- Third Quarter 2002	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	11/1/2002	Corrective Action Plan (Building 1199)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	12/9/2002	Cost Proposal for Continued Corrective Action Plan Implementation at Buildings 210, 211, 717, 1133, 1199, 3138, 3161		No relevance to PFAS
Admin Records	12/12/2002	Facsimile Transmittal Letter	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin record	12/31/2002	Corrective Action Plan (Building 247)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	1/13/2003	CAP Implementation Report (Building 1805)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	1/31/2003	Underground Storage Tank System Integrity Testing Report - Year 2002	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	2/10/2003	Site Characterization Report Addendum (Building 1197)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin Records	3/20/2003	Corrective Action Update Meeting	Fort Belvoir Petroleum Program Management	No relevance to PFAS
Admin records	4/1/2003	Army Environmental Cleanup Strategy	Department of the Army	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sit es/USAEC_PFOS_PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2		Ground-Water Gauging and Remedial Endpoint Re- Evaluation Report, Fourth Quarter 2002 (Building 2217/2209)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%2DRegion%205/FTBELVOIR0014_2003_1st_dtr_bldg_1805_CMR.pdf?csf=1&e=8eecL		Post-Closure Ground-Water Gauging Report- First Quarter 2003 (Building 1805)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	5/27/2003	Veeder-Root Systems, Annual Evaluation Report- Year 2002	Mactec Engineering and Consulting, Inc.	No relevance to PFAS



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https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%2 ODocuments/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0015_T_17_scanned_final_report.pdf?csf=1&e=MhsAAs		Hydrogeologic Report (T-17 Area)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013 2003 2ndqtrbldg 773 GWMR.pdf?csf=1&e=zbiKtp	7/15/2003	Ground-Water Gauging Report- Second Quarter 2003	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC PFOS PFOA/PFAS/General% 20Documents/READ%20DATA/Belvoir%2 ORegion%205/FTBELVOIR0014 2003 2nd qtr bldg 1805 CMR.pdf?csf=1&e=6azJSD		Post-Closure Ground-Water Gauging Report- Second Quarter 2003 (Building 1805)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	7/29/2003	Cost Proposal For Corrective Action Implementation at Buildings 717, 3161, and 3138	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin Records	7/29/2003	Corrective Action Monitoring Reports (Second Quarter 2003)	Mactec Engineering and Consulting, Inc.	Description of continued remediation efforts for petroleum-based spill
Admin records	9/23/2003	Soil Approval Contract Form (Building 324)	Clean Earth of Maryland, Inc.	No relevance to PFAS
Admin records	10/1/2003	Fort Belvoir Installation Action Plan	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	10/29/2003	Engineer Proving Ground SWMU Site Closure Plans	Unknown	site M-26 identified; former hydrocarbon tank was located here. M-7 fire equipment test area used in the mid 1960s. A flammable liquid was placed on top of a large tank and ignited. Remaining tank contents were drained into the nearby creek
Admin records	1/13/2004	Veeder-Root Systems, Annual Evaluation Report- Year 2003	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_2004_1st_Qtr_256_GWMR.pdf?csf=1&e=viJ10w		Post-Operational Ground-Water Monitoring Report- First Quarter 2004	Mactec Engineering and Consulting, Inc.	No relevance to PFAS



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Admin records	7/8/2004	Case Closed, Fort Belvoir- Building 3138	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	7/20/2004	Case Closed, Fort Belvoir- Building 210	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_2nd_Qtr_2004-Post-Op_GW_Monitoring_Report.pdf?csf=1&e=y2zhJ1	8/3/2004	Post-Operational Ground-Water Monitorign Report- Second Quarter 2004 (Building 256)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	8/3/2004	Post Operational Groundwater Monitoring Report (Building 256)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	9/1/2004	Compliance-Related Cleanup Guidance Manual	Office of the Assistant Chief of Staff for Installation Management	No relevance to PFAS
Admin records	9/21/2004	Veeder-Root Systems, Annyal Evaluation Report- Year 2004	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_3rd_Qtr_2004-Post-Op_GW_Monitoring_Report.pdf?csf=1&e=L6JaY2		Post-Operational Ground-ater Monitoring Report - Fourth Quarter 2004 (Building 256)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	1/31/2005	Completion of Activities Report- Analytical Results (Buildings 3151 & 3121)	ECG Industries, Inc.	Contains pesticide/herbicide test methods, metals data, soil data
Admin records	1/31/2005	Completion of Activities Report- Analytical Results (Buildings 187, 1124, 1462, 1985, 3145, & 3151)	ECG Industries, Inc.	No relevance to PFAS
Admin records	2/23/2005	Site Characterization Report Addendum	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	3/1/2005	U.S. Army Garrison Fort Belvoir Installation Action Plan for Compliance Cleanup	(multiple)	No relevance to PFAS



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https://arcadiso365.sharepoint.com/:b:/r/sit	3/1/2005	Resource Conservation and Recovery Act Facility	Department of the Army	Specific mention of AFFF fire fighting foam in the
es/USAEC_PFOS_PFOA/PFAS/General%		Investigation		Fire Control Training Area Oil/Water Separator
20Documents/READ%20DATA/Belvoir%2				(SWMU D-02) and Fire Control Training Area
From Site Visit - CERCLA Admin Record -	5/1/2005	Site Investigation Summary Hydrocarbon Spill	Dewberry	Repetitive information. Mentions the transfering
CERCLA		Area, M-26		of property rights at M-26 to VDOT for Fairfax
				County Parkway. Geology, Surface water flow,
Admin records	5/27/2005	FY 2006 U.S. Army Garrison Fort Belvoir, Virginia,	(multiple)	No relevance to PFAS
		Installation Action Plan		
Admin records	5/27/2005	FY 2006 U.S. Army Garrison Fort Belvoir, Virginia,	(multiple)	No relevance to PFAS
		Compliance-Related Cleanup Installation Action		
https://arcadiso365.sharepoint.com/:b:/r/sit	5/31/2005	Plan Ground-Water Gauging Report- First Quarter 2003	Mactec Engineering and	No relevance to PFAS
es/USAEC PFOS PFOA/PFAS/General%		(Building 717) Ground-Water Gauging Report- First Quarter 2003 Mactec Engineering and Consulting, Inc.		NO Televance to FFAS
20Documents/READ%20DATA/Belvoir%2			Consulting, Inc.	
0Region%205/FTBELVOIR0013 2005 1st				
Qtr Bldg 717 Post-				
Op Rpt.pdf?csf=1&e=SpW7H0				
From Site Visit - CERCLA Admin Record -	6/1/2005	Groundwater Investigation Summary Report SWMU	Dewberry	SWMU M-27 was used in the mid-to-late 1950s
CERCLA		M-27	·	for waste ammunition and explosives.
Admin records	7/18/2005	Case Closed; Fort Belvoir Storage Depot, Building	Commonwealth of	No relevance to PFAS
		717	Virginia, Department of	
			Environmental Quality	
https://arcadiso365.sharepoint.com/:b:/r/sit	7/20/2005	Summary of History and Current Status of Solid	Department of the Army	Inclues site description and cleanup strategy for
es/USAEC PFOS PFOA/PFAS/General%		Waste Management Units (SWMUs)		Fire Control Training Area and related sites
20Documents/READ%20DATA/Belvoir%2				
0Region%205/FTBELVOIR0187.pdf?csf=1				
<u>&e=2zwlFv</u>				
Admin records	8/29/2005	Veeder-Root Systems, Annyal Evaluation Report-	Mactec Engineering and	No relevance to PFAS
, tallilli 10001d0	3,20,200	Year 2005	Consulting, Inc.	110 1010 1011 110
From Site Visit - CERCLA Admin Record -	9/1/2005	Response to Comments: Site Investigation	Dewberry	Repetitve information. Depicts the Right of Way
CERCLA		Summary Report Hydrocarbon Spill Area M-26		boundary for VDOT.
Admin records	9/2/2005	Injection Well- Building 324	Mactec Engineering and	No relevance to PFAS
			Consulting, Inc.	
Admin records	9/9/2005	Solid Waste Management Units Background and	Tetra Tech, Inc.	No relevance to PFAS
		Scope of Work		



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From Site Visit - CERCLA Admin Record - CERCLA	10/25/2005	Phase III Soil and Groundwater Investigation Report SWMU M-26	Mactec Engineering and Consulting, Inc.	Repetitve information. VDOT ROW is located along the southern portions of SWMU M-26. 1968 release primarily impacted soil and groundwater along the northern (upstream) side of the site access road - acces road is elevated and forms a dam which restricted the flow from mograting laterally downgradient across the access road. Thick, impermeable clay,= likely limited the
Admin records	11/2/2005	Service Order	DPW-ENRD	No relevance to PFAS
Admin records	12/20/2005	Case Closed, Fort Belvoir - Building 1199	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	3/1/2006	Environmental Investigation and Removal Plan SWMU M-27	Conti Environment and Infrastructure, Inc.	Figures depicting M-27 provided. Background information provided. M-27 was used from the mid-to-late 1950s for the destruction of ammunitions and explosives.
From Site Visit - CERCLA Admin Record - CERCLA	3/16/2006	Support of Excavation and Dewatering Plan at SWMU M-26	Conti Environment and Infrastructure, Inc.	Excavation of M-26 piping
From Site Visit - CERCLA Admin Record - CERCLA	4/1/2006	Remedial Implementation Work Plan SWMU M-26	Conti Environment and Infrastructure, Inc.	Excavation, and containerization of impacted soils, removal of exisiting wells, etc. Well removal schedule provided. Excavation work plan attached.
Admin Records	4/6/2006	Corrective Action Monitoring Reports (First Quarter 2006)	Mactec Engineering and Consulting, Inc.	Description of continued remediation efforts for petroleum-based spill
Admin Records	4/11/2006	Summary of Air Permit Requirements- Building 1197	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	4/11/2006	Summary of Air Permit Requirements- Building 1197	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	4/11/2006	Monitoring Well Closure Report, Fort Belvoir, Virginia	Mactec Engineering and Consulting, Inc.	
Admin records	5/9/2006	Post-Operational Monitoring Report (Building 900)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	5/10/2006	Additional Piping Excavation Plan SWMU M-26	Unknown	Part of FTBL-68. Consisted of piping infrastructure connecting it to FATTS area with contaminated soils around it
Admin records	6/12/2006	Case Closed; Fort Belvoir, Building 900	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS



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https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0182.pdf?csf=1&e=CaGAPI		Underground Hazardous Waste Storage Tank at Building 1124	Commonwealth of Virginia, Department of Environmental Quality	Mention of "fire suppression system" in Defense Ceta (one of Ft. Belvoir's tenant facilities), and in Belvoir R& D Center
Admin Records	8/10/2006	Corrective Action Monitoring Reports (Second Quarter 2006)	Mactec Engineering and Consulting, Inc.	Description of continued remediation efforts for petroleum-based spill
Admin records	8/11/2006	Directed Shutdown of Building 247 and 3161 Remediation Systems	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin Records	9/1/2006	Final Site Inspection Work Plan, Fort Belvoir, Fairfax County, Virginia	Malcolm Pirnie, Inc.	No relevance to PFAS
General Documents	9/1/2006	Draft Operational Range Assessment Program Phase I Qualitative Assessment Report	EA Engineering, Science, and Technology, Inc.	No specific relevance to PFAS
Admin records	10/24/2006	Health and Safety Plan for Petroleum-Hydrocarbon Contaminated Siets at Fort Belvoir, Virginia	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin Records (FTBELVOIR0001.pdf)	11/1/2006	Site Safety and Health Plan, Final	Conti Environment and Infrastructure, Inc.	Ordinance and explosive use, disposal, and storage
Admin Records	3/1/2007	Range Procedures and Utilization of Training Areas	United States Department of the Army	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	3/1/2007	Phase II Remediation Plan Former Aboveground Tanks Site (FATTS)	Tetra Tech Inc.	Background site history, topography, geology, surfacewater and groundwater flow described. Figures provided.
From Site Visit - CERCLA Admin Record - CERCLA	5/1/2007	Final Environmental Investigation Summary Report SWMU M-7/M-18	Tidewater, Inc. and Mactec Engineering and Consulting, Inc.	SWMU M-7 is a circular concrete based pit, 50 feet in diameter. M-18 is 3 abandonded USTs south of building 2037/5037 (5037 is the new numbering for the building). USTs no larger than 10,000 gallons stored flammable liquids like diesel that were used from 1952-1973 at M-7. Piping at -18? Topography, surfacewater, geology, hydrogeology described. Nine soil and 13 groudnwater samples tested for metal, VOCs and SVOCs. Figures with site location, groundwater monitoring wells, and gradient provided.



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From Site Visit - CERCLA Admin Record - CERCLA	5/1/2007	Final Environmental Investigation Summary Report AOPC-04	Tidewater, Inc. and Mactec Engineering and Consulting, Inc.	AOPC-04 is assumed to be part of the fire equipment testing area and/or fuel storage area. Consists of a concrete retaining wall, metal retaining wall, suspect cistern, concrete sump, fuel tank loading area, piping, and shut off valve here. Located next to a Former Burning Slab (AOPC-03B). Topography, surfacewater, geology, hydrogeology described. Four soil and 3 groudnwater samples tested for metal, VOCs and SVOCs. Figures with site location, groundwater monitoring wells, and gradient provided.
From Site Visit - CERCLA Admin Record - CERCLA	5/1/2007	Final Environmental Investigation Summary Report Petroleum Storage Area (PSA)-2033 at Engineer Proving Ground	Tidewater Inc.	2,000 gallon diesel UST was removed. Left behind contaminated soils. No action nesessary if the area was not changed/developed. Possible site reuse prompted additional investigations into the state of the contamination. Figures of site and groundwater monitoring wells provided.
From Site Visit - CERCLA Admin Record - CERCLA	5/1/2007	Final Environmental Investigation Summary Report Petroleum Storage Area (PSA)-2034 at Engineer Proving Ground	Tidewater Inc.	4,000 gallons diesel UST removed from the northeastern side of building 5034. 113 tons of petroleum impacted soil was removed. Groundwater monitoring took place. Figures of site and groundwater monitoring wells provided.
From Site Visit - CERCLA Admin Record - CERCLA	5/1/2007	Final Environmental Investigation Summary Report Petroleum Storage Area (PSA)-2009 at Engineer Proving Ground	Tidewater Inc.	Two 10,00 gallon USTs removed near building 5009 along with 390 tons of impacted soil. a 1,000 gallon fuel oil tank was removed near build 5009 with contaminated soils. The site was monitoring and later closed.
Admin records	5/8/2007	Post-Operational Ground-Water Gauging Report (Former Building 773, Former Tanks B and C)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	6/1/2007	Phase II Environmental Investigation Plan FTA at Engineer Proving Ground	Unknown	Benzenes exceeded MCL at M-18 in the FTA. Groundwater flow from this site is semi-radially with flow to the north and east. Carbon Tetrachloride was also found at AOPC-04 above MCL. Piping at M-18. figures of sites with groundwater, surface water, groundwater gradients, etc. provided.
From Site Visit - CERCLA Admin Record - CERCLA		Phase II Environmental Investigation Plan Inside Heller Loop	Unknown	
Admin records	6/26/2007	Former Tanks B and C	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	6/29/2007	Response to EPA Comments	SCS	No relevance to PFAS



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Admin records	7/19/2007	Ft. Belvoir Phase Data	Directorate of Public Works, Environmental and Natural Resources Division	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	9/1/2007	Phase III Environmental Investigation Plan SWMU M-18 at Engineer Proving Ground	Unknown	Repetitive information. Provdies good summary of previous activities. Carbon tetrachloride was detected in one groundwater sample collected from a well in AOCP-04. Figures with wells, gradients, surface water, etc provided.
From Site Visit - CERCLA Admin Record - CERCLA	9/1/2007	Soil Remediation Report SWMU M-26	Tetra Tech Inc.	Repetive information. Four ASTS (0500A, B, C, and D) proximal to site, and used for fire fighting activites.
From Site Visit - CERCLA Admin Record - CERCLA	10/1/2007	Decision Document SWMU M-26 and FATTS	Tetra Tech	Contamination at both sites - plan for remedial action described. Provides good summary of previous studies. Figures of sites and groundwater monitoring wells provided. Groundwater flow arrows provided. Location of pipe provided.
From Site Visit - CERCLA Admin Record - CERCLA	10/1/2007	Phase II Investigation Summary Report FTA at Engineer Proving Ground	Tetra Tech Inc.	Repetitive information. AOPC-03A and B are referred to as "Former Burning Slabs" in use before 1949 throught 1963. AOPC-04 use might have gone back as far as 1951. Accotink Creek is 700 feet west of the FTA. 26 groundwater monitoring wells were installed at the FTA. Figures with wells, gradients, surface water, etc provided
From Site Visit - CERCLA Admin Record - CERCLA	11/1/2007	Phase II Environmental Investigation Plan Inside Heller Loop	Tetra Tech Inc.	
From Site Visit - CERCLA Admin Record - CERCLA	12/1/2007	Phase III Investigation Summary Report FTA at Engineer Proving Ground	Tetra Tech Inc.	Repetitive information. Figures with wells, gradients, surface water, etc provided.
From Site Visit - CERCLA Admin Record - CERCLA		Phase III Investigation Summary Report FTA at Engineer Proving Ground	Tetra Tech Inc.	Repetitive information.
From Site Visit - CERCLA Admin Record - CERCLA	12/21/2007	Letter - Enclosed report (AOPC-09)	US Department of the Army	



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From Site Visit - CERCLA Admin Record - CERCLA	2/1/2008	Final Phase III Investigation Summary Report FATTS	Tetra Tech Inc.	Background site history, topography, geology, surfacewater and groundwater flow described. Figures provided. "Over time the contaminants migrated through the vadose zone and reached the water table. Although the groundwater appears to have limited further vertical or downward migration of the contaminants, the natural flow of the groundwater also acted as a transporter to further disperse the chemicals horizontally or across the site in multiple directions particularly to north, northwest, and southeast. This resulted in a thin lens (5-10 feet thick) of contamination located approximately 25 feet below ground surface over the FATTS area. While the leaking valve is the likely source of the contamination it appears that it was contamination transportation of contaminants by means of the groundwater that lead to the more significant impacts"
From Site Visit - CERCLA Admin Record - CERCLA	2/1/2008	Final Phase IV Investigation Summary Report at FATTS	Tetra Tech Inc.	Repetitive information. Background site history, topography, geology, surfacewater and groundwater flow described. Figures provided.
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0003.pdf?csf=1&e=k3f6ca		Investigation and Removal Action, Range Clearance and Site Investigation	Conti Environment and Infrastructure, Inc.	Mention of ordinance burial pit. Mention of fire extinguisher parts.



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From Site Visit - CERCLA Admin Record - CERCLA	5/1/2008	Final Phase II Investigation Summary Report	Tetra Tech Inc.	PSA 2000 consists of 4 former ASTs used for fueling and fire training activites. Located within the FTA. Tanks A, B, and C were installed prior to 1949 and were located in the area east of the perennial stream that flows between SWMUs M-7 and M-26 and Tank D was installed between the years of 1950 and 1954. The use of these tanks is unknown apart from the release (Solid Waste Management Unit M-26) of between 30,000 and 100,000 gallons of gasoline from Tank D in August 1968. It appears based on the historical aerial photographs that the tanks were decommissioned over a period of 12 years from 1972 to 1984. Figures provided.
Admin records	6/10/2008	SWMU A-04 EIP Comments	Tetra Tech	No relevance to PFAS
Admin records	6/13/2008	Corrective Action Plan Addendum (Building 202)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	6/13/2008	Corrective Action Plan Addendum (Building 202)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	7/9/2008	RE: For Belvoir 2007 Annual Report	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	8/21/2008	Operation and Maintenance Manual for Catalytic Oxidizer	Proact Services Corporation	No relevance to PFAS
Admin records	9/30/2008	Re: Underground Storage Tank Closer Report, Building 677	Aisow Technologies Corporation	No relevance to PFAS
Admin records	11/1/2008	Operation and Maintenance Manual and As-Built Drawings- UST Conversion to E-85 Fuel (Building 1124)	Aisow Technologies Corporation	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	1/1/2009	Environmental Investigation Plan AOPC-20	Unknown	Site identified December 2008 during site prep for the installation of underground infrastructure lines. The Matthews Group reported suspected contaminated soils exhibiting order and stain in a test pit hole, encountered 6 feet bgs. 10 soil boringw and 3 groundwater monitoring wells were installed to investigate.
From Site Visit - AFFF SDS	2/9/2009	SDS - JET-X 2% High Expansion Foam Concentrate	ANSUL	Foam in Lakota/O'neil fire suppresion system; foam associated with release May 18, 2018. Non-PFAS
Admin records: FTBELVOIR184	3/2/2009	Phase I RFI	Tidewater, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	1	Letter - 3rd Quarter 2008 LTM Submittal	US Department of the Army	



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Admin Records	5/15/2009	Annual Corrective Action Monitoring Report (First Quarter 2009)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0177.pdf?csf=1&e=2Zz6Fx		Government Performance and Results Act	Directorate of Public Works, Environmental and Natural Resources Division	Mention of Fire Control Training Area Unit. Mention of APOC-20 (believed to be a burn-pit)
From Site Visit - CERCLA Admin Record - CERCLA	7/15/2009	Letter - 4th Quarter 2008 LTM Submittal	US Department of the Army	
Admin records	2/15/2010	Annual Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0202.pdf?csf=1&e=zIGGWb		RCRA-Based Phase II PBA		Includes figure with vehicle wash rack
Admin records	8/10/2010	Post-Operational Monitoring Report, Second Quarter 2010	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
	11/11/2010	Ansulite ARC 3x6 MSDS	Ansul	Includes identification, hazards identification, composition/information on ingredients, first aid measures, fire-fighting measures, accdiental release measures, hadnling and storage, exposure controls/personal protection, physical and chemical properties, stability and reactivity, toxicological information, ecological information, disposal considerations, transport information, regualtory information, and other information for Ansul Ansulite ARC 3x6
Admin records	8/3/2011	Historic Petroleum Storage Area MP-1 (Storage Update Meeting)		No relevance to PFAS
Admin Records	8/2/2011, 8/8/2011	Annual Corrective Action Monitoring Report (Second Quarter 2011)	AMEC Environment and Infrastructure, Inc.	Description of continued remediation efforts for petroleum-based spill
Admin Records	8/3/2011, 8/16/2011	Corrective Action Monitoring Reports (Second Quarter 2011)	AMEC Environment and Infrastructure, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	10/1/2011	Human Health Risk Assessment FTA Fort Belvoir North Area.	Tetra Tech	FTBL-66. Last used in the mid-1960s for testing fire-fighting equipment. AOPC-04 was a building that provided water and fire suppressents; 3 USTs there (SWMU M-18). SWMU M-07 was a concrete pad where fire testing occurred. SWMU M-18 was the area of the USTs that stored fuel for the fire-fighting. Combined SWMUs is ~9 acres.



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https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/Region1/Shared%20Documents/Fort%20Belvoir/03_Deliverables/11%20-%20SI%20Scoping%20Call%20Slides/Resources/Reports/HHRA%20for%20PSA%20Inside%20Heller%20Loop.pdf?csf=1&web=1&e=kMpdBf		Human Health Risk Assessment, Inside Heller Loop, Fort Belvoir North Area.	Tetra Tech	Pesticides data and analytical results are included (from Engineer Proving Ground: APOC-14-EB-090607, BM39-MW01, BM39-MW03)
From Site Visit - Old Hospital - Bldg 808	10/1/2012	Phase II Facility Characterization Assessment Report Buildings 808, 808A, and 808B	IAP worldwide Services	Closure of Hospital building due to BRAC requirements. Part of building 808 was converted into a new outpatient warrior clinic. Silver found in rooms via wipe samples (RCRA metals) DeWitt Army Community Hospital (DACH) was built in September 26, 1054 and closed August 2011. Ag found in dark room B136 at 0.58; X-ray room C129 at 0.60; Change room C139 at 0.60; Office D206 at 0.27; Storage room A416 at 7.4; Soiled Utility B517 at 0.16; in Trauma room. Document failed to load properly. Need to revisit
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	2012	2012-01-25 MS4 Permit Compliance Report	Paciulli, Simmons, and Associates	Watershed information provided. SWM areas map - over half of the impermeable land drians directly into streams.
From Site Visit - CERCLA Admin Record - CERCLA	5/1/2013	Long-term Monitoring Plan Addendum Former SWMU M-26 Hydrocarbon still area and FATTS.		4 ASTs at SWMU M-26. 30,000 to 10,000 gallons of gas from tank 05000D was spilled in August in 1968 from an AST - gas flowed over the protective bern and flowed into an unnamed tributary and Accotink Creek. Gas was ignited, trees, structures, and the I-95 Bridge over Accotink was destroyed. M-26 is the area impacted by the spill. 5 ASTS on an 6-acre parcel were used for fire training at the FATTS area. Open top vessels in which fuel was poured and set on fire. Piping connected M-26 to FATTS leaked and contributed to contamination - 70,000 tons of impacted soils were removed.



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General Documents- IMCOM Sampling Data 2016	10/15/2013	IMCOM - PFOA PFOS Water System Testing		All analytes non-detect
https://www.duffelblog.com/2014/04/center-orm-fire/	4/18/2014	Center for Operational Risk Management Catches Fire	DuffelBlog	Building fire; Fort Belvoir Fire Department responded
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/Region1/Shared%20Documents/Fort%20Belvoir/03_Deliverables/11%20-%20SI%20Scoping%20Call%20Slides/Resources/Reports/3161%20CMR%201st%20QTR%202014.pdf?csf=1&web=1&e=RsUx3Z		Post-Operational Monitoring Report, First Quarter 2014, Building 3161- Fort Belvoir, Virginia	AMEC Environment and Infrastructure, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA October 2014 Admin Record Update	9/1/2014	Final 2014 Groundwater Sampling Report FTBL- 068	CB&I Federal Services, LLC	Repetitive information. Summarizes previous reports. Provides data on water quality parameters as well as contaminants for sites. Figures provided with groundwater monitoring wells.
From Site Visit - Old Hospital - Bldg 808	10/14/2014	Appendix 1 Analytical Data Packages	Test America	Document failed to load properly. Need to revisit
General Documents	2014	DoD Inventory of Fire/Crash Training Area Sites		Identifies Fort Belvoir army fire and crash sites (Sites M-07/18 and APOC-4, as well as Fire Fighting Training/Burn Area)
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Conservation	2014	Integrated Cultural Resources Management Plan	US Army Garrison Fort Belvoir	Sewage pump station Facility #7350 (formerly 350); SM-1 Plant Facility#372, Waste Retention Building; and Water Filtration Building Facility #1400 listed eligible for SHPO Architectural Resources.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	2014-2015	American Water UCMR3 Results	American Water?	No hits for PFAS constituents on Telegraph Road.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	2014-2015	American Water UCMR3 Results	American Water?	No hits for PFAS constituents on "TelegraphIntertEP AM."
From Site Visit - CERCLA Admin Record - CERCLA September 2015 Admin Record Update	1/13/2015	Letter - Enclosed 2014 Groundwater Sampling Report FTBL-068	US Department of the Army	
From Site Vist - MWR Car Wash SDS	4/1/2015	SDS - CleanEdge 2880	CleanEdge, LLP	Proprietary Surfactant Blend listed.
From Site Vist - MWR Car Wash SDS	4/23/2015	SDS - CleanEdge 2102, 2103, 2104	CleanEdge, LLP	Proprietary Surfactant Blend listed.
From Site Vist - MWR Car Wash SDS	4/23/2015	SDS - CleanEdge 2279	CleanEdge, LLP	Proprietary Surfactant Blend listed.
From Site Vist - MWR Car Wash SDS	4/23/2015	SDS - CleanEdge 2689	CleanEdge, LLP	Proprietary Surfactant Blend listed.
From Site Vist - MWR Car Wash SDS	4/24/2015	SDS - CleanEdge 2689-R	CleanEdge, LLP	Proprietary Surfactant Blend listed.
From Site Vist - MWR Car Wash SDS	5/1/2015	SDS - CleanEdge 2049	CleanEdge, LLP	Proprietary Surfactant Blend listed.



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From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update https://arcadiso365.sharepoint.com/:b:/r/sit es/USAEC_PFOS_PFOA/Region1/Shared %20Documents/Fort%20Belvoir/03_Delive rables/11%20- %20SI%20Scoping%20Call%20Slides/Resources/Reports/Sewer%20Mapbook%20- %20ALL.pdf?csf=1&web=1&e=8PRWUN	12/21/2015	Letter - FTBL North Area: FTA (FTBL-66) Draft Sampling and Analysis Plan (SAP) EPA approval Sewer Mapbook - ALL	USEPA American Water, Military Services Group	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update		Quality Assurance Project Plan for Data Collection Activites for SWMUs Final Sampling and Analysis Plan For Data Gap Investigation and Feasiblity Studeis FTA (FTBL-66)	TriEco Tetra Tech, Joint Venture TriEco Tetra Tech, Joint Venture	Likely irrelevants; could not load document properly. Repetitive information. Describes surface water, groundwater flow, geology, hydrogeology installation wide.
From Site Visit - CERCLA Admin Record - CERCLA	2/3/2016	Letter - USEPA approval of Ft. Belvoir QAPP	USEPA	installation wide.
From Site Visit - CERCLA Admin Record - Fort Belvoir Final LUCIP	8/1/2016	Final Land Use Control Implementation Plan	Aesostar SES LLC	LUC, LTM, and CMI(O) at FTBL-68, M-26 FATTS. Former landfills mentioned from 1940s-1950s.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response- Discharges - Known-Suspected AFFF Discharged	12/12/1984, 6/28/2016	1984 Plane Crfash South of DAAF Files (2) - Email Jero Sebek and Gary Smith; Website with Summary of Crash	Unknown/Various	PFCS used to extinguish plane that crashed south of DAAF on December 13, 1984. Another time PFCS were used to extinguish a helicopter fire at DAAF that occurred when the motor caught fire. Archive dated December 12, 1984 - crashed occurred in a wooded area adjcent to the airfiled while attempted to land with zero visibility - information from Army Sgt. Thomas Wade.
General Documents- IMCOM Sampling Data 2016	2016	IMCOM Sampling Data 2016		No mention of Belvoir
General Documents- IMCOM Sampling Data 2016	2016	IMCOM PROS/A Report		No mention of Belvoir



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	4/10/2017	CHEMGUARD C306-MS-C 3% AFFF C306-MS-C Concentrate Safety Data Sheet	Chemguard	Includes identification, hazards identification, composition/information on ingredients, first aid measures, fire-fighting measures, accdiental release measures, hadnling and storage, exposure controls/personal protection, physical and chemical properties, stability and reactivity, toxicological information, ecological information, disposal considerations, transport information, regualtory information, and other information for CHEMGUARD C306-MS-C 3% AFFF concentrate
	4/12/2017	USEPA Spill Incident Form (Building 1436)	Fort Belvloir Fire Department & DPW	Describes incident inside Buildilng 1436, which involved a spill of about 5 gallons fo 3% AFFF concentrate. Report describes extent of spill, areas of impact, and corrective actions taken.
FTBL	6/2/2017	FY2016 Fort Belvoir Army Defense Environmental Restoration Program, Installation Action Plan (printed 2 June 2017)	Fort Belvoir Directorate of Public Works	Installation background and history; information on current and closed installation restoration projects.
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	6/15/2017	Letter - 2017 Draft Final Master Uniform Federal Policy Plan	US Department of the Army	Enclosed plan sent to VDEQ.
General Documents	8/31/2017	Lead PFOS-PFOA Groundwater Sampling		No mention of Belvoir
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response- Discharges - SPCC Plan	9/1/2017	Ft Belvoir SPCC Plan	Water Resources Division Army Public Health Center	Drainage flow and tank figures provided.
J	9/1/2017	Fort Belvoir Spill Prevention, Control, and Countermeasure Plan	Water Resources Division Army Public Health Center	No relevance to PFAS
	11/15/2017	USEPA Spill Incident Report Form (Building 1436)	Fire Department & DPW	Describes incident outside of Building 1436, which involved 10-15 gallons of AFFF concentrate foam. Report describes extent of spill, areas of impact, and corrective actions taken.
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	1/1/2018	Final Uniform Federal Policy Quality Assurance Project Plan	AECOM	Quality assurance plan.
From Site Visit - CERCLA Admin Record - CERCLA		Letter - VDEQ approval of Final Uniform Policy Quality Assurance Plan	VDEQ	
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update		Letter - Approval of the Final Uniform Federal Policy Quality Assurance Plan	VDEQ	Approval of QA plan.
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update		Letter - Final QAPP FTBL-68, FTBL-69, and CC-MPS-2009	VDEQ	Approval of QA plan.
General Documents	2/23/2018	FY 18-IMCOM Pesticide Use Proposal		No mention of Belvoir



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From Site Vist - from DAAF interview - Incident Report for Lakota Hangar	5/18/2018	Memorandum of Record. INC# 2018-1705881, 6959 Britten Dr. Building 3140/3141, Accidental Sprinkler/Deluge System Discharge	Fort Belvoir Fire and Emergency Service	Repetitive Information; pictures provided.
	5/18/2018	US Army Garrison Fort Belvoir, Fort Belvoir Directorate of Public Works Investigation Form	Fort Belvoir Fire and Emergency Service	Describes investigation of potential impacts from accidental release of AFFF at Lakota Hanger, Building 3140. Form includes description of visit, photos, and maps with potentially impacted areas.
	5/21/2018	USEPA Spill Incident Form (Building 3140)	Fort Belvoir Fire Department & DPW	Describes incident at Lakota Hanger, Building 3140, involving accidental release of fire suppressant foam (JET-X 2% High Expansion Foam Concentrate) and subsequent migration into the stormwater conveyance system and sanitary lines on DAAF.
	5/22/2018	Prep Site Investigation Report	Virginia Department of Environmental Quality	Describes the site inspection following the spill of AFFF concentrate at Building 3140 (Lakota Hangar), including inspection notes and photos.
From Site Visit - AFFF Manifest	5/30/2018	HEPACO Manifest	HEPACO	Turned in 5,100 gallons, 4,150 gallons, and 3,300 gallons of AFFF/Water on 5/30/2018 to HEPACO in Norfolk, VA
From Site Visit - CERCLA Admin Record - CERCLA	6/22/2018	VDOT Landuse Permit	Fort Belvoir	Installation of groundwater monitoring wells within a Fairfax County ROW - 6 wells for FTBL-69 and 24 for FTBL-68.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Conservation	8/1/2018	Integrated Natural Resources Management Plan	US Army Garrison Fort Belvoir	General installation descriptions provided - background etc. Wildfire management plan provided. No prescribed burning at Ft Belvoir - currently and historically.
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/Region1/Shared %20Documents/Fort%20Belvoir/03_Delive rables/11%20-%20SI%20Scoping%20Call%20Slides/Resources/Reports/2018-November_Building%203233%20SCR_Final.pdf?csf=1&web=1&e=kyVE68		Final Building 3233 Site Characterization Report Addendum	AECOM	No relevance to PFAS



Document Location	Document	Document Name	<u>Author</u>	Descripiton of Information
(name/type/location)	<u>Date</u>			(type, general subject and PFAS relevance)
From Site Visit - CERCLA Admin Record - CERCLA	12/1/2018	Final FTBL-68: Semi Annual Groundwater Monitoring Report	AECOM	FTBL-68 consists of sites M-26, Hydrocarbon Spill Area and the Former Above Ground Test Tank Site (FATTS). Wells were re-installed after the highway was constructed (2007-2010). August 1968 approximately 30,000 to 100,000 gallons of gasoline were released from a 100,000 gallon AST (ID 05000D) into an unnamed, intermittent tribuarty of Accotink Creek. The gas ignited subsequently burning and destroying the bridge over I-95 and nearby buildings. Historical ASTS located at FATTS consisted of over top vessels in which fuel was poured, ignited and extinguished as part of fire fighting training. The 5 ASTs at the site were removed before 1994. 70,000 tons of soil was excavated
http://www.amwater.com/ccr/fortbelvoir.pdf	2018	2018 Annual Water Quality Report, Fort Belvoir, PWS ID: VA6059450		American Water supplies Fort Belvoir watert and/or wastewater services
https://www.wsscwater.com/sites/default/files/2021-03/wqr%202019.pdf	2019	Water Quality Report, FY2019	WSSC Water	Provides information on water quality and drinking water sources.
From Site Visit - CERCLA Admin Record - CERCLA	1/1/2019	Final Supplemental Remdial Investigatio Report for CC-MPS-2009	AECOM	CC-MPS-2009 consists of former UST petroleum storage areas (PSA-2009, 2033, 2034). 508 tons of petroleum impacted soil was removed from PSWQA-2009 and 2034 after the tanks were removed. Tanks wee associated with several buildings. Tanks ranged between 2,000 to 10,000 gallons. Carbon Tertachloride was a contaminant of concern for PSA-2034



<u>Document Location</u> (name/type/location)	Document Date	<u>Document Name</u>	<u>Author</u>	<u>Descripiton of Information</u> (type, general subject and PFAS relevance)
From Site Visit - CERCLA Admin Record - CERCLA	2/1/2019	FTBL-66 Data Gap Investigation Report, Final	TriEco Tetra Tech, Joint Venture	Great description of site and figures provided; PFCs detected. M18-MW34 210 ng/l PFC "PFCs were detected in the FTA groundwater samples at low levels. All detected PFCs were below the screening levels, indicating the FTA has not been impacted by PFCs" Detections ranged between 2ng/l and 210ng/l.
From Site Visit - CERCLA Admin Record - CERCLA	2/28/2019	Letter - FTBL66 Data Gap Investigation - VDEQ no further comments	VDEQ	
From Site Visit - CERCLA Admin Record - CERCLA	4/25/2019	Letter - FTBL66 Data Gap Investigation - VDEQ response on comments.	VDEQ	
	4/27/2019	USEPA Spill Incident Report Form (Lewis Village)	Fire Department & DPW	Describes an incident at Lewis Village, which involved a car fire upon which approximately 5-10 gallons of AFFF foam were applied. Report describes the incident and subsequent action.
	4/28/2019	USEPA Spill Incident Report Form (DAAf Fire Station, Fire Training Area)	Fire Department & DPW	Describes an incident at the DAAF Fire Station fire training are, which involved discharge of approximately 25 gallons of AFFF concentrate. The report describes the incident and subsequent corrective action.
	5/1/2019	Virginia Department of Environmental Quality, Report Pollution Online Form	Fort Belvoir Directorate of Public Works	Describes an incident at the DAAF Fire Station, which involved release of approximately 1 gallon of AFFF concentrate which resulted in approximately 10-20 gallons of AFFF foam (C8 formula). Report describes
From Site Visit - AFF SDS	8/20/2019	MSDS - ANSULITE 3% AFFF (AFC-3-A)	ANSUL	Foam in Night Vision Hangar; PFAS not specifically mentioned; assumed to be in mixture, possbily that it is a component below reportable levels.
	1/1/2020	Final FTBL-68: Semi-Annual Event #3 Groundwater Monitoring Report	AECOM	Report includes site description and background, description of field activities, summary of results, and analysis of results. No specific mention of PFAS.
	6/1/2020	Final Preliminary Assessment Report, Army Aviation Support Facility, Fort Belvoir, Virginia	AECOM Technical Services, Inc.	Report includes AOIs, summary of uncertainties, and a summary of PA findings. Includes descriptions of FTA and non-FTA areas. Mentions of AFFF spills.



Document Location	<u>Document</u>	Document Name	<u>Author</u>	Descripiton of Information
(name/type/location)	<u>Date</u>			(type, general subject and PFAS relevance)
https://www.charlescountymd.gov/services/public-works-utilities/water-quality-reports	2020	2019 Annual Drinking Water Quality Report	Charles County, MD	Provides information on water quality and drinking water sources for the 15 water systems in the county.
Virginia Department of Environmental Quality	2020	Well registration data for wells installed between 2015 and 2020. Virginia Department of Environmental Quality and Virginia Department of Health Water Well Registration Records. Provided via Freedom of Information Act request in July 2020.	Virginia Department of Environmental Quality	Well registration data for wells installed in Virginia from 2015 up until the request was submitted in July 2020.
Installation	6/1/2021	Final Data Gap Investigation Report for Resource Conservation Recovery Act (RCRA) Solid Waste Unit (SWMU) MP-2, U.S. Army Garrison Fort Belvoir, Virginia (excerpt)	Plexus Scientific Corporation	Provides information on the geology and hydrogeology of FTBL.
https://pwcsa.dcatalog.com/v/East- Distribution-System-2020/	2021	2020 Water Quality Report, East System 6153600	Prince William County Service Authority	Provides information on the source of water for zip codes where there was a PFAS detection in 2014.
https://www.fairfaxwater.org/sites/default/files/newsletters/ccr_2020.pdf	2021	2020 Annual Water Quality Report	Fairfax Water	Provides information on water quality and surface water intakes.
https://en.climate-data.org/north- america/united-states-of- america/virginia/alexandria-764481/	2021	Climate Data for Alexandria, Virginia	Climate-Data.Org	Provides average high and low temperatures and precipitation by month.
	10/20/2021	Email from P. Gregory, General Engineer (FTBL) to R. Williams (Arcadis) re: When Hangar 3232 was renovated, and the fire-suppression system was replaced	P. Gregory	Current fire-suppression system in Hangar 3232 was installed in 2019. It utilizes a non-PFAS-containing high-expansion foam. The hanga was equipped with a water deluge fire-suppression system since the hangar became operational until the hangar was renovated in 2019 and the fire-suppression system was replaced.
	10/21/2021	Email from J. Jett, Jr., Fire Marshal (FTBL) to R. Williams (Arcadis) re: When Hangar 3232 was renovated and what sort of fire-suppression system was utilized prior to renovation.	J. Jett, Jr.	Current fire-suppression system in Hangar 3232 was installed in 2019. It utilizes a non-PFAS-containing high-expansion foam. The hanga was equipped with a water deluge fire-suppression system since the hangar became operational until the hangar was renovated in 2019 and the fire-suppression system was replaced.



<u>Document Location</u> (name/type/location)	Document Date	<u>Document Name</u>	<u>Author</u>	<u>Descripiton of Information</u> (type, general subject and PFAS relevance)
	05/23/2022	Email from J. Jett, Jr., Fire Marshal (FTBL) to R. Williams (Arcadis) re: When Hangar 3140's Jet-Ex fire-suppression system was installed and what sort of fire-suppression system was installed previously.	J. Jett, Jr.	Current fire-suppression system in Hangar 3140 was installed in approximately 2011. It utilizes a non-PFAS-containing high-expansion foam. The hangar was equipped with a water deluge fire-suppression system since the hangar became operational until the the fire-suppression system was replaced in ~2011.
Admin records	Various	Case Closed; US Army- Fort Belvoir	Commonwealth of Virginia, Department of Environmental Quality	No relevance to PFAS
Admin records	Various	Storage Tank Profile	Directorate of Engineering and Housing Environmental and Natural Resources	No relevance to PFAS
Admin records	Various	Corrective Action Plan	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Plan	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Plan	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report: Building 2217/2209	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
Admin records	Various	Groundwater Gauging Report: Building 2217/2009	Law Engineering and Environmental Services, Inc.	No relevance to PFAS



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Admin Records	Various	Corrective Action Monitoring Report (First, Second, Third, Fourth Quarter 2009)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Plan	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Post-Operational Monitoring Report (Building 1199)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Reports	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Groundwater Monitoring Report (SWMU M-26 and FATTS)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS



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Admin records	Various	Groundwater Monitoring Report (SWMU M-27)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0018_T_17_Figures.pdf?csf=1&e=rbogys		various site maps and figures	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Ground-Water Gauging Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Ground-Water Gauging Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	Various	Corrective Action Monitoring Report	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Restoration	Various	Final Data Gap Investigation Report FTBL-66 (Fire Training Area)	TriEco Tetra Tech Joint Venture	"PFCs were detected in the FTA groundwater samples at low levels. All detected PFCs were below the screening levels, indicating the FTA has not been impacted by PFCs" Detections ranged between 2ng/l and 210ng/l.



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From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response- Discharges - Known-Suspected AFFF Discharged	Various	2017-04-12 AFFFF spill inside Bldg 1436 - LRC Files	Unknown/Kelsey Ross	Photos - Empty Ansulite 3%AR AFFF 55 gallon drum (remaining AFFF from truck that did not spill out was put in it). Drain covered. Lab pack that AFFF and absorbant material was put into. Culpable valve on engine. Spill Form - 5 gallons AFFF concentrate spilled from fire truck due to corroded valve - don't know what type of foam spilled. Proper cleanup with 20
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response- Discharges - Known-Suspected AFFF Discharged	Various	2017-11-15 AFFF Discharge outside Bldg 1436 _LRC Files	Unknown/Kelsey Ross	Email/ Spill Form - Spilled robel cleanly with 20 Email/ Spill Form - Spill of 10-15 gallons AFFF concentrate/foam spilled outside garage area; no onsite personnel; Fire Department responded. Wet spot (AFFF) didn't reach grass. Reportedly,
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response-Discharges - Known-Suspected AFFF Discharged	Various	2018-05-17 Lakota Hangar Bldg 3140 Fire Supression System Files	Unknown/Kelsey Ross	Spill Form/Memo/Incident log/ other documents - fire suppression system activated due to a power surge; 40,100 gallons of 2% AFFF (JET-X 2 3/4% High-Expansion Foam Conc.) was released. On Thursday, 17 May 2018, the foam had engulfed the entire hangar. Foam spread outside onto grassy areas - including a grassy depression that drains water from the run way and taxi area into a stream. Foam was visible in yard inlets. Foam used was not PFAS AFFF. See documents for additional details. Other - Storm Utility map provided showing drainage flow and spill area. Photos depict the foam quantity and spill measures.



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From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response-Discharges - Known-Suspected AFFF Discharged	Various	2019-04-25 FAAD Fire Station Training Area AFFF Thursday Incident Files	Unknown/Kelsey Ross	Photos - Foam on cracked concrete and adjoining grassy areas. Standing water mixed with foam. Soil removal and vacuuming. VDEQ Report Pollution Form / Pollution report text- Firefighter accidentally pressed foam button on Foam 466 unity on Thursday 25 April 2019. Approximately 1 gallon of AFFF concentrate was release resulting in 10-20 gallons of foam - Ansulite 3% AFFF (AFC-3-A). Because the fire training exercise was using water first, there were puddles of water/foam around the fire training area/concrete pad. Faom spread to ditch on western side of FTA pad and on easter side in grassy area. Trench on FTA pad had foam in it, which connected to a bioretention pond, that did not have foam in it. Shop vacuum removed foam in water. Sod cutter removed 2-3 inches of soil in foam covered grass areas Total of 10 drums were taken to hazardous waste facility with the impacted soil and water. Other - Aerial map provided. SDS for Ansulite 3% AFFF with "other components" not listed - likely PFAS. Aerial Map with foam depicted and surface water. Map with drainage direction provided. Storm utility maps provided showing bioretention pond and drainage ditch



<u>Document Location</u> (name/type/location)	<u>Document</u> <u>Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripiton of Information</u> (type, general subject and PFAS relevance)
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response-Discharges - Known-Suspected AFFF Discharged	Various	2019-04-27 Lewis Village Car Fire AFFF Discharge Files	Unknown/Kelsey Ross	Photos - Transformer with straw covered area around it. Burned fench poles and straw covered area extending into backyard. Other - SDS for Ansulite ARC 3x6 (Likely PFAS containing but not listed on sheet). Spill Form - Car on 27 April 2019; car hit above ground transformer, which leaked mineral oil and caught fire. Foam apparatus 466 responded, AFFF was applied. Location of fire was adjacent to the garage of 5980 Sitgreaves Road. Approximately 5-10 gallons of foam was used along with 250 gallons of water. AFFF got into adjacent storm sewer, which connects downstream to a wet pond. No foam was observed in pond on Sunday evening.



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From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response-Discharges - Known-Suspected AFFF Discharged	Various	2019-04-28 DAAF Fire Station Training Area AFFF Sunday Incident Files	Unknown/Kelsey Ross	Photos - Similar to Thursdays but foam is more extended outside of FTA pad and on grassy areas. Foam in bioretention pond but not in ditch. Soil removal operations the following day. Staw on excavated areas. Other - SDS for Ansulite ARC 3x6 (Likely PFAS containing but not listed on sheet). Map with Outfall 003. Map with foam extent depcited and drainage paths. Stormwater utility maps provided. Email - On Sunday 28 April, 2019 a mechanical malfunction with Fire Engine 466 that caused the foam reservoir on the apparatus to leak or be pumped into the water tank on the apparatus, and then all of the water and foam was discharged from the engine by a firefighter. There was approximately 25 gallons of AFFF concentrate and approximately 500 gallons of water on the apparatus that was discharged during this incident. The foam on Engine 466 was a different AFFF foam - Ansulite ARC 3 or 6%. Foam on concrete,, adajcent grassy areas, in trench drain and bioretention pond. Foam was observed where the bioretention pond meets the ditch. Bubble were observed in the ditch that connects to Accotink Creek at the industrial outfall 003. HEPACO pumped foam out of puddles and from the bioretention pond/trench drain. 7 drums were sent to hazardous waste. Additionally, on 20 April water was pumped out of the biorention pond (85 gallons) by Clean Harbors. 21 55 galoons drums were turned into the hazardous waste building by were turned into the hazardous waste building by
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response- Discharges - Known-Suspected AFFF Discharged	Various	Unknown Date - Helicopter Fire	Unknown/Kelsey Ross	Same email between Jero Sebek and Gary Smith (above).



<u>Document Location</u> (name/type/location)	<u>Document</u> <u>Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripiton of Information</u> (type, general subject and PFAS relevance)
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Spill Response-Discharges - Known-Suspected AFFF Discharged	Various	2017-4-11 AFFF Discharge in front of DAAF Fire Station Files	Unknown/Various	Photos - AFFF spill extends to other side of street but not really on street, on grassy area by fence. Broomed it over road to help with dissipation; Stormwater inlet might be impacted; Chemguard #5 AFFF (SDS provided). VDEQ Report/ Pollution reposnse text - Accidential discharge 8:00 AM Tuesday 11 April, 2017 - pressed foam button instead of water. 1 gallon of concentrate with water = 5 gallons of foam. Wind scattered foam on Gavin Rd and adjacent grass areas. Foam was washed away, then swept on roadway per VDEQ instruction. Other - Storm Utility Map shows water flow impacted by foam trending northeast towards stream/river
Admin records	Various	various untitled correspondence, figures, etc.	varied	No relevance to PFAS
Admin Records	Unknown	For Belvoir Index		No relevance to PFAS
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Drinking Water	Unknown			
Admin records	Unknown	PB Series; Cast Aluminum Pressure Blowers	OEM and Industrial Air Handling Specialist	No relevance to PFAS
Admin records	Unknown	DR4300 Circular Chart Recorder Product Manual	Honeywell	No relevance to PFAS
	Unknown	CHEMGUARD C306-MS 3% AFFF Concentrate Data Sheet	Chemguard	Includes descriptions, properties, storage and handling, and other product information for CHEMGUARD C306-MS 3% AFFF Concentrate
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	Unknown	Memo - Second Phase Environmental Investigation FTA	Unknown	Work plan for SWMU M-7 and M-18 and AOPC- 04 - includes the drilling of 7 additional groudnwater monitoring wells, 4 will be within the NGA fence and will require special security to enter. Figures of site with groundwater monitoring well, benzene plume, etc provided.



<u>Document Location</u>	Document	Document Name	<u>Author</u>	Descripiton of Information
(name/type/location)	Date			(type, general subject and PFAS
				relevance)
From Site Visit - CERCLE Admin Record -	Unknown	Unknown	Unknown	Self explanatory.
CERCEL Information Repository	0			o en explanatery.
From Site Vist - Documents from Kelsey	Unknown	Map - Ft Belvoir North Area Restoration Site	Unknown	Depicts location of FTBL-66, -68, , FTBL-005-R-
for AEC for PFAS PA - Restoration				01, etc.
From Site Vist - Documents from Kelsey	Unknown	Map FTBL-66	Unknown	Depicts location of groundwater monitoring wells,
for AEC for PFAS PA - Restoration		'		surface water, benzene plume, etc.
From Site Vist - Documents from Kelsey	Unknown	Map FTBL-68	Unknown	Depicts location of groundwater monitoring wells,
for AEC for PFAS PA - Restoration		'		and surface water
From Site Vist - Documents from Kelsey	Unknown	2019 ArcMap Army Compatible Data	Unknown	Unable to open - GIS sent to Charlie.
for AEC for PFAS PA - Stormwater				·
From Site Vist - Documents from Kelsey	Unknown	Stormwater Utility Maps by Grid	Unknown	Stormwater map for AOPIs
for AEC for PFAS PA - Stormwater				
From Site Vist - Documents from Kelsey	Unknown	MS4 Outfalls Map	Unknown	Unable to keep open; appears to be a map with
for AEC for PFAS PA - Stormwater				outfalls installation-wide.
From Site Vist - Documents from Kelsey	Unknown	Wastewater Map	Unknown	Likely the most up-to-date waste water map;
for AEC for PFAS PA - Stormwater				depicts lines, lift stations, manholes, etc.
From Site Vist - from DAAF interview -	Unknown	July 1958 Crash	Unknown	Helicopter crash; two men died while putting a
1958 Crash Report				three passanger reconissance helicopter through
				a demonstration for Reserve Officers and were
				attempting to land. Helicopter crashed and
				burned. Maps with location provided.
From Site Vist - from DAAF interview -	Unknown	3/11/1983 Crash	Unknown	Low fuel caused plane to crashed in a wooded
1983 Crash Report				area 500 yards short of RWY 32. No fuel; likely
				no fire or need for AFFF.
From Site Vist - from DAAF interview -	Unknown	DAAF Hangars Map	Unknown	Depicts locations of 7 hangars.
DAAF Hangar Map				
From Site Visit - Old Hospital - Bldg 808	Unknown	Phase I Report Bldg 808	Unknown	Unable to open document.
From Site Visit - Dye Testing Results	Unknown	Unknown	Unknown	Maps depict the flow of stormwater, sanitary lines
				near building 3243 and hangar 3232 (one of the
				renovated hangars).
From site Visit - FBNA Site Visit AEC	Unknown	Unknown	Unknown	Map of the FBNA with various FTBLs.
PFAS PA				
From Site Visit - Pesticide List	Unknown	Unknown	Unknown	No Sulfurimid listed - per last PFAS call tracking
				pesticides is no longer a priority.
Admin records		Operation and Maintenance Manual- Soil Vapor	Enviro-Industries, Inc.	No relevance to PFAS
		Extraction and Aquifer Sparge Remediation		
		System, and Free Product Recovery System		



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Admin records		Operations and Maintenance Manual- Dual-Phase Extraction Remediation System	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records		Operations and Maintenance Manual, Building #3161	Law Engineering and Environmental Services, Inc.	No relevance to PFAS
General Documents- AFFF Inventory Data		ACSIM AFFF Data Call	IMCOM	440 gallons reported on hand, 0 gallons turned in
General Documents- AFFF Inventory Data		AFFF Inventory Data		1280 gallons reported on hand, in "apparatus", 550 gallons reported in "warehouse"
General Documents- AFFF Inventory Data		AFFF Inventory Data		No mention of Belvoir
General Documents- AFFF Inventory Data		AFFF Inventory Data		3600 gallons reported in "hangers", "apparatus", and "warehouses" (includes manufacturer, 3%/6%, and other details on AFFF)
General Documents- AFFF Inventory Data		O&M Army Overall- AFFF/PFOS		No mention of Belvoir
General Documents- AFFF Inventory Data		U.S. Army AFFF Inventory and Disposal		No mention of Belvoir
General Documents		Army Plating Workplaces		No mention of Belvoir
General Documents		IMCOM Priorities for Preliminary Assessment (PA) and/or Site Investigation (SI) Related to the Use of Perfluorooctanoic acid (PFOA) and/or Perfluorooctanesulfonic acid (PFOS) Containing Products		Identifies Fort Belvoir army fire and crash sites (Siets M-07/18 and APOC-4, as well as Fire Fighting Training/Burn Area)

APPENDIX G

Compiled Interview Logs



Interview Log						
Installation:	Fort Belvoir			State:	VA	-
Date/Time: Interviewer(s): Other Attendees:	6/4/2019 Courtney Ingersoll, Jessica T Fran Coulters	ravis, Katie Mageland,	Carla DaParma,	, Lauren Henderson, Afto	n Hess	-
Person(s) Interviewed						
Name	Title/Rank/Role	Time at Installation (or other affiliation)	Time in Current Role	Previously Held Roles (and time period)	Contact Phone/Email	Other Notes
Lindsey David	IRP Manager				703-806-0053 / lindsey.g.david.civ@mail.mil	
Chris Manikas	MMRP Manager				703-806-0030 / christopher.s.manikas.civ@mail. mil	
Carol Creasap	IRP/MMRP Support Contractor				703-806-3766 / carol.m.creasap.ctr@mail.mil	Transferred to Air Program Manager at Fort Belvoir after PA site visit
Kelsey Ross	Wastewater, Drinking Water Coordinator				703-806-0137 / kelsey.d.ross.civ@mail.mil	Left installation after PA site visit
Felix Mariani	Environmental Chief				703-806-3193 / felix.m.mariani3.civ@mail.mil	Left installation after PA site visit, still employed by DoD
Wilamena Harback	Environmental Compliance Chief				703-806-0020 / wilamena.g.harback.civ@mail.m il	
John Redmond	Airfield Safety Manager				703-806-7538 / john.t.redmond.civ@mail.mil	
Dale Walters	Airfield Historian				703-806-7044 / dale.m.walkters.civ@mail.mil	
Nick Wood	GIS Coordinator				703-806-0637 / nicholas.p.wood.civ@mail.mil	
Phyleta Rhodes	Hazardous Waste Manager				phyleata.h.rhodes.civ@mail.mil	



	Interview Log	g	
Installation: Fort Belvoir	Interviewee: In-Brief Attendees	Date: 4 June 2019	
Potential Areas of Potential Interest Discussed			
All areas of potential interest			
General Knowledge Discussed			
Some sites are under a RCRA permit. DPW can pr	ovide permit.		
	in suppression systems to the new appeoved AFFF (Ci g AFFF use. Ms. Rhodes can provide waste manifests t	C6). Any new construction of hangars will include suppression systems with newer AFFF. for disposal of old AFFF.	·.
Drinking water intake (Corbalis intake; surface water	er) for water provided to Fort Belvoir is on the Potomac	River. The intake is more than 5 miles from Fort Belvoir (upstream).	
Installation's list of pesticides goes back to 2010. D	PW can provide. Pesticide management before 2000 v	was contracted. Pesticide storage building is next to Building 1490.	
Dewitt Hospital had a historical x-ray operation that	used liquid developers. Buildings 221 and 320 were sil	silver reclaim operations. The old hospital and these two buildings are now demolished.	
Car washes (wash racks) at tactical facilities do not	t use soap. The only car wash with soap is the MWR Ca	Car Wash.	
FTBL-66/68 are in the NGA area and visits have to	be coordinated with NGA (Mr. Moloney) ahead of time	e. Previous PFAS sampling has occurred at the FTBL-66 IRP site.	
Dye tests occurred on oil-water separators in May 2	2011.		
Fort Belvoir just completed the stormwater inventor	ry.		
Fort Belvoir has two abandoned WWTPs, now used	d as lift stations.		
CERCLA administrative record can be provided via	disc.		



	Interview Log	
Installation: Fort Belvoir	Interviewee: In-Brief Attendees	Date: 4 June 2019
Documents Obtained		
CERCLA Administrative Record disc		
Data Gaps or Items for Follow-Up		
Waste manifests from AFFF disposal - completed		
RCRA permit - completed		
Records of old hospital x-ray chemicals - completed		



Interview Log						
Installation:	Fort Belvoir			State:	VA	
Date/Time: Interviewer(s): Other Attendees:	6/4/2019 Courtney Ingersoll, Jessica Travis, Katie Mageland, Carla DaParma, Lauren Henderson, Afton Hess Fran Coulters					
Person(s) Interviewed						
Name	Title/Rank/Role	Time at Installation (or other affiliation)	Time in Current Role	Previously Held Roles (and time period)	Contact Phone/Email	Other Notes
John Redmond	Airfield Safety Manager				703-806-7538 / john.t.redmond.civ@mail.mil	
Dale Walters	Airfield Historian				703-806-7044 / dale.m.walkters.civ@mail.mil	
Potential Areas of Potential	Interest Discussed					
Hangars						
Crashes						



	Intervie	ew Log
Installation: Fort Belvoir	Interviewee: Airfield	Date: 6/4/2019
General Knowledge Discussed		
Three hangars are currently being renovated	d to change out the suppression system - Building 3145	, 3151, 3232. Will need to follow up with what kind of suppression systems were used historically
One hangar is leased by ARNG - at end of E	Britten Drive	
Building 3126 (Night Vision hangar) - Currer	nt and historical suppression system was water only	
Building 3132 (Night Vision hangar) - Contai Testing performed by Vector contracting.	ns Ansulite AFFF suppression system, installed when b	ouilding was built approximately 8-10 years ago. Tested annually with chemical called PlanIt Safe.
	- Spill occurred May 18, 2018. Building filled with foam a sam therefore, likely non-PFAS). This is the oldest hang:	and some ran out onto pavement and into french drain. Spill report can be provided by DPW. ar; in use since 1950s.
Accidents discussed:		
		it is likely that AFFF was not used. Accident report was found, but could not pinpoint the exact an it is now, therefore, best guestimate of location is just before Route 1 around curve
. , , , , , , , , , , , , , , , , , , ,	,	the runway that was 500-feet long at the time. AFFF use is not confirmed. Pictures of the crash urn instead of attempting to put out (general practice confirmed by fire department).
A Fort Belvoir plane crash occurred sometin	ne in 2017 off-post; Fort Belvoir fire department did not	respond.
Pentagon Heliport - there was a massive res	sponse with mutual aid from many surrounding fire station	ons for 911 (September 11, 2001).
Fire training occurs once per year at the end	d of the runway. Mr. Redmond doesn't think they use foa	ım.
Have had previous mass casualty training e	vents on the airfield but never flowed any water/foam.	
Oil-water separators attached to hangars ge	t overloaded very quickly.	
Fort Belvoir operates a helipad at Fort Meye	er - 1 concrete pad and 4 helipads on top of roof; no kno	wn issues where they would have used AFFF



	Intervi	iew Log	
Installation: Fort Belvoir	Interviewee: Airfield	Date: 6/4/2019	
Documents Obtained		2 416.1 (3) 1,720.10	
Reports of known crashes			
SDS for Ansultie AFFF, PlanIt Safe, and JetEx	foam		
Data Gaps or Items for Follow-Up			
Where do hangar drains go? (Maps received f	rom DPW)		
	formation discussed with fire department, some data	a gaps remain).	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		. gp	



Interview Log						
Installation:	Fort Belvoir		-	State:	VA	
Date/Time: Interviewer(s): Other Attendees:	6/5/2019 Courtney Ingersoll, Jessica T Fran Coulters	ravis, Katie Mageland,	- Carla DaParma	Lauren Henderson	- -	
Person(s) Interviewed		T (1 (1) C	-	D : 11111D1		
Name	Title/Rank/Role	Time at Installation (or other affiliation)	Time in Current Role	Previously Held Roles (and time period)	Contact Phone/Email	Other Notes
Kelsey Ross	Wastewater, Drinking Water Coordinator				703-806-0137 / kelsey.d.ross.civ@mail.mil	Left installation after PA site visit
Jerry Sheehan	Spill Response Manager	8 years	8 years	None	703-806-3864 / gerald.j.sheehan3.civ@mail.mi	
Potential Areas of Potential	Interest Discussed					
AFFF spill responses						
Fire Stations						
Building 1436						
Hangars						



	Interview Log	
Installation: Fort Belvoir	Interviewee: Spill Response	Date: 6/5/2019
General Knowledge Discussed		
April 2017 - AFFF spill occurred in front of DA ditch. Some also went into retention area adja		stead of the water button on the fire enginer. AFFF flowed into the street and across into a
April 2017 - Building 1436 - Approximately 10 department and submitted for disposal off-pos		vas over drain therefore no release into sanitary sewer. Material was containerized by fire
November 2017 - Building 1436 - AFFF disch	arge in parking lot of building, just outside bay doors while re	pairing a JBMHH fire engine. Approximately 10 gallons spilled onto asphalt.
May 2018 - Lakota Hangar spill		
April 2019 - 3 spills		
Thursday – accidental foam discharge at DAA	F FTA behind FTA; foam button accidentally hit; reached gra	ss; but top 2" of grass; approximately 10-20 gallons of AFFF mixed with water
Saturday – car fire at Lewis Village; someone dirt	hit an above ground transformer with non PCB mineral fuel;	AFFF and water entered storm drain; HEPAC cleaned out area with oil spilled; excavated
	vis fire let water out at the FTA behind the DAAF FD, and foal was excavated. Got into trench drain and SW on DAAF.	n had leaked into the water reservoir. 20 gallons of product mixed with 500 gallons of wate
Kelsey has spill records dating back to 2009.	Can provide spill reports for all spills discussed.	
DPW O&M is in charge of suppression system	n testing.	
A sewer service agreement has been in place	with Fairfax County since 1976; only domestic wastewater g	pes to Fairfax County.
Wastewater treatment is performed by America	can Water.	
3 drinking water systems, all utlimately from F	airfax County.	
Historical drinking water treatment plant was I	ocated near Pohick off the Accotink Creek; now a homeless	helter.



		Interview Log		
Installation: Fort Belvoir Documents Obtained	Interviewee: Spill Response		Date: 6/5/2019	
Spill reports				
Data Gaps or Items for Follow-Up				
None				



Interview Log						
Installation:	Fort Belvoir		-	State:	VA	
Date/Time: Interviewer(s): Other Attendees:	6/6/2019 Courtney Ingersoll, Jessica Fran Coulters	Travis, Katie Mageland,	- Carla DaParma,	Lauren Henderson	_ _ _	
Person(s) Interviewed						
Name	Title/Rank/Role	Time at Installation (or other affiliation)	Time in Current Role	Previously Held Roles (and time period)	Contact Phone/Email	Other Notes
Scott Ross	Fire Chief/Fire Training Coordinator				703-806-7306 / christopher.s.ross.civ@mail.mi	
Stephen McDoniel	Assistant Fire Chief	23 years			703-806-1911 / stephen.a.mcdoniel.civ@mail. mil.	
Kevin Good	Deputy Fire Chief				703-805-4843 / kevin.n.good.civ@mail.mil	
Potential Areas of Potential	Interest Discussed					
Fire Stations						
Fire Training locations						
Crashes						
Fire responses						



	Interview Log	
Installation: Fort Belvoir	Interviewee: Fire Department	Date: 6/6/2019
General Knowledge Discussed		
2 foams used by the Fire Dept: 3-6% AR AFF	F, 3% C-8 Ansulate AFFF	
	luge systems (Bldg 3140-Lakota Hangar, Bldg 3151-behind A 3151 was newly renovated. First hangar that went to AFFF si	RNG hangar, Bldg 3156-new Night Vision hangar, Bldg 3232-currently being renovated). uppression system was the ARNG hangar.
First hangar that went to AFFF suppression s	ystem was the ARNG hangar.	
Hangar AFFF storage is separate from the fire	e department's – might just get contracted when needed; i.e.	someone comes and brings in foam when needed so no storage
Building 1495 (Hazardous Waste Building) ha	s an AFFF system.	
Contractor comes in and deals with removing	, rinsing, decontaminating of foam from trucks and to make s	pace for new foam to be put in
AFFF has solidified in the engines before which	ch causes valve issues every 3 years; LRC cleans it out – AF	FF is very corrosive
5 Engines total (S-Post, here, DAAF, Belvoir I and 201 gallon	North, Reserve Engine [currently at S. Post). Average 30 gall	ons, one 40 gallon reservoir, all 3-6 % AR Foam Ansulate; 2 Big foam units – 420 gallon
Current fire engine maintenance building is 14	436; Building 707 is permanent LRC, currently being renovate	d.
Fire department does not perform nozzle testi	ng with AFFF, only done with water.	
Training is always with water, might have train	ned with fluoroprotein in the past.	
Fire department is not aware of any training w	ith foam on the airfield. No other training sites or accidental r	eleases (besides those mentioned by Spill Response personnel).
Sometimes, AFFF buckets are taken back to	stations to refill reservoirs. AFFF stored at LRC.	
T-6 range has had some brush fires, but they	were put out with water.	



	Interview Lo	og	
Installation: Fort Belvoir Documents Obtained	Interviewee: Fire Department	Date: 6/6/2019	
SDS for AFFF			
Data Gaps or Items for Follow-Up	asian araban in Didu 4405 (asamulatad)		
Follow up with Hazardous Waste about suppre	ssion system in Biag 1495 (completed)		

DAY 1

Hangars (6) - meet in office building 3136

- 3 Renovated Hangars non-AOPI; likely that had PFAS in suppression system; currently being renovated
 - 3145, 3151, 3232
 - Follow up with what suppression system current and historical was used here
 - See / get spec of what they are changing it to
 - Find out what chemical is it going to be changed to

Night Vision (2 hangars)

- 3126 current and historically water system
- 3132 Anuslate (PFAS containing) 3%; suppression system installed with building (approx. 8-10 years)
 - Tested with Planet Safe chemical; Vector contractor that did the testing? (instead of Ansulate)
 - Deploy system consist of mini sprinklers

Lakota/O'Neil Hanar 3140/3141

- 2% Jet Ex Foam likely non AFFF; vent-like suppression system that didn't look like your typically AFFF suppression system (it's a high expansion generator for high expansion foam)
- Had a release May 18, 2018 that filled hangar, likely got into French drain (OWS STP likely); stopped before it got to ditch; DPW investigation form for it
- Was this the only fire suppression used historically? ask DPW/LRC
- Oldest hangar since 1950s
- Goes to OWS (French drain outside does)

National Guard

- Belongs to Belvoir; leased by National guard
- Two tanks of AFFF (EcoFoam) said that they were never used, but marks on the site indicated the amount of AFFF going down
 - Look up to see if ECO foam has PFAS

Accidents

- 1983: B non-lethal commercial plane that ran out of fuel that crashed; however, no fuel left and no fire so likely AFFF not used; have accident report; couldn't pinpoint exact location but was likely it was on or very close to the end of the strip; end of strip would be around the curve just before route 1
- **1958**: A lethal helicopter crash, don't have much details, no longer an airfield but has photos of where the 500 foot airfield was where the crash occurred; crashed and burned
- 1968: accident petro spill that caught fire, destroyed structures and burned several acres –
 30,000 100,000 of petro
 - Follow up with this
- 9-11: Fort Meyer used Foam for 9-11; Fort Belvoir foam was not used

Helipad – 1 concrete pad and 4 grass pads ontop of roof; Fort Belvoir operates it at Fort Myer – no issues where they would have deployed

Fire Training Areas:

- Training facility behind the Fire Department same as fire control training area?
- Training area behind hangar the Airfield annual MAS COW training here; no AFFF used follow up about this
 - o Practice by un rolling hoses but don't expel liquid / foam

Drainage for these hangars

DAY 2

FTAs in the FBNA

FTBL 66

- M7, M18, AOPC4, AOPC20
- Multiple FTAs in one area
- Petro was found when digging utilities for NGA, found when soil was removed
- Lots of GMW there but only one had benzene most recent sampling event 2016/2018
- Currently doing feasibility study and working way towards closure just not UUUE
- RAFS site and will go RAO
- Former FTA in 1960s
- Used Solvent Carbon Tetra Chloride only supposedly
- PFAS in GWMW under the HAL
- GW flow would go across bridge; SW flow would do same (stream adjoining site connected by a wetland)
- Any infrastructure with FTA is no longer there; site is over grown and vegetated
- Roads built sometime after/around 2006/2007

FTBL 68

- Site of large fire tat burnt interstate in 1968
- Not much info on it
- Stream adj. to / connects both sections of site
- Lots of GWM wells

INTERVEIWS with Kelsey Ross and Gerry Shehan

- Gerry was not aware of historic spills; was aware of recent car fire spill, soil excavation, foam in hangar (which is non-AFFF). Kelsey provided all of the information.
- Kelsey listed the following spills:
 - o April 2017: DAAF spill accidental release in form on the FD at DAAF

- April 2017: Indoor spill in building 1436 (Fire truck maintenance). Plug on sanitary sewer so nothing could go in there; release was approximately 10 gallons of AFFF
 - FD collected it and put it in an old AFFF container don't know if Kelsey said this
- o November 2017: Foam discharge at 1436 on asphalt outside, approximately 10 gallons
- May 2018: Lakota hangar release non-AFFF
- o April 2019 (3)
 - Thursday accidental foam discharge at DAAF FTA behind FTA; foam button accidentally hit; reached grass; but top 2" of grass; approximately 10-20 gallons of AFFF mixed with water
 - Saturday car fire at Lewis Village; someone hit an above ground transformer with non PCB mineral fuel; AFFF and water entered storm drain; HEPAC cleaned out area with oil spilled; excavated dirt
 - Sunday foam unit that responded to the Lewis fire let water out at the FTA behind the DAAF FD, and foam had leaked into the water reservoir. 20 gallons of product mixed with 500 gallons of water came out into concrete and grassy areas; soil was excavated. Got into trench drain and SW on DAAF.
- There are 7 AFFF related spills; From Gary Smith
 - o 1984 plane crash south of DAAF
 - o S. Training area
 - Helicopter crash
- First DAAF spill (April 2017) Kelsey called everyone; 5-10 gallons released; some got into grass
 - o C-6 foam
- 2nd spill foam was spread out to dissipate
- Past April's spill soil was excavated 2" where the spill occurred
- Sunday spill 2 more inches excavated
- Lakota hangar French drain likely goes to storm drain
- Drain inside hangars go to WOS 3140/3145 goes to OWS
- Night Vision doesn't have a drain
- Kelsey has spill records going back to 2009; Gerry started in 2010
- O&M might have info on fire suppression systems
 - O&M test out fire systems with Planet Safe which has gone into sanitary sometimes
- Water Services at Belvoir
 - o 1976 sewer service agreement only domestic goes to Fairfax Water no pretreatment
 - DW wells on site don't know how many or if there are any; historically there is a series
 of irrigation wells at the golf course
 - Wastewater treatment is from American water
 - Drinking water is from American water (standard assets)
 - o 3 DW systems all ultimately from Fairfax water
 - Community water system; most used- private with American water
 - Non-community #1 serves NGA (Ft Belvoir north); overall 10,000 people served
 - Non-community #2 Woodlawn water works 80F east defense? 24hr water system
 - Drinking water treatment plant was located near Pohick off the Accontink River; now a shelter for the homeless

 Ft Belvoir privatized with American Water – purchase from them for community water but all water ultimately comes from Fairfax water

SITE RECON with Kelsey (and Sean interview)

- Building 1436 Fire Truck Maintenance

- o Two spills in 2017 associated with this area (indoor and outdoor spill)
- Spill November 2017 outdoor spill; cracks in asphalt present. According to Sean (maintenance guy) all of the spill was contained in the asphalt. There was a power divider failure and had to pull out truck residue from drum spills(?). Overflow of AFFF in drums was sitting on top of drum and washed down from rain, resulting in spill, approximately 5 gallons.
- Spill April 2017 floor drain was plugged; went to ix pipe on fire truck and pipe broke and the whole reservoir form fire truck spilled out – 20-30 gallons of AFFF or maybe just 10
- All AFFF stored here Chemguard, PurpleK
- o According to Sean, no nozzle testing has occurred in the past 5 years
- o Detrick, AP Hill, Meyers, Ft Lee tucks all maintained at Ft Belvoir
- Looked at heat resistant lubricants found two suspicious products
 - PTRE Teflon SDS 08
 - Hi Temp Red SDS 012

- Building 707

o Former fire truck maintenance; been in renovation for 5 years. Nothing has ever happened spill-wise at 707 as far as Sean knows.

Lewis Village Car Crash

- AFFF on soil likely, SW drain inlet downgradient which flows to a dry pond and discharges to SW. HEPACO dug out as deep as they could smell
- Car Wash Area photo taken of soaps used; no obvious waxes listed
- **Fire Station (FS) at DAAF** accidental discharge of C-6 foam in front of FS, 5 10 gallons; small amount on grass and on other side of fence across the street. No excavation of soil, swept AFFF to dissipate faster

- FTA on concrete pad behind FS at DAAF -

- o Joints on concrete pad have obvious joints/cracks with grass growing in them
- Thursday incident 10-20 gallons of foam released,
 - Excavation occurred around ditch
 - Trench drain exposed; covered in AFFF; dumps into pond, ditch and them Accotink River (no a source of DW)
 - Also excavated along light pole
 - Base contractor put AFFF into 55-gallon drums 1495 disposal
- Sunday incident release extended in same areas as Thursday (on pad and outside of pad) but even more since it was a bigger release. Had to excavated soil all the way down to the woods
 - Clean harbors disposal, used bioretention, allie-u-soil? Dispose of in 1495
- GWM wells in field behind FTA which was a burn pit a long time ago. Bentonite was used to close wells

Old Hospital – open field now.

DAY 3

INTERVIEW with Fire Department – Stephan McConnel, and two others @ 8:30

- 2 foams used by the FD
 - 3-6% AR AFFF
 - o 3% C-8 Ansulate AFFF
- Only storage in maintenance area #%, no 3-6% left?
- Hangar storage is separate from the fire department's might just get contracted when needed; i.e. someone comes and brings in foam when needed so no storage
 - Only storage was in 2 five gallon buckets at National Guard hangar
- 3 hangars have foam the rest have water diluted systems
 - o National guard, night vision and Lakota
 - All renovated had water dilute system; don't know what the new system will be
 - National guard was the first hangar to switch to foam
 - In 1995 all were water based
- Hangar 3232 system is being renovated
- Hangar 3141 is Lakota
- Hangar 3151 is being renovated; located down past National Guard
- Building 1495 is the hazardous waste building with an AFFF system
- Contractor comes in and deals with removing, rinsing, decontaminating of foam from trucks and to make space for new foam to be put in
 - Ask Felix about this
- 5 Engines total (S-Post, here, DAAF, Belvoir North, Reserve Engine (currently at S. Post)
 - Average 30 gallons, one 40 gallon reservoir, all 3-6 % AR Foam Ansulate
 - o LRC might have a Meyer engine with AFFF in it
 - LRC unit services Meyer Henderson units in the old manufacturing building
- AFFF has solidified in the engines before which causes valve issues every 3 years; LRC cleans it out – AFFF is very corrosive
- Leaking incident in Building 1436 was a Meyers Henderson Fire Truck
- Not aware of any spill in building 707
- Purging on lines occurs in situ
- Nozzle testing only done with water
- Never did a foam flow test
- New foam unit tested when manufactured around 2009 2020 in Dulles
- Training is with water always; might have trained with fluoro protein in the past
- Don't know anything about the training in the proving ground
- No other training sites or accidental releases
- 2 Big foam units 420 gallon and 201 gallon
 - Non AR 3% ansulate; housed at DAAF
 - filling of AFFF is at the warehouse or at DAAF station; uses an electric pump, any residual goes into empty barrel

- brush truck has no foam; fire management plan no prescribed burns; largest brush fire was 5 acres
- DPW should know of other fire suppression systems
- ADF has fuel farms and generators; likely with no AFFF
- Not aware of any historic crashes, releases, etc.
- 1983 plane crash was carrying gold
- 1984 plane crashed into a water tank

SITE RECONSSANCE Building 1495 (and interview with Ms.???)

- AR AFFF suppression system Buckeye
- Has never gone off
- FD come here sometimes and checks on it?

6-4 Ft Belvoir Site Visit as KAD sites behind any tower (Fire white & Duffel blog - satire website? has PFAS data at FTBL-66 GWI claiment self ree only wells on site irrigation @ golf course 100% water purchased from American Water 1980s switched to municipal water/ww No prescribed burning occurs here AStides out of order in template tentative outbrief @ 1300 thursday Haz Waste - Hepa Co: AFFF spill soils sent Offsite for incineration. * Haz Waste has manifests Pesticides - everent no PFAS Asteve Watters - 2000-2018 list pesticides prior to their - AD OHM contractor? not sure who would have into *Kelsey has maps of wells at FTBL-66 and PFAS sampling data

6-4 Ft Belvoir Site Visit as KAD sites behind any tower (Fire white & Duffel blog - satire website? has PFAS data at FTBL-66 GWI claiment self ree only wells on site irrigation @ golf course 100% water purchased from American Water 1980s switched to municipal water/ww No prescribed burning occurs here AStides out of order in template tentative outbrief @ 1300 thursday Haz Waste - Hepa Co: AFFF spill soils sent Offsite for incineration. * Haz Waste has manifests Pesticides - everent no PFAS Asteve Watters - 2000-2018 list pesticides prior to their - AD OHM contractor? not sure who would have into *Kelsey has maps of wells at FTBL-66 and PFAS sampling data

fire training - doesn't use foam, annual training Mr. Weaver - POC fire dept - meeting Thurs hose exercises occurred on airfield but no discharges water or foam Billy Gomez POC

#3145, 3151, 3232

Brangars with systems being rehabbed

Whire dept will know approx installation

dates for suppression systems - Guard hangar still has AFFF (lax from)
- Might Vision "" " John Selby 3126 Hangar- always water system (Night Vision hangar) - First 3132 Hangar - system (Night) second 2008 "Planet Jake" used For test (every 5 yr)
Vector Fire dud test * can provide Airfield Map (hangar #5)

Guard hangar - no deployment since 2008 site visit FTBL-66 former fire training area (multiple areas)

doing FS now for closure, most recent

samples well had exceedance of benzere

soil removal occurred during utility installation for NGA sampled for PFAS once - detections below 70 ppt . * A get contractor report contractor said used carbon tetrachloride for fire training of get history Urrom existing reports wells present / traffic training needed wetlands and overpass/highways present Akelsey has sewer at stormwater infrastructure mapping - putting on CD she emelad utility to ask if hangar

R Jerry Sheehan - not aware of spills

From car wash / maintenance etc

(non-AFFF)

Fire have V. The fire hangar - highEX Foam (not AFFF) Kelsey put together folder of known spills

D APROIT Davidson Army Air Field Firestation Gam

B APR 2017 Blg 1436 Fire Maintenance (plug in sanitary sewer) 10gal Spill reports on CD B Nov. 2017 - Bldg 1436 repairing JBMHH

fire truck - 10gal an outside bldg on

asphalt - [Fire Dept collected foam indoor spilling.

B May 2018 - Lacoda hangar [outside disipate]

5,6,7 Apr 2019 - 3 incidents

Thurs. Fire training a lea accidental discharge

(sod cutter due up) 10-20gal

sat, car file leups up) 10-20gal non PCB mieral oil (foam response) 59al entered storm water system. Hepco contacted to remove soils sur. foam resevoir leaked and discharged about 20 gal of product (not proportioned) area from in it didn't see at with 110" foam in it . didn't see at outfall (on rock) sod cutter 2 more inches excavated sent to haz waste bldg

Firefighting Known Releases 1984 - plane crash - south of Davidson Airfield Unk date. helicopter crash

(Gary Smith POC if Fire Dept can't provide hangars - drains outside buildings go to stormwater system. Interior M drains should go to O/W system Night Vision - no floor drain Records of Spills are very accurate to 2012 Some more records date to 2009, not sure about prior about prior

Kelsey- started in 2010

Kolsey- started in 2010

Kolsey- started in 2010

to con do database search of foam of provide

copy of database 0t M night have fire suppression systems into

1976 - wastewater sent to Fairfax Always just domestic/household. Requests for any

3 DW system - Ff Belvoir (37,000 population) with American, two noncommunity DW

systems -NGA (10,000 population), Woodlawn (Defense)
water for 35ystems ADFEast (2,000)
all from Fairfax County Kelsey can ask if sewer integrity surgey Fire Station Site Visit 3242 accelental discourse Apr 2017 out Front towards road, got to edge of opass, not to storn drain 6 Fire Training Station Thurs, Sat, Sun spills / release K-sites

Williams, Rebecca

From: Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@army.mil>

Sent: Wednesday, October 20, 2021 9:46 AM

To: Williams, Rebecca

Subject: Re: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview

follow up re Hangar 3232

Rebecca, a lot of your answers are down the hall in the O&M and Engineering Divisions. COVID stopped the meetings where you could easily get the information. I have been systematically upgrading the fire protection systems in all our hangars.

Thanks, Pem

BTW, people have switched my name all my life. It is not a big deal.

From: Williams, Rebecca < Rebecca. Williams@arcadis.com >

Sent: Wednesday, October 20, 2021 12:15 PM

To: Gregory, Pemiton E CIV USARMY TAAB (USA) pemiton.e.gregory.civ@army.mil>

Subject: RE: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

Thank you, Mr. Gregory Firstly, I apologize for transposing your first name and surname in previous e-mail correspondence. Second, we have recorded that Hangar 3232 became operational in 1995. Was a water-only deluge system used for fire suppression between 1995 and 2019 when the Jet-X-containing fire-suppression system was installed?

Thank you, Rebecca

From: Gregory, Pemiton E CIV USARMY TAAB (USA) pemiton.e.gregory.civ@army.mil>

Sent: Wednesday, October 20, 2021 7:51 AM

To: Williams, Rebecca < Rebecca. Williams@arcadis.com >

Subject: Re: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

The fire protections system is new, completed in 2019.

Pemiton E. Gregory General Engineer US Army Aviation Brigade 703=806-7542 From: Williams, Rebecca < Rebecca. Williams@arcadis.com < Caution-mailto: Rebecca. Williams@arcadis.com > >

Sent: Tuesday, October 19, 2021 9:46 PM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@mail.mil < Caution-

mailto:jerry.w.jett.civ@mail.mil > >; Gregory, Pemiton E CIV USARMY TAAB (USA)

<pemiton.e.gregory.civ@army.mil < Caution-mailto:pemiton.e.gregory.civ@army.mil > >; Gregory, Pemiton E CIV

Cc: Redmond, John T CIV USARMY MDW (USA) < john.t.redmond.civ@army.mil < Caution-

mailto:john.t.redmond.civ@army.mil > >; Hess, Afton <Afton.Hess@arcadis.com < Caution-

mailto:Afton.Hess@arcadis.com > >

Subject: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

Hello, Mr. Jett.

Could you please let me knowthe water deluge fire-suppression system been in place since Hangar 3232 became operational in 1995? Thank you for your assistance.

Respectfully, Rebecca

Rebecca Glos Williams (she/her)

Project Manager Arcadis U.S., Inc. 320 Commerce Suite 200 | Irvine CA | 92602 | USA T+17145082670

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From: Williams, Rebecca

Sent: Monday, October 18, 2021 12:02 PM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@mail.mil < Caution-mailto:jerry.w.jett.civ@mail.mil > >;pemiton.e.gregory.civ@army.mil < Caution-mailto:pemiton.e.gregory.civ@army.mil > ; Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@mail.mil < Caution-mailto:pemiton.e.gregory.civ@mail.mil > > Cc: john.t.redmond.civ@army.mil < Caution-mailto:john.t.redmond.civ@army.mil > ; Hess, Afton <Afton.Hess@arcadis.com < Caution-mailto:Afton.Hess@arcadis.com > >

Subject: RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Mr. Jett.

Thank you so much for your response. Has the water deluge fire-suppression system been in place since Hangar 3232 became operational in 1995?

Thank you, again, Rebecca

From: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@mail.mil < Caution-Caution-mailto:jerry.w.jett.civ@mail.mil < Caution-mailto:jerry.w.jett.civ@mail.mil %3c Caution-Caution-mailto:jerry.w.jett.civ@mail.mil %3c Caution-Caution-mailto:jerry.w.jett.civ@

mailto:jerry.w.jett.civ@mail.mil >>> **Sent:** Monday, October 18, 2021 5:34 AM

To: Williams, Rebecca < Rebecca. Williams@arcadis.com < Caution-Caution-

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Subject: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

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Ms Williams

Yes the Mil-Con Spec Jet-X 2% was used to fill the new holding tank. This is the biodegradable solution and not the AFFF.

This hangar did not contain any AFFF foam, it was just a water deluge system.

Just google the Jet-X 2% Foam and you should be able to get the SDS on it from there. I don't have the SDS.

Thanks,

Jerry W. Jett, Jr., CFPS Fire Marshal USAG Fort Belvoir Fire & Emergency Services 9701 Gunston Rd Fort Belvoir, Virginia 22060

Office: 703-805-2091 Desk: 703-805-2702 Cell: 571-595-6621 Fax: 703-805-2303

NIPR:jerry.w.jett.civ@mail.mil < Caution-Caution-mailto:jerry.w.jett.civ@mail.mil >

From: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@army.mil < Caution-Caution-mailto:jerry.w.jett.civ@army.mil < Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-mailto:jerry.w.jett.civ@army.mil >>>

Sent: Sunday, October 17, 2021 3:00 PM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@mail.mil < Caution-Caution-mailto:jerry.w.jett.civ@mail.mil < Caution-mailto:jerry.w.jett.civ@mail.mil %3c Caution-Caution-

mailto:jerry.w.jett.civ@mail.mil >>>

Subject: Fw: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Importance: High

From: Williams, Rebecca < Rebecca. Williams@arcadis.com < Caution-Caution-

mailto:Rebecca.Williams@arcadis.com < Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-

mailto:Rebecca.Williams@arcadis.com >>>

Sent: Friday, October 15, 2021 2:51 PM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@army.mil < Caution-Caution-

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Subject: RE: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

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Hello, Messrs. Jett and Pemiton.

Are either of you able to answer our three questions about Hangar 3232 as listed below?

Thank you, Rebecca

From: Williams, Rebecca

Sent: Tuesday, October 12, 2021 9:21 AM

To: Redmond, John T CIV USARMY MDW (USA) <john.t.redmond.civ@army.mil < Caution-Caution-mailto:john.t.redmond.civ@army.mil < Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil >>>

Cc: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@army.mil < Caution-Caution-mailto:jerry.w.jett.civ@army.mil < Caution-mailto:jerry.w.jett.civ@army.mil <>>>; Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@army.mil < Caution-Caution-mailto:jerry.w.jett.civ@army.mil < Caution-Caution-mailto:jerry.w.jett.civ@army.mil <>>>; Gregory, Pemiton E CIV USARMY TAAB (USA) < pemiton.e.gregory.civ@mail.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@mail.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@mail.mil %3c Caution-Caution-mailto:pemiton.e.gregory.civ@mail.mil >>>; Gregory, Pemiton E CIV USARMY TAAB (USA) < pemiton.e.gregory.civ@army.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@army.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@army.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@army.mil >>> Subject: RE: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Mr. Redmond,

Thank you for following up with me and forwarding my information request to Messrs. Jett and Pemiton.

Messrs. Jett and Pemiton,

Thank you in advance for your assistance! Could you please let me know (1) when Hangar 3232's fire-suppression system was renovated/replaced, (2) if a new foam is utilized, what it is and whether it contains PFAS, and (3) what was done with the AFFF foam concentrate that was removed from the fire-suppression system's foam tank? Also, if you have an SDS for the new foam and it's not an imposition, could you please send it to me so that I can add it to the data record?

Respectfully, Rebecca

Rebecca Glos Williams (she/her)

Project Manager Arcadis U.S., Inc. 320 Commerce Suite 200 | Irvine CA | 92602 | USA T +1 714 508 2670

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From: Redmond, John T CIV USARMY MDW (USA) <john.t.redmond.civ@army.mil < Caution-Caution-mailto:john.t.redmond.civ@army.mil < Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@army.mil %3c Caution-Cautio

Sent: Tuesday, October 12, 2021 4:29 AM

To: Williams, Rebecca < Rebecca. Williams@arcadis.com < Caution-Caution-Caution-

mailto:Rebecca.Williams@arcadis.com < Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-

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Subject: RE: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Ms. Williams,

Good morning, sorry for the late response but I was out on Friday. I have CC'd Jerry Jett (Fire Marshall) and Pemiton Gregory (Brigade Engineer) because they are the individuals that would have this information. I am sure they will be able to help you get the answer and please let me know if you need anything else.

Thank you,

John T. Redmond Airfield Safety Manager Davison Army Airfield Pentagon Army Helipad O: (703) 806-7538 WC: (703) 346-3402

WC: (703) 346-3402

C: (315) 405-7253

From: Redmond, John T CIV USARMY MDW (USA)

Sent: Thursday, October 7, 2021 8:14 AM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@army.mil < Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Caution-Caution-mailto:jerry.w.jett.civ@army.mil %3c Caution-Ca

Subject: FW: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Jerry,

Good morning, please see below email. I am pretty positive that when we renovated 3232, they replaced the fire suppression system without PFAS included. Can you confirm that this was the case?

Thank you,

John T. Redmond Airfield Safety Manager Davison Army Airfield Pentagon Army Helipad O: (703) 806-7538

WC: (703) 346-3402 C: (315) 405-7253

Email: john.t.redmond.civ@army.mil < Caution-mailto:john.t.redmond.civ@army.mil > < Caution-Caution-mailto:john.t.redmond.civ@army.mil > < Caution-Caution-Caution-mailto:john.t.redmond.civ@army.mil >

From: Williams, Rebecca < Rebecca. Williams@arcadis.com < Caution-Caut

mailto:Rebecca.Williams@arcadis.com < Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-Caution-mailto:Rebecca.Williams@arcadis.com %3c Caution-

mailto:Rebecca.Williams@arcadis.com %3c Caution-Caution-Caution-mailto:Rebecca.Williams@arcadis.com >>>> **Sent:** Wednesday, October 6, 2021 8:48 PM

To: Redmond, John T CIV USARMY MDW (USA) <john.t.redmond.civ@mail.mil < Caution-Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caution-Caution-mailto:john.t.redmond.civ@mail.mil %3c Caution-Caut

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Subject: [Non-DoD Source] Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

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Dear Mr. Redmond.

On 6 June 2019, some of my colleagues interviewed you and Mr. Walters during a Preliminary Assessment (PA) site visit looking at potential locations for the use, storage, and disposal of per- and polyfluoroalkyl substances (PFAS) with an emphasis on aqueous film-forming foam (AFFF). According to our interview notes, airfield staff were in the process of renovating/replacing the fire-suppression system in Hangar 3232 and switching to a PFAS-free foam, or were in the planning stage for an eventual renovation or replacement of the Hangar 3232 fire-suppression system. We are in the process of finalizing the report covering the PA and subsequent environmental sampling and we would really appreciate it if you could provide us with an update on the disposition of Hangar 3232's fire-suppression system so that we can include this information in the report.

Thank you in advance for your assistance and please let me know if you have any questions.

Respectfully, Rebecca

Rebecca Glos Williams (she/her)

Project Manager Arcadis U.S., Inc. 320 Commerce Suite 200 | Irvine CA | 92602 | USA T +1 714 508 2670

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america%2F&data=04%7C01%7CRebecca.Williams%40arcadis.com%7Cf8f24b7a25034ce0263608d8ed782780%7C7f900 57d3ea046feb07ce0568627081b%7C0%7C0%7C637520447948799935%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4w LjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=pGeDn1g7NscKBEnG46mY0FUvrFF4riZZ

AeM1TGi5ryA%3D&reserved=0 > Caution-Ca

Williams, Rebecca

From: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@mail.mil>

Sent: Thursday, October 21, 2021 4:44 AM

To: Williams, Rebecca; pemiton.e.gregory.civ@army.mil; Gregory, Pemiton E CIV USARMY

TAAB (USA)

Cc: john.t.redmond.civ@army.mil; Hess, Afton

Subject: RE: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview

follow up re Hangar 3232

Yes. It has always been a water deluge since the Hangar was built which was back in the 50's. That was part of the renovation was to bring the Hangar up to code was the new high expansion deluge system.

Jerry

From: Williams, Rebecca < Rebecca. Williams@arcadis.com >

Sent: Tuesday, October 19, 2021 9:47 PM

To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) < jerry.w.jett.civ@mail.mil>; pemiton.e.gregory.civ@army.mil;

Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@mail.mil>

Cc: john.t.redmond.civ@army.mil; Hess, Afton <Afton.Hess@arcadis.com>

Subject: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

Importance: High

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

Hello, Mr. Jett.

Could you please let me knowthe water deluge fire-suppression system been in place since Hangar 3232 became operational in 1995? Thank you for your assistance.

Respectfully, Rebecca

Rebecca Glos Williams (she/her)

Project Manager Arcadis U.S., Inc.

320 Commerce Suite 200 | Irvine CA | 92602 | USA

T+17145082670

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www.arcadis.com%2F&data=04%7C01%7CRebecca.Williams%40arcadis.com%7Cf8f24b7a25034ce0263608 d8ed782780%7C7f90057d3ea046feb07ce0568627081b%7C0%7C0%7C637520447948789974%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=%2BUAeyuAz5HXUwAMM9Y1EezwtdA%2FiMcg20y2KPbCLpok%3D&reserved=0 >

Williams, Rebecca

Hello, Jerry.

From: Sent: To: Cc: Subject:	Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@army.mil> Monday, May 23, 2022 3:57 AM Williams, Rebecca; Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) Redmond, John T CIV USARMY MDW (USA); Hess, Afton; Gregory, Pemiton E CIV USARMY TAAB (USA); Gregory, Pemiton E CIV USARMY TAAB (USA) RE: [URL Verdict: Neutral]RE: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary</jerry.w.jett.civ@army.mil>
Please see below for your answe	Assessment interview follow up re Hangar 3140
Thanks,	
Jerry W. Jett, Jr., CFPS Fire Marshal USAG Fort Belvoir Fire & Emerge 9701 Gunston Rd Fort Belvoir, Virginia 22060 Office: 703-805-2091 Desk: 703-805-2702 Cell: 571-595-6621 Fax: 703-805-2303 NIPR: jerry.w.jett.civ@army.mil	ncy Services
Cc: Redmond, John T CIV USARM Afton.Hess@arcadis.com ; Gre Pemiton E CIV USARMY TAAB (USubject: [URL Verdict: Neutral]Rifollow up re Hangar 3140 All active links contained in this expression of the second secon	

We are in the process of finalizing the report prepared following Arcadis' June 2019 Preliminary Assessment site visit. We have received a question about Hangar 3140 that we are unable to answer fully with the information we already have. We know that Hangar 3140 has been in use since the 1950s and, according to FTBL Fire Department personnel, a fire-suppression system was installed in the hangar sometime after 1981. We also have information on the large release of non-AFFF 2% Jet-Ex high-expansion foam on 18 May 2018.

Are you able to provide information on the following:

- 1. When was a fire-suppression system first installed in Hangar 3140?
 - ORGINAL WAS WATER DELUGE
 - HIGH EXPANSION WAS INSTALLED 2011-ish
- 2. What kind of fire-suppression agent was utilized (e.g., water, AFFF or other per-/polyfluorinated foam)?
 - Jet-Ex 2% high-expansion foam
- 3. Was the fire-suppression system (suppression agent) changed between when the system was first installed and the transition to Jet-Ex 2% high-expansion foam? NO
- 4. When the fire-suppression system switched to Jet-Ex 2% high-expansion foam, if AFFF or other per-/polyfluorinated foam was formerly utilized, was the tank and plumbing system replaced as part of the change-over to Jet-Ex? N/A ALWAYS BEEN JET-EX 2%

Any information you can provide that adds to our	understanding of Hangar	3140's fire-suppression	history is most
appreciated.			

Thank you,

Rebecca

Rebecca Glos Williams (she/her) Project Manager Arcadis U.S., Inc.

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APPENDIX H Site Reconnaissance Photo Log

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 1

Description:

Fire Suppression
System - Non-AFFF 2%
Jet Ex foam released
from Lakota/O'Neil
Hangar

Location:

Lakota/O'Neil Hangar (Building 3140)

Date: 6/4/2019



Photograph: 2

Description:

Temporary fire truck maintenance area where two AFFF spills occurred in 2017 (one as shown here outside the bay doors).

Location:

Building 1436 Logistics Readiness Center (LRC) AOPI

Date: 6/5/2019

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 3

Description:

Temporary fire truck maintenance area where two AFFF spills occurred in 2017 – 3% AFFF located within the building.

Location:

Building 1436 (LRC) AOPI

Date: 6/5/2019



Photograph: 4

Description:

Temporary fire truck maintenance area where two AFFF spills occurred in 2017 (one inside the facility).

Location:

Building 1436 (LRC) AOPI

Date: 6/5/2019

USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 5

Description:

Temporary fire truck maintenance area where two AFFF spills occurred in 2017

Location:

Building 1436 (LRC) AOPI

Date: 6/5/2019



Photograph: 6

Description:

Former fire truck maintenance facility. Frequency of spills or releases of AFF is unknown.

Location:

Building 707 (LRC) AOPI

Date: 6/5/2019

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 7

Description:

Former fire truck maintenance facility. Frequency of spills or releases of AFF is unknown.

Location:

Building 707 LRC AOPI

Date: 6/5/2019



Photograph: 8

Description:

Location of 27 April 2019 car fire. Occurred when a car hit a transformer behind the townhouse and caught fire. Approximately 5 to 10 gallons of AFFF was discharged.

Location:

Lewis Village Car Fire AOPI

Date: 6/5/2019

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 9

Description:

Location of 27 April 2019 car fire. Occurred when a car hit a transformer behind the townhouse and caught fire. Approximately 5-10 gallons of AFFF was discharged.

Location:

Lewis Village Car Fire AOPI

Date: 6/5/2019



Photograph: 10

Description:

Area of April 2017 AFFF release. The release started on asphalt/concrete surfaces but extended into grassy areas in front of the fire station.

Location:

Davison Army Airfield (DAAF) Fire Station AOPI

Date: 6/5/2019

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 11

Description:

Area of April 2017 AFFF release. The release started on asphalt/concrete surfaces but extended into grassy areas in front of the fire station.

Location: DAAF Fire Station AOPI

Date: 6/5/2019



Photograph: 12

Description:

Former fire training area - open grassy area located behind the DAAF Fire Station (groundwater wells were abandoned).

Location:

FTBL-12 (Fire Fighting/Burn Area)

Date: 6/5/2019

APPENDIX H – SITE RECONNAISSANCE PHOTO LOG USAEC PFAS PRELIMINARY ASSESSMENT/SITE INSPECTION



FORT BELVOIR, VIRGINIA



Photograph: 13

Description:

Pond and drainage ditch near the fire training area behind the DAAF Fire Station.

Location:

FTBL-12 (Fire Fighting/Burn Area)

Date: 6/5/2019



Photograph: 14

Description:

AFFF suppression system – containing 3% AFFF

Location:

Building 1495-Hazardous Waste Building (AFFF firesuppression system)

Date: 6/6/2019

APPENDIX I Compiled Site Reconnaissance Logs



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort B	elvoir State: <u>Virginia</u>
Date:		5-Jun-19
Potential Area of Interest (PAOPI)		Building 1436 and 707
Location Descript	tion:	Fire Truck Maintenance Buildings
Latitude/Longitud	e:	38°42'2.20"N, 77° 9'4.51"W (building 1436) and 38°41'20.37"N, 77° 8'31.85"W (building 707)
Field Personnel:		Lauren Henderson, Carla DaParma, and Katherine Mageland
Site Contact/Title:	:	Kelsey Ross - DPW Environmental
Weather:		Clear and Sunny

Sources

Recognized Primary Source (circle):

Fire, fire training, fire station, nozzle testing, crash site, chromium plating, hangar/aqueous film-forming foam suppression system, auto maintenance, photo processing, fuel spill, pesticide/insecticide use, wash rack, other:

Building 1436: Temporary fire truck maintenance area where two AFFF spills occurred in 2017. Spill on November 15, 2017 - overfilled AFFF was sitting on top of 55-gallon drums and washed down from rain, resulting in spill. Spill on April 12, 2017 - pipe on fire truck broke when maintenance workers were attempting to

When/Frequency: fix it, and the entire reservoir of the fire truck spilled out.

Building 707: Former fire truck maintenance area; is currently being renovated (since approximately 2014). No

recorded releases or spills.

Product Released and Volume:

Building 1436: Spill in November 2017 - approximately 5-15 gallons of AFFF concentrate/foam was released outside of building Spill in April 2017 - approximately 5 gallons of 3% AFFF concentrate released inside of building. Type of AFFF unknown.

For the spill inside building 1436, the floor drain was plugged; however, for the spill outside, the asphalt was cracked where the overflow occurred. Building 1436 is also the area of AFFF storage, in 55 gallon drums (Ansulite AFFF 3% and Chemguard 3% AFFF). No leaks observed in storage area; all 55 gallons drums were located on pallets. PFAS containing heat resistant lubricants were found inside the building (less than 1 gallon). These included "AST-RV silicon adhesive/instant gasket Hi temp red" and TFE pipe thread sealant with PTFE."

Other Notes:

Recognized Secondary Source(s) (circle):

Stormwater or sewer system components, wastewater treatment plants, landfills, remediated soil application sites, surface water flow pathway, potential for groundwater infiltration, other:

When: Apr-17
Building 1436: Exterior spill has the potential for groundwater infiltration due to cracks in asphalt.

Other Notes:

Physical Setting of Potential Area of Potential Interest

Topography and floor/ground surface (note vegetation/pavement, soil composition/color/staining, how surface may influence sampling access, and evidence of erosion especially near point of possible release):

Building 1436 interior: concrete floors with no cracks or obvious staining. Exterior: cracked asphalt.

Infrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, buildings):

Roads leading to sites; both sites in a manufacturing warehouse/industrial area. Stormwater inlets observed adjacent to building 707.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Building 1436 ar	Date: nd 707	5-Jun-19
On- or off-installation condition of wells):	ı monitoring or drin	king water w	ells (number and	proximity to pote	ential area of potential interest, note access and
No wells were obser	ved near buildings.	_			
Surface water bodies	s (proximity to and	relative drain	age direction and	d receptor, note p	ponding or standing water nearby):
No surface water boo	dies were observed	d .			
Surface drainage wit	hin or adjacent to (natural or ma	anmade, flow dire	ection, lining [stor	ne, vegetation, other], blockages):
Surface drainage out is still being renovate					ed next to building 707; however, this building
Site status (current o actions or other perfl	•				l attenuation, system], previous remedial
Unknown.					
Miscellaneous notes	:				
Health and Safety C	Considerations				
* Please note any he	alth and safety cor	ncerns here (e.g., access, ove	rhead/buried util	ities, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Belvoir	State:	<u>Virginia</u>
Date:	6-Jun-19		
Potential Area of Pot			
Interest (PAOPI) Nar		erials)	
Location Description	· · · · · · · · · · · · · · · · · · ·		
Latitude/Longitude:	38°42'7.14"N, 77° 9'14.56"W		
Field Personnel:	Courtney Ingersoll, Lauren He	nderson, and Katherine	e Mageland
Site Contact/Title:	Kelsey Ross/ DPW - Environm		
Weather:	Clear and Sunny		
C			
Sources Recognized Primar	v Source (circle):		
Recognized Fillial	y Source (circle).		
			ueous film-forming foam suppression system other: HazMat Room Suppression System
When/Frequency:	AFFF suppression system located in bu	lding 1496; no known i	ncidents or releases.
Product Released and Volume:	N/A.		
Other Notes:	Buckeye Platinum 3%-3% AR AFFF		
Stormwater or sewer	r groundwater infiltration, other:	ent plants, landfills, rem	nediated soil application sites, surface water flow
When:	No secondary sources observed.		
Migration Potential:	N/A		
Other Notes:			
Physical Setting of	Potential Area of Potential Interest		
	r/ground surface (note vegetation/pavem d evidence of erosion especially near poi		olor/staining, how surface may influence
AFFF suppression sy	stem is located in a utility room with con-	crete floors. No appare	nt drains were observed in the room.
Infrastructure (e.g., r buildings):	note entry to sewer system via drop inlets	storm drains/sanitary s	sewer/wastewater treatment plant, pavement,

Roads leading to building 1495. No drains or sewer systems observed.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Building 1495 (Hazardous Materials	Date:	6-Jun-19
On- or off-installation condition of wells):	monitoring or drin	king water v	wells (number and proxi	mity to pote	ential area of potential interest, note access and
No wells were observ	ved near the buildi	ng.			
Surface water bodies	(proximity to and	relative drai	nage direction and rece	ptor, note ¡	ponding or standing water nearby):
No surface water boo	lies were observed	l near the b	uilding.		
Surface drainage with	nin or adjacent to (natural or m	nanmade, flow direction	lining [sto	ne, vegetation, other], blockages):
Unknown.					
,	•		no further action, monito poctanoic acid investiga		l attenuation, system], previous remedial
Unknown.					
Miscellaneous notes:					
H10					
Health and Safety C			/	الفرياء ماريطا	itiaa ataan tamain hislanisal hamanda)
Please note any ne	aith and salety cor	icerns nere	(e.g., access, overnead	/buried util	ities, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Bel	voir	State:	<u>Virginia</u>
Date:		5-Jun-19		
Potential Area of Pote	ntial			
Interest (PAOPI) Nam		Car Wash		
Location Description:		Located off Gorgas Road		
Latitude/Longitude:		38°43'11.87"N, 77° 8'52.42"W		
Field Personnel:		Lauren Henderson, Carla DaParr	ma. Katherine Magela	and, and Jessica Travis
Site Contact/Title:		Kelsey Ross - DPW Environment		,
Weather:		Clear and Sunny		
		,		
Sources				
Recognized Primary	Source	(circle):		
		ozzle testing, crash site, chromiur essing, fuel spill, pesticide/insection		eo us film- forming foam suppression system, ther:
When/Frequency:	Unknowr	if PFAS containing waxes or othe	er car wash material i	s or was used here.
Product Released and Volume:	Unknowr	1.		
Other Notes:				
Recognized Secondary Stormwater or sewer spathway, potential for	system c	omponents, wastewater treatment	plants, landfills, rem	ediated soil application sites, surface water flow
When:	Unknowr	l.		
Migration Potential:	Migratior	potential to stormwater or sewer	systems via drains lo	cated in car wash bays.
Other Notes:				
Dhysical Cattings of F) 	Avec of Detential Interest		
Physical Setting of F	otentiai	Area of Potential Interest		
		surface (note vegetation/pavemen e of erosion especially near point		lor/staining, how surface may influence
Site consists of severa	al self ca	r washing bays, atop asphalt. No	obvious cracks or sta	nining observed.
Infrastructure (e.g., no buildings):	ote entry	to sewer system via drop inlets/sto	orm drains/sanitary s	ewer/wastewater treatment plant, pavement,

Road leading to site. Parking lot surrounding car wash area. Building/car bays associated with site. Drains located in bays.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Car Wash Area	Date:	5-Jun-19
On- or off-installation n condition of wells):	nonitoring or drink	king water v	vells (number and pro	oximity to pote	ential area of potential interest, note access and
No wells were observe	ed near car wash.				
Surface water bodies (proximity to and r	elative drai	nage direction and re	eceptor, note p	oonding or standing water nearby):
No surface water bodie	es were observed	immediate	ly adjacent to site.		
Surface drainage within	n or adjacent to (r	natural or m	nanmade, flow directi	on, lining [stor	ne, vegetation, other], blockages):
Surface drainage within	n car wash bays g	joes into dr	ains.		
actions or other perfluc		L 0 /	,		l attenuation, system], previous remedial
Unknown.					
Miscellaneous notes:					
Unknown if PFAS was - list included mostly so	•		orand names of car w	ash chemicals	s was recorded. Waxes were no included in list
Health and Safety Co	nsiderations				
* Please note any heal	th and safety con	cerns here	(e.g., access, overhe	ead/buried utili	ties, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Belvoir State: <u>Virginia</u>
Date:	5-Jun-19
Potential Area of Pote Interest (PAOPI) Nan	
Location Description:	DAAF Fire Station (infront of station and behind in FTA)
Latitude/Longitude:	38°42'55.35"N, 77°10'35.29"W (infront of Fire Station), and 38°42'53.36"N, 77°10'31.85"W (behind Fire Station in FTA)
Field Personnel:	Lauren Henderson, Carla DaParma, Katherine Mageland, and Jessica Travis
Site Contact/Title:	Kelsey Ross/ DPW - Environmental
Weather:	Clear and Sunny

Sources

Recognized Primary Source (circle):

Fire fire training, fire station, nozzle testing, crash site, chromium plating, hangar/aqueous film-forming foam suppression system, auto maintenance, photo processing, fuel spill, pesticide/insecticide use, wash rack, other:

Three known releases of AFFF at the DAAF Fire Station:

1. April 11, (Tuesday) 2017 - Infront of Fire station - accidental discharge of AFFF. Fire fighter accidentally hit foam button instead of water button on fire truck.

When/Frequency:

- 2. April 25, (Thursday) 2019 Behind Fire Station in FTA; accidental discharge of AFFF. Fire fighter accidentally hit foam button instead of water button on fire truck during a training exercise.
- 3. April 28, (Sunday) 2019 Behind Fire Station in FTA; accidental discharge of AFFF. A mechanical malfunction with Fire Engine 466 caused foam reservoir on the apparatus to leak or be pumped into the water tank on the apparatus, and then all of the water and foam was discharged from the engine by a firefighter.

Product Released and Volume:

- 1. 5-10 gallons 3% Chemguard C306-MS-C mixed with water less than 1 gallon on super concentrate.
- 2. 10-20 gallons of foam; approximately 1 gallon of AFFF concentrate Ansulite 3% AFFF (AFC-3-A); C-8 foam
- 3. 25 gallons of AFFF (Ansulite ARC 3% or 6%) mixed with 500 gallons of water

Other Notes:

The second and third release are collocated at the FTA.

Recognized Secondary Source(s) (circle):

Stormwater or sewer system components, wastewater treatment plants, landfills, remediated soil application sites, surface water flow pathway, potential for groundwater infiltration, other:

When: April 2017 and April 2019

- 1. Potential for groundwater infiltration from foam extending into a ditch across the street from release, grassy areas/potential dry pond with culverts adjoining the release area and grassy areas across the street from the release. Foam was reportedly swept/spread out on Gavin Road for faster dissipation no cracks observed in asphalt.
- 2. and 3. Surface water flow pathway release caused foam flow into a trench drain on the FTA concrete pad, into the nearby bioretention pond, followed by a drainage ditch and finally the Accotink Creek. Foam was observed up to the nearby pond. Groundwater infiltration potential concrete pad associated with the FTA where the foam was released was cracked. Foam also extended beyond concrete into adjoining grassy areas.

Migration Potential:

- 2. Foam was vacuumed up in a shop vac, and 2-3 inches of soil was removed from foam-impacted areas. 10 55-gallon drums were transported to building 1495 (Hazardous Waste Facility).
- 3. Water and foam was removed from the trench drain and 2-3 inches of soil was removed. CleanHarbors pumped out the bioretention pond (approximately 85 gallons of water). 23 55-gallon drums of impacted soils, and water were sent to building 1495.

Other Notes:



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Physical Setting of Potential Area of Potential Interest

Topography and floor/ground surface (note vegetation/pavement, soil composition/color/staining, how surface may influence sampling access, and evidence of erosion especially near point of possible release):

- 1. Release started on asphalt/concrete surfaces but extended into grassy areas in front of Fire Station.
- 2. and 3. Release started on concrete but extended into grassy areas beside the FTA.

Infrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, buildings):

Roads leading to Fire Station. Culverts and as stormwater inlet was observed near #1. French drain at FTA.



Site Reconnaissance Log

Installation:	Fort Belvoir	_PAOPI:	Three AFFF releases at DAAF Fire Station	Date:	5-Jun-19
On- or off-installation m condition of wells):	nonitoring or drink	king water w	vells (number and proxi	mity to poter	ntial area of potential interest, note access and
Groundwater monitorin field adjacent to FTA.	ig wells were aba	ndoned nea	ar the FTA in Old FTA a	rea. Severa	al wells filled with bentonite were observed in
Surface water bodies (proximity to and r	elative drair	nage direction and rece	ptor, note po	onding or standing water nearby):
Pond and drainage ditor Ditch across the street		at appeared	d to be a dry pond with	culverts was	s observed in from the Fire Station next to #1.
Surface drainage withir	n or adjacent to (r	natural or m	nanmade, flow direction	lining [stone	e, vegetation, other], blockages):
Draining from FTA (#2 (#1) unknown. Stormw	,.		, ,	litch and Aco	cotink Creek. Drainage from infront of FTA
Site status (current or pactions or other perfluo			· ·		attenuation, system], previous remedial
Unknown.					
Miscellaneous notes:					
These areas will likely i	make up 2 or 3 se	eparate AOI	Pls. Grouped together	for this log o	due to proximity.
Health and Safety Co					
* Please note any healt	th and safety con	cerns here	(e.g., access, overhead	/buried utilit	ies, steep terrain, biological hazards).



Installation:

Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Fort Belvoir

Date:	4-Jun-19
Potential Area of Potential	
Interest (PAOPI) Name:	Night Vision Hangar (3126/3132), Lakota/O'Neil Hangar (3140), and National Guard Hangar (3121)
Location Description:	Davidson Army Airfield (DAAF)
Latitude/Longitude:	38°42'51.56"N, 77°11'1.88"W and 38°42'51.54"N, 77°10'58.53"W (Night Vision); 38°42'47.80"N, 77°10'51.34"W (Lakota); and 38°42'53.27"N, 77°11'6.28"W (National Guard)
	Courtney Ingersoll, Afton Hess, Lauren Henderson, Carla DaParma, Katherine Mageland, and
Field Personnel:	Jessica Travis
Site Contact/Title:	John Redmond and Dale Walters - Airfield Division
Weather:	Clear and Sunny
Sources	
Recognized Primary Source	ce (circle):
	n, nozzle testing, crash site, chromium plating, hangar/aqueous film-forming foam suppression system

When/Frequency:

Single release of suppression system from Lakota/O'Neil Hangar on May 18, 2018. No recorded releases from

State:

Virginia

other hangars.

Product Released and Volume:

Non-AFFF 2% Jet Ex foam released from Lakota/O'Neil.

Exact volume unknown - foam filled entire hangar and extended outside of hangar into adjacent drainage ditch.

No releases associated with other hangars. One of Night Vision's suppression systems contained AFFF (Ansulite 3% AFFF); however there were no known incidents or releases (since hangar construction and suppression system installment 8-10 years ago). Night Vision's other hangar has currently and historically had a water based suppression system. The National Guard hangar also had AFFF (EcoFoam); however, this is not under Fort Belvoir's jurisdiction and there were no known incidents of the suppression system leaking.

Other Notes: Possible AFFF leaking from storage area observed during site visit.

Recognized Secondary Source(s) (circle):

Stormwater or sewer system components, wastewater treatment plants, landfills, remediated soil application sites, surface water flow pathway, potential for groundwater infiltration, other:

When: At the time of the release, May 18, 2018.

Foam migration downgradient into a ditch, which was stopped.

French drain adjacent to hangar likely was impacted by foam. Any cracks in asphalt or concrete could lead to

Migration Potential: potential groundwater infiltration.

Other Notes:

Physical Setting of Potential Area of Potential Interest

Topography and floor/ground surface (note vegetation/pavement, soil composition/color/staining, how surface may influence sampling access, and evidence of erosion especially near point of possible release):

Night Vision: Two hangars; hangar with concrete floors, and no apparent drains - appeared to be in good condition and not cracked. Lakota/O'Neil: Inside of the hangar had concrete floor that appeared to be in good condition and not cracked. There was drain located near the middle of the hangar. No obvious staining inside or outside of hangar. Concrete area outside of hangar where foam reached was also in good condition and not cracked. Grassy areas next to concrete were impacted.

National Guard: Hangar with concrete floors, and no apparent drains - appeared to be in good condition and not cracked. AFFF storage consisted of two 400 gallon plastic containers which appeared to be leaking.



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Infrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, buildings):

Lakota/O'Neil: French drain adjacent to hangar, located in concrete area, was impacted. Drainage ditch downgradient was covered/protected from the foam.

For Night Vision and National Guard hangars, there were no apparent sewer/drainage systems.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Night Vision Hangar (3126/3132),	Date:	4-Jun-19
			Lakota/O'Neil Hangar		
			(3140), and National		
			Guard Hangar (3121)		
On- or off-installatio condition of wells):	n monitoring or drin	king water v	vells (number and proxir	mity to po	tential area of potential interest, note access and
No wells observed i	near hangars.				
	_	relative drai	nage direction and rece	ptor, note	ponding or standing water nearby):
Drainage ditch adja	cent to Lakota/O'Ne	il hangar.			
Surface drainage wi	ithin or adjacent to (natural or m	anmade, flow direction,	lining [sto	one, vegetation, other], blockages):
Lakota/O'Neil: Frend Drainage ditch down			ated in concrete area, d from the foam.		
For Night Vision and	d National Guard ha	ngars, there	e were no apparent sewe	er/drainag	ge systems.
			no further action, monito octanoic acid investigat		al attenuation, system], previous remedial
Unknown.					
Miscellaneous notes	S:				
recorded releases. I Additionally, three o	Historically, all hang other hangars were o	ars had a w on site but w	ater based suppression	system p	ession system, and other hangars did not have prior to current suppression systems. d. These originally had water based ms will be.
Health and Safety	Considerations				
* Please note any h	ealth and safety cor	ncerns here	(e.g., access, overhead	/buried ut	ilities, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Belvoir State: Virginia
Date:	5-Jun-19
Potential Area of Pol Interest (PAOPI) Na	
Location Description	r: Fort Belvoir North Area (FBNA)
Latitude/Longitude:	38°44'55.80"N, 77°11'42.75"W (FTBL-66) and 38°44'48.38"N, 77°11'43.07"W (FTBL-68)
Field Personnel:	Lauren Henderson, Carla DaParma, Katherine Mageland and Jessica Travis
Site Contact/Title:	Chris Manikas - DPW FTBL
Weather:	Clear and Sunny

Sources

Recognized Primary Source (circle):

Fire, fire training, ire station, nozzle testing, crash site, chromium plating, hangar/aqueous film-forming foam suppression system, auto maintenance, photo processing, fuel spill, pesticide/insecticide use, wash rack, other:

FTBL 66: Former Fire Training areas (FTA) in the 1960s. Consisted of four different areas (M7, M18, AOPC4,

and AOPC20)

When/Frequency: FTBL 68: Former petroleum fire area that burned down an overpass in the 1960s (consisted of the

Hydrocarbon Spill Area [M-26] and Above Ground Tank Site [FATTS]).

FTBL 66: Unknown what type of foam or how much was used. Reportedly only the solvent Carbon Tetra Chloride was used for fire training. Still possible that AFFF or animal protein foam containing PFAS was used

Product Released and Volume:

Other Notes:

for fire training at that time.

FTBL 68: Unknown what type or how many. Possible that AFFF or animal protein foam containing PFAS was used to extinguish the petroleum based fire.

FTBL 66: Petroleum was found in this area when digging utility lines for the NGG. Groundwater monitoring wells were installed and last sampled in 2016/2018. Benzene was found in wells. PFAS was found in

monitoring wells below the health advisory limit (HAL)

Recognized Secondary Source(s) (circle):

Stormwater or sewer system components, wastewater treatment plants, landfills, remediated soil application sites, surface water flow pathway, potential for groundwater infiltration, other:

In the 1960s - when the FTA was active and when the fire at the overpass occurred. When:

FTBL 66 and FTBL 68: Groundwater flow would move downgradient to a adjoin stream and wetland. Stream

and wetland is located between sites - sites are divided by a bridge. Soils in area were also impacted.

Migration Potential:

Other Notes:

Physical Setting of Potential Area of Potential Interest

Topography and floor/ground surface (note vegetation/pavement, soil composition/color/staining, how surface may influence sampling access, and evidence of erosion especially near point of possible release):

FTBL 66: Site consists of an overgrown forested area.

FTBL 68: Site consists of a wetland and forested area.

Infrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, buildings):

Roads adjacent to both sites. Site bisected by a bridge. Infrastructure reportedly built around 2006-2007.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:		Date:	5-Jun-19
		F	ΓBL 66 and FTBL	68	
On- or off-installat condition of wells)	-	king water wells	s (number and pro	ximity to pote	ential area of potential interest, note access and
Both sites contain	many groundwater n	onitoring wells.			
Surface water boo	lies (proximity to and	relative drainag	e direction and re	ceptor, note	ponding or standing water nearby):
Wetland and strea	am adjoin both sites.				
Surface drainage	within or adjacent to (natural or manr	nade, flow directio	n, lining [sto	ne, vegetation, other], blockages):
	L 68: Groundwater flores are divided by a b		downgradient to a	adjoin strea	m and wetland. Stream and wetland is located
	nt or past IRP and dec erfluorooctane sulfon				al attenuation, system], previous remedial
FTBL 66: Currentl FTBL 68: Unknow		dy and working	way towards closu	ıre just not U	JUUE. RAFS site and will go RAO.
Miscellaneous not	es:				
Health and Safet	y Considerations				
		ncerns here (e.g	,, access, overhe	ad/buried util	lities, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Be	lvoir	State:	Virginia			
Date:		5-Jun-19					
Potential Area of Interest (PAOPI)		Lewis Village Car Fire					
Location Descripti	ion:	Lewis Village Neighborhood					
Latitude/Longitude	e:	Lewis Village, behind 5980 Sitgreaves Road next to garage					
Field Personnel:		Lauren Henderson, Carla DaParma, Katherine Mageland, and Jessica Travis					
Site Contact/Title:		Kelsey Ross - DPW Environmental	Kelsey Ross - DPW Environmental				
Weather:		Clear and Sunny					

Sources

Recognized Primary Source (circle):

Fire fire training, fire station, nozzle testing, crash site, chromium plating, hangar/aqueous film-forming foam suppression system, auto maintenance, photo processing, fuel spill, pesticide/insecticide use, wash rack, other:

When/Frequency: Care fire in Lewis Village on April 27, 2019.

Product Released and Volume:

Approximately 5-10 gallons of foam (Ansulite ARC 3% or 6%) was discharged during this fire fighting activity,

along with approximately 250 gallons of water.

Other Notes: Car reportedly hit a non-PCB mineral fuel transformer in neighborhood and caught on fire.

Recognized Secondary Source(s) (circle):

Stormwater or sewer system components, wastewater treatment plants, landfills, remediated soil application sites, surface water flow pathway, potential for groundwater infiltration, other:

When: Apr-19

AFFF entered an adjoining stormwater inlet, which drained into a dry pond. Potential for groundwater

infiltration at pond and in situ due to AFFF being sprayed on open ground adjoining the transformer. Cracks

Migration Potential: observed on road next to transformer - potential for groundwater infiltration under road.

Other Notes:

Physical Setting of Potential Area of Potential Interest

Topography and floor/ground surface (note vegetation/pavement, soil composition/color/staining, how surface may influence sampling access, and evidence of erosion especially near point of possible release):

Site is located between two rows of townhouses next to a resident's backyard fence. Open grassy ground is located at site, and was likely impacted by AFFF. Concrete and asphalt surfaces associated with driveways and roads adjoin site. Cracks observed in asphalt.

Infrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, buildings):

Roads leading to site. Stormwater inlets observed adjacent to site.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Lewis Car Fire	Date:	5-Jun-19				
On- or off-installation monitoring or drinking water wells (number and proximity to potential area of potential interest, note access and condition of wells):									
No wells were observed near site.									
Surface water bodies	s (proximity to and r	elative drai	nage direction and	receptor, note p	onding or standing water nearby):			
No surface water boo	dies were observed	immediate	ly adjacent to site.	Dry pond locate	d nearby.				
Surface drainage wit	hin or adjacent to (ı	natural or n	nanmade, flow direc	tion, lining [stor	e, vegetation, other], blockages)	:			
Stormwater inlet adja	Stormwater inlet adjacent to site collected AFFF release, which drains into a dry pond nearby.								
Site status (current cactions or other perfl	•	L 0 /	•		attenuation, system], previous r	emedial			
Unknown.									
Miscellaneous notes	:								
HEPACO dug out so	il "as deep as they	could smel	l" around the transfo	ormer - they we	re focusing on oil and not AFFF.				
Health and Safety C									
* Please note any he	alth and safety con	cerns here	(e.g., access, overh	nead/buried utili	ties, steep terrain, biological haza	ards).			
1									



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Belvoir	State:	<u>Virginia</u>			
Date:	5-Jun-19					
Potential Area of Pot	tential					
Interest (PAOPI) Na	me: Old FTA Behind	the DAAF Fire Statin (Fire Control Tr	aining Area)			
Location Description	: Behind DAAF Fir	e Station				
Latitude/Longitude:	38°42'51.70"N,	77°10'32.15"W				
Field Personnel:	Lauren Henderso	on, Carla DaParma, Katherine Magel	and, and Jessica Travis			
Site Contact/Title:		W - Environmental				
Weather:	Clear and Sunny					
Sources						
Recognized Primar	v Source (circle):					
Fire fire training, fire	station, nozzle testing, cra	sh site, chromium plating, hangar/aqu pesticide/insecticide use, wash rack, o	ueous film-forming foam suppression system, other:			
When/Frequency:	Former FTA; uncertain if A	AFFF was released here or how much	n was released here.			
Product Released and Volume:	Unknown.					
Other Notes:	Might have used animal pr	rotein foam.				
Stormwater or sewer	dary Source(s) (circle): system components, waster or groundwater infiltration, of		rediated soil application sites, surface water flow			
When:	Unknown.					
Migration Potential:	Potential for groundwater i	infiltration in the event of AFFF releas	se onto open ground area.			
Other Notes:						
Physical Setting of	Potential Area of Potentia	al Interest				
		etation/pavement, soil composition/co cially near point of possible release):	olor/staining, how surface may influence			
Open grassy area lo	cated behind fire station. N	o obvious staining evident.				
Infrastructure (e.g., r	note entry to sewer system v	/ia drop inlets/storm drains/sanitary s	ewer/wastewater treatment plant, pavement,			

Roads leading to Fire Station.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Old FTA Behind the DAAF Fire Statin (Fire Control Training Area)		5-Jun-19_
On- or off-installation condition of wells):	on monitoring or drin	king water v	wells (number and proxir	nity to pote	ntial area of potential interest, note access and
Groundwater monit	oring wells were abo	andoned he	re. Several wells filled w	<u>/ith bentoni</u>	te were observed in field.
Surface water bodie	es (proximity to and	relative drai	nage direction and rece	otor, note p	onding or standing water nearby):
Unknown.					
Surface drainage w	rithin or adjacent to (natural or m	nanmade, flow direction,	lining [ston	e, vegetation, other], blockages):
Unknown.					
,	•		no further action, monito poctanoic acid investigat		attenuation, system], previous remedial
Unknown.					
Miscellaneous note	es:				
Health and Safety	Considerations				
* Please note any h	nealth and safety cor	ncerns here	(e.g., access, overhead	/buried utili	ties, steep terrain, biological hazards).



Site Reconnaissance Log

Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation:	Fort Belvoir	State: <u>VIrginia</u>					
Date:	5-Jun-19						
Potential Area of Potential	ential						
Interest (PAOPI) Nan	ne: Old Hospital						
Location Description:	Located off of Farrell Road						
Latitude/Longitude:	38°42'0.61"N, 77° 8'12.04"W						
Field Personnel:	Lauren Henderson, Carla DaP	arma, Katherine Mageland, and Jessica Travis					
Site Contact/Title:	Kelsey Ross - DPW Environme	ental					
Weather:	Clear and Sunny						
Sources							
Recognized Primary	• •						
	station, nozzle testing, crash site, chrom noto processing, fuel spill, pesticide/insec	ium plating, hangar/aqueous film-forming foam suppression system, sticide use, wash rack other: X-Ray					
When/Frequency:	Former hospital; unknow if PFAS was us	sed in x-ray photo processing.					
Product Released	Unknown.						
Other Notes:							
Stormwater or sewer	dary Source(s) (circle): system components, wastewater treatmer groundwater infiltration, other:	ent plants, landfills, remediated soil application sites, surface water flow					
patimay, potential for	ground nator miniation, outer.						
When:	Unknown.						
Migration Potential:	Potential for groundwater infiltration if Pl	FAS x-ray chemicals were released outside of former hospital.					
Other Notes:							
Physical Setting of	Potential Area of Potential Interest						
sampling access, and	r/ground surface (note vegetation/pavem d evidence of erosion especially near poi xt to a neighborhood. No obvious stainin						
Infrastructure (e.g., n buildings):	nfrastructure (e.g., note entry to sewer system via drop inlets/storm drains/sanitary sewer/wastewater treatment plant, pavement, uildings):						

Roads leading to former hospital. Area consists of open land. Stormwater inlets observed on Farrell Road next to former hospital.



Site Reconnaissance Log

Installation:	Fort Belvoir	PAOPI:	Old Hospital	Date:	5-Jun-19				
On- or off-installation r condition of wells):	nonitoring or drink	king water v	wells (number and	proximity to poter	ntial area of potential interest, note access and				
Unknown - none obse	rved.								
Surface water bodies (proximity to and r	elative drai	nage direction and	d receptor, note p	onding or standing water nearby):				
Unknown.									
Surface drainage withi	n or adjacent to (r	natural or n	nanmade, flow dire	ction, lining [ston	e, vegetation, other], blockages):				
Unknown.									
,	Site status (current or past IRP and decision [e.g., no further action, monitored natural attenuation, system], previous remedial actions or other perfluorooctane sulfonate/perfluorooctanoic acid investigations):								
Unknown.									
Miscellaneous notes:									
Health and Safety Co	nsiderations								
* Please note any heal	th and safety con	cerns here	(e.g., access, ove	rhead/buried utilit	ties, steep terrain, biological hazards).				

APPENDIX J

Site Inspection Field Notes



Project _	Project Fort Belvoir PFAS SI		Project No.	Project No. 30001992.3DL10		of	
Site Location Fairfax (x County, Virginia	Client	USACE/USAEC/BRAC			
Pr	epared By	Justin Coffey/	Dakota Valle/Matt Blower	Date	9/27/20		

Date/Time	Notes
0630	J. COFFEY AND D. VALLE MOBE TO FORT BELLOIR.
F1F0	ARCADIS "JEFF GEAUT ARRIVE & NORTH POST FIRE STATION, SPEAK
	WI FIRE STATION TO STAGE RIG DISCUSS SCOPE, MORNING HIS AU
	TAILGATE SAFETY BRIEF.
0740	CONDUCTED SITE HEALTH AND SAFETY BRIPPING, STAGE RIG.
0800	CAUBRATED HORIBA U-52 AND RKI (PID) GX-6000 * SEE CALIBRATION
	FORM *
0915)	SAMPLED FIBL - NPFS-01-50-092770 FOR PFAS, TOC, PH, AND GS.
0945)	SAMPLED FIBL-NPFS-012-50-092770 FOR PFAS ONLY
(OHI)	SAMPLED ETBL-NPES-01-GW-09272D FOR PEAS ONLY * SEE PURGE FOR
1223	MOBE TO BUILDING 1436 - TOW TRUCK UNDADING FIRE TRUCK
1340)	SAMPLED FIBL-BIY36-01-50-092720 FOR PFAS, TOC, pH, ANG GS.
(1355)	SAMPLED FIBL-BIY36-02-50-092720 FOR PFAS ONLY.
(1600)	SAMPLED FTBL-B1436-01-6W-092720 FOR PEAS OULY.
(1730)	SAMPLED FIBL - LVCF-01-SO-092720 FOR PFAS, TOC, pH, AUD GS.
(1822)	SAMPLED FIBL - LUCF - 01-GW-092720 FOR PFAS ONLY
1910	MOBE TO BUILDING FOF TO STAGE TRAILER / IDW:
1930	MOBE TO HOTEL IN SPRINK-FIELD, UN.
1000	EUD DE FIELD DAY.
V	
	9/21/20
	als.



Project	ect Fort Belvoir PFAS SI		Project No.	30001992.3DL10	Page	of	
Site Location Fairfax Co		x County, Virginia	Client	USACE/USAEC/BRAC			
Pre	epared By	Justin Coffey/	Dakota Valle/Matt Blower	Date	9/23/20		

	Date/Time	Notes
	0630	J. LOFFEY AND DAKOTA VALLE MOSE FROM HOTEL TO FORT BELLCIP.
	0704	ARRIVE @ FORT BELLIOIR TO BEGIN DRILLING
	0430	CAUBATED HORIBA U-52 AND EKI - PID * SEE CALIBBATION FORM *
	0750	J. COFFEE MOBE TO HOME PEPOT TO PICKUP SUPPLIES FOR SECONDARY
		CONTAINMENT
	0839	ARRIVE @ HATLWASTE FACILITY TO BUILD SECONDARY COUTAINMENT
		-MEET MAUGGER PHYLEATH RHODES @ HAZ WASTE BUILDIAX, 1495, WE ARE
		ABLE TO STOKE IN THE COUPY BOX BUT NEED TO HAVE FULL DRIMMS.
	0915	MOSE TO BFOF AREA TO CHECK IN W/ CREWS.
	6950) SHC	SAMPLED FIBL BTOT OL-SO 692920 FOR PEAS, TOC, PH, CRAIN SITE 9
	(0905)	SAMPLED FIBL-BADA-01-GW-0928200 FOR PFAS ONLY.
	0957	MOBE TO OLD SOWH POST FIRE STATION - NO MARKINGS PERMIT IS
		NOT COMPLETE - CALLED J. SALVARS TO GET PERMIT NOT COMPLETE.
	1038	CALLED J. REDMOND AFTER DISCUSSING ISSUES WITHEIS MANIKUS.
	1115	MORE TO DAVIDSON ARMY AIRFIELD TO COMPLETE DRILLING Q
		DAAF FIRE STATION.
	1155	BEGAN DELLUIS (HAND AUGER) DAAF FO SITE. J. LOFFEY TO MORE
, I		WILL REDNIAD TO DISCUSS LOGISTICS.
Alac	(334D)	SAMPLED FIBL - DAAF - 01-097870 AND DUP-01-097820 *
		SOIL DUPLICATE FOR PEAS, TOC, PH, AND GRAINSITE.
VOC	(1335)	SAMPLED FIBL-DAME-DI-GIU-092920 (GIU) FOR PEAS \$ MS MSD
Alac	(1350)	SAMPLED FIBL-DAAF-07-50-0928700 FOR PEAS *MS/MSD *
	1435	J. COFFEY MOBE W/ 2 DRUMS AND (8) - 5-GALLON BUCKETS
		TO BUILDING 1495 TO STACE
	(1600)	SAMPLED FIBL-12-01-SD-0928200 FOR PEAS, TOC, PH, GRAWSO
MRC	(1653)	SAMPLED FIBL-12-01-GW-0978ZO FOR PFAS ONLY AND DUP-
		1-092820.*
Jac	(1850)	SAMPLED FIBL-12-03-6W.092870 FOR PFAS OULY * MS/MSD
	1925	MOBE TO HOTEL TO MEET M. BLOWER, GIVE EQUIPMENT,
-		SUPPLIES, DETAILS, ETC.
- 1	2045	M. BLOWER OFF SITE.
		9/28/20
	4-1	all
		49



Project_	Project Fort Belvoir PFAS SI		Project No.	Project No. 30001992.3DL10		of	-	
Site Location Fairfax Co		x County, Virginia	Client	USACE/USAEC/BRAC				
Pro	epared By	Justin Coffey/	Dakota Valle/Matt Blower	Date	9/25/20			

Date/Time	Notes					
0630	J. COPPEY AND DAKOTA VALLE MOSE FROM HOTEL (EPENGHELD . VA)					
	TO DAVIDSON AAF TO TAKE FLT @ BASE OPS					
0100	ARRIVE @ DAAF BASE CRS SIGN IN TO TAKE TEST.					
0303	COMPLETED TEST RECEIVED BADGES AND FLT CARDS MOBE					
	TO DARF FIRE STATION AND FIBI-IZ TO COMPLETE LAST BORK					
0315	CONDUCTED HEALTH & SACETY TAILGATE BRIEF					
0850	CALIBRATED HORIBA 4-52 AND RKI (PID). * SEE CALIBRATION FORMS					
COORG	SAMPLED FIBL-12-02-50_092920 FOR PEAS ONLY *SEE BORNEGED X					
C945)	SAMPLED FIBL-12-02-612, CAZAZO FOR PFAS DULY & SEE PLIESE FORMS					
1010	MOBE FROM DAAF FIRE STATION TO HANGER 3145 SITE / WILLIAM					
	F. O'NEAL HANGAR					
(135)	SAMPLED FIBL-H3145-01-50-092920 FOR PFAS, TOC, GRAIN SIZE.					
(125)	SAMPLED FIBL-H3145-01-GW-D9Z9ZD FOR PFAS OULY.					
12.35	MOSE TO BUILDING 3121					
13301	SAMPLED FTBL-83121-03-50-092976 FOR PFAS ONLY. (2.5-4.5)					
1445	SAMPLED FIBL-B3121-03-CW-092920 FOR PEAS OULLY					
1535	MOBE FROM DAAF TO ON POST TO SAMPLE OLD SOUTH POST FS.					
16150	SAMPLED FIBL-OSPPS-01-50-097920 FOR PFAS, TUC, PH. GS.					
1645)	SAMPLED PIBL-DSPFS-02-50_092970 FOR PEAS ONLY.					
17553	SAMPLED FIBL-OSPES- 01-GW-092920 FOR PEAS AND FIBE-					
	05PFS - NUP-3-097970:					
1830	MOBE TO DAAF TO STAGE THE DRILL RIG					
1900	END OF DAME STAGING MORE TO HOTEL.					
1921	ARRIVE @ HOTEL END OF DIELD DAY.					
	The state of the bay.					
	1/20					
	0/29/0					
	/ 4.					
	∀					



Project_	Fort Belvoir	PFAS SI	Project No.	30001992.3D	L10	Page_	1	of _	_1	
Site	e Location	Fairfa	x County, Virginia	Client_	USA	ACE/USA	EC/BRAC			
Pr	epared By	Justin Coffey	Dakota Valle Matt Blowe	Date	9/29/2	20				

Date/Time	Notes					
0730	Artive @ Fort Belogir North Area. Check-in w/ commercial vehicle inspection					
0825	Proceed to South Gate.					
0850	Arrive @ south gute. Calibrate YSI. Scope out Well ID ADPC 20 - MWOD.					
0935 Lock on ADPC20 - MWOD inocomesible w/ current they Call C. Manak						
	into on wells.					
0445	Proceed to sample location FIBL-66-68-01-5W					
Ø1015	Sample FTBL-66-68-01-5W-290920					
1017	Surple FIBL-66-68-01-SW-290920-(MS)					
1019	Sumple PTBL- 66-68-01-5W-290920-(MSD)					
1031	Sample DUP-2-290920					
1035	Bag + pack FTBL-66-68-01-SW 290420 sample sets					
1045	Scope out + locate lattempt to open FTBL-66 monitoring wells					
1125	Successfully located My/18-MW-34, MIE-MW32, FTBL-MIE-M.B					
4	Successfully located FTBL-M18-MW31					
1137	Travel to FTBL South to retaine keys from POC					
1226	Acquire keys from Chris Milankis					
1305	Arrive back @ FTBL-66-68					
1313	Mob to FTBL -AOPCZO-MWOZ					
1902	Sample FTBL- ADPC20-MW02-290920 @ 14:02					
1435	Decon equipment @ mab back to vehicle					
1440	Meet w/ NGA Police to exit area, park @ now sample " parking					
I au tail	wea					
M 1500	Mob to FTBL-M18-MW31					
1532	Set up pump @ FTBL-MI8-MW31					
1612	Scriple FTBL-M18-NW31-290920 @ 1612					
1614	Pump off. Decon equipment and nob to vehicle					
431710 NB	Arrive @ vehicle. Load up equipment and call J. Colfey					
1695	Depart site to meet w/ I cassey @ Fort Belvoir south					
1710	Arrive @ Fort Belioir south. Provide J. Coffey w/ Mon. Well access toys					
1721	Depart site to ID FTBL-M26-LTM-GI + FTBL-FATTS-LTM-MWOB					
1753	Identified FTBL-FATTS-LTM-MWC8. Unable to locate FTBL-M26-LTM-01					
1610	Depart site for day.					
	Ins Plus					

Daily Log



Project_	Fort Belvo	oir PFAS SI	Project No.	30001992.3DL10	Page i	of	
Sit	te Location	Fairfa	x County, Virginia	Client	USACE/USAEC/BRAC		
Pr	repared By	Justin Coffey/	Dakota Valle/Matt Blowe	r Date	9/30/20		

Date/Time	Notes
0630	J. COFFEY AND D. VALLE MOBE TO DAAF.
0650	ARRIVE @ BASE OPS TO PICKUP AND SIGN OUT A CLICKER AND RADIO
0704	MOBE TO AVERTICID TO MEST J. REDILLOND - DELINY IN SCHEDULE DUE TO
	AN INCOMING AIR CRAFT.
0844	BEGIN HAND AUGERING FIBL-FIBOPE-02-50/GW
0900)	SAMPLED FIBL-1980PC-67-50-093020 FOR PFAS OUV.
(1235)	SAMPLED FIBL - 1980PC-01-GW-0930ZO FOR PFAS ONLY.
(1200)	SAMOLEN FIBL- HBOPC -01-SO-093020 FOR PRAS, TOC, PH, GS
(1500)	SAMPLED FIBL- 1980PC-01-6W-0930ZD FOR PFAS.
1530	MORE OF 32 PAUP APPROACH TO VEHICLES
1548	MORE W/ J. REDMOND TO HANGAR 323Z - UPDATE TOWER OF WCATION.
	IN SOUTH SOD AREA.
1623	BEGAN PHEGING FIBL-MW-IR WARESTALTIC PUMP, HORIBA, WULL
(1650)	SAMPLED PILE FIBL-MW-IR-093020 FOR PFAS
0820	SAMPLED FIBL-H3232-OL-GW-093020 FOR PFAS.
1847	MODE TO HOTEL TO MEET M. BLOWER, TRADE SAMPLES, IDW, AUD
	NOTES.
1936	ARRIVE & HOTEL COMPLETE COCS, MEET W/ MATE
2030	END OF DAY,
	9/30/20
	al ³
	(N9)
	T.



Project_	oject Fort Belvoir PFAS SI		Project No.	30001992.3DL10	1992.3DL10 Page			
Site	e Location	Fairfa	x County, Virginia	Client	USACE/USAEC/BRA	C		
Pro	epared By	Justin Coffey	Dakota Valle/Matt Blow	ver Date O	/30/20			

Date/T	ime	Notes						
0655		Call NGA Police, alert then to my arrivel at fort Beliair North /1	NG-A					
0711		Arthe @ Fort Belieir North Area. Begin puperwork/organizing duily me	eterial's					
0745		Calibrate YSI: Initial Final.	21.01.01.3					
		-pH 4 4.00 4.00						
		· Conductivity (n s/cn) 4.44 4.46						
	T.	- Teurbidity 2.0 0.0						
		-DO (ng/L) 8.43 8.50						
		- ORP(nV) 340 340						
0528	4.5	Arrive @ FTBL. M26- Htw LTM- OG. Begin set up.						
0845		Pump on @ FTB-M26-LTM-06						
0907		Sample taken @ FTBL-M26-LTM-06-300920						
0915		Depart back to vehicle						
0938		Arrive @ vehicle. Prep to mob to FTRL-FATTS-ITM-MWD 0						
1001		Arrige @ FTBL-FATTS-LTM-HWO8. Set up equipment						
1028		Troubleshoot Peri-pump						
1051		Peri-pump Sixed. Bogin pumping.						
1103		Sample ID FIBL-FATTS-LTM-MWOB-300920 taken @ 11:03	Sample ID FTBL-FATTS-LTM-MWOR-300920 to hom @ 11:03					
1146		Begin scope out for FTBL-M26-LTM-01.						
1240		Unable to locate FTBL-M26-LTM-01. Call to Lawren Henderson to						
		discuss alternatives.						
1300		Coordinate access to FTBL North Fire station.						
1304		Depart to FTBL North Fire Station.						
1325		Arrive @ FTBL North fire station. Set up pump .						
1407		Scample ID: FTBL-PSA2009-MW42 300920 taken @ 1407.						
1435		Mobilize to FTBL-M26-LIM-01						
1530		Unable to locate FTBL-MOG-LTM-01. Depart site.						
4								
1930		Meet w/ J. Coffey @ Hotel to discuss plans for following day						
		The state of the s						
		2.01						
		Mal Marie						



Site Location	Fairfax County, Virginia Client USACE/USAEC/BRAC	
Prepared By		
Date/Time	Notes	Sycs:
0630	J.COPPEY AND D. UNLIE MOBE FROM HOTEL TO DAAF.	DV: STANDARD OVERNIGHT
15/19	ARRIVE @ DANT PICK UP A RADID AND CLICKER AND SIGN IN	ARD (
	AT BASE OPS.	OVERN
0706	J. COPPEY (ARCHOIS) CONDUCTS HIS TAILGALE W/D. VALLE (ARCHOIS)	8619 8619
	AND 3. GRANT (5.6. DRILLIOG).	
710	CALIBRATED PID (RKI) # 02468 AND 451 6920 # 17836 * SEE CAL-	0.00
	IBRATION FORM FOR ADDITIONAL DETAILS.	-
0855)	SAMPLED FIBL-FB-01-100120 FOR PFAS @ HANDAR 3151 LOCATION	TOTAL:
0900	SAMPLED FIBL-SB-01-1001ZD FOR PFAS (SOURCE BLANK) DRIVER WATER	1
59000	SAMPLED FIBL-H3151-01-SO-100120 FOR PFAS, TOK, PH, GRAIN SITE.	-
०१४	SAMPLED FIBL-H3151-01-6W-100120 FOR PFAS & SEE PLEGE FORMS A.	-
	WELL WEUT DEY @ 0919 RECHARGED GRABBED SAMPLE.	- ,
943	FINISH H3151 MOBE TO B3121 TO CONDUCT SAMPLING	_ · i
(21/0	SAMPLED FIBL-BOIZI-02-SO-100120 FOR PRAS QUIL	-,
100)	SAMPLED FIBL-B3121-02-GU-10020 FOR PFAS ONLY.	-
230)	SAMPLED FIBL- B3121-01-50-100120 FOR PFAS OFF, TOC, PH. AND CS.	
255)	SAMPLED FIBL - B31ZI - QI - GLD- 1001Z' FOR PFAS.	\dashv
430)	SAMPLED FIBL-EB-01-100170 FOR PEAS (TUBING) *.	-
135	SAMPLED FIRE - EB-02-100120 FOR PEAS (WATER LEVEL METER), +	
4460		—80AS
1445)	SAMPLED FIBL-EB-03-100/20 FOR PFAS (HAND AUGER), * SAMPLED FIBL-EB-04-100/20 FOR PFAS (DAILUNG ROD SHOE) *	- <u>P</u>
1450)		NI ROIR
(500)	SAMPLED FTBL-EB-05-100120 FOR PFAS (SCREEL) & SAMPLED FTBL-FB-02-100120 FOR PFAS (FIELD BLANK) C-KBNA FIXE SCATLO SAMPLED FTBL-FBNAFS-02-50-100120 FOR PFAS.	OVER
545)	SAMOLEO CIAL CANAGE ME SO LIGHTON TO SELECTION OF SOME STATION	를
1640)	SAMPLED FIBL-FBNAFS-02-50-100120 FOR PFAS. SAMPLED FIBL-FBNAFS-02-60-100120 FOR PFAS	MAR _
725)	SOMPLED FIRE FOR ALL SO LOCATE OF STATE	Bter 17
	SAMPLED FIBL-FBUARS-01-50-100170 FOR PFAS, TOC, PH, GS	24 37
2018	SAMPLED FIBL-FBNAFS-03-50-100120 FOR PFAS,	DV: Master 1724 3700 7520 TRCK: 1724 3700 7540
	SAMPLED FIBL-FBNAFS-01-6W-1001200 FOR PFAS OULY.	20
	50 22 22 22 23	0
	SAMPLED FIBL-IDW-50 +DIOZO (SOIL IDW) FOR TOLP PEAS AUD	0.00
100	ETBL-IDW-GW-100170 (WAVER IDW) FOR PEAS TELP	15 E.O.
	END OF DAY.	PE N
		TOTAL:
	10/1/20	0
		0.00

Daily Log



Project FI BELUDIR	PFAS SI Project No	. 30001992.3DL10	Page \	of <u></u>
Site Location	FORT BELVOIR / VA	Client	USACE	
Prepared By	Justin Coffey	Date 3	sholzi	

Notes
J. COFFEY BEGILS PREPING EQUIPMENT PAPERLYDRIC FOR SOIL SAMPLING
@ FT BELUINE BIY95.
HAND AUGER APRILES @ HOTEL - MOBE TO PT BELLIGIR, B1495 TO BEGIN SAMPLIN
4-SHALLOW PEAS SOIL SAMPLES
SAMPLED PIBL- B1495-001-50-031021 - FOX PFAS SIDIL(1) 2515:ML HOPE
SAMPLED FIBL-B1495-04-50-031021 FOR PASSOIL.
SAMPLED FIBL-B1495-02-50-031021 FOR PFAS SOIL.
SAMPLED FIBL-BILLS-03-50-03/02/ FOR PEAS SOIL.
FINISHED STAGING DRUM CHECKED OUT W/ B1495 FOCKS.
SHIPPED SAMPLE @ FED EX - NEXT DAY AIR 10:30.
END OF DAY.
10 Pil
2/W
1-1
197

/
/

APPENDIX K

Site Inspection Field Forms

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

2225 Tomlynn Street Richmond, Va. 23230 Toll-free: (866) 801-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 40225 Description GX-6000

Calibrated 9/24/2020 11:40:28AM

Manufacturer RKI Model Number GX-6000

Serial Number/Lot 52H0102101-26RN

Number

Location Virginia

Department

State Certified

Status Pass

Temp °C 22.9

Humidity % 59.7

Calibration Specifications

Group # 1 Group Name Isobutylene Stated Accy Pct of Reading

Range Acc % 0.0000 Reading Acc % 3.0000 Plus/Minus 0.0

Nom In Val / In Val 100.0 / 100.0

In Type PPM

Out Val 100.0

Out Type PPM

Fnd As 97.9

Lft As 100.0

Dev% 0.00%

Pass/Fail Pass.

Test Instruments	(As Of Cal Entry Date)				
Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date / Expiration Date Opened Date
VA ISO 100 PPM -	ISOBUTYLENE (100 PPM)	Gasco	31721	LBH-248-100-4	Opened Date 11/14/2021
LBH-248-100-4 VA ZERO AIR - 822863	ZERO AIR	Calgaz	31844	822863	9/30/2020

Notes about this calibration

Calibration Result Calibration Successful Who Calibrated Patrick Anderson

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT



Pine Environmental Services LLC

2225 Tomlynn Street Richmond, Va. 23230 Toll-free: (866) 801-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 27082

Description YSI 6920 V2

Calibrated 9/24/2020 1:16:33PM

Manufacturer YSI

Model Number 6920 V2

Serial Number/Lot 14F101427

Number

Location Virginia

Department

State Certified

Status Pass

Temp °C 21

Humidity % 57.1

		Calib	ration Specific	ations			
Group !	oup# 1 Name PH Accy Pct of Re	eading		Range Acc % Reading Acc % Plus/Minus	3.0000		
Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fai
7.00 / 7.00	PH	7.00	PH	7.12	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	4.03	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	9.89	10.00	0.00%	Pass
Group N	Name Conduct Accy Pct of Re			Range Acc % Reading Acc % Plus/Minus	3.0000		
Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fai
1.413 / 1.413	ms/cm	1.413	ms/cm	1.396	1.413	0.00%	Pass
Group !	oup # 3 Name Redox (G Accy Pct of Re	3 4 3 3 5 4 1		Range Acc % Reading Acc % Plus/Minus	3.0000		
Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fai
240.00 / 240.00	mv	240.00	mv	243.60	240.00	0.00%	Pass
Group N	oup # 4 Name Disolved Accy Pct of Re			Range Acc % Reading Acc % Plus/Minus	3.0000		
Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	97.20	100.00	0.00%	Pass
Group N	oup # 5 Name NTU Accy Pct of Re	eading		Range Acc % Reading Acc % Plus/Minus	3.0000		
Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fai
0.0 / 0.0	NTU	0.0	NTU	0.0	0.0	0.00%	Pass



Project Name:	Fort Belvoir	PAS				Date: <u>09/27/</u>
Project Number:	36001992.31	110				-
Calibrating Personnel:	Justin Coffey					
Time of Calibration:	0757					
Weather Conditions:	Cloudy					
Barometric Pressure:	inch	es Hg x 25.4 =	mm Hg			
CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	3.89	4.0	4.0	0757	20.82
Conductivity (mS/cm)	Horiba U-53	4.65	4.58 4.49	4.49		
Turbidity (NTU)	Horiba U-53	0.0	0-0	0.0		
DO (mg/L)	Horiba U-53	12.08	10.31	10.31		-
DO%	Horiba U-53	136.9%	116.9%	116.8%		
ORP (mV)	Horiba U-53	329		346		7
Isobutylene	MiniRae 3000	10 ppm	10ppm	10 ppm	0757	71°F
Notes: Horiba #	038032	-	-			
Auto Callo	+ # 9 G	1380 exp	Oct 20			



Project Name:	FT BELVOIR PF	FAS SI				Date: 9 28 20
Project Number:	30001992.3DC	(0)				
Calibrating Personnel:	Justin Coffey					
Time of Calibration:	0430					
Weather Conditions:	666 CLOUD	4				
Barometric Pressure:	4.	nes Hg x 25.4 =	759.71 mm Hg			
CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	4.05	_ 4.00_	4.00	0430	66°F
Conductivity (mS/cm)	Horiba U-53	4.37	4.49	449	1	1
Turbidity (NTU)	Horiba U-53	2.0	0.0	0.0		
DO (mg/L)	Horiba U-53	10.26	9.03	9.04		
DO%	Horiba U-53	116.0	102.5	101.8		
ORP (mV)	Horiba U-53	_334	_	340		
Isobutylene	MiniRae 3000	100	_100	100	1	1
						
Notes:						
Notes.						



	(PARTLY) nches Hg x 25.4 = INITIAL READING 4.22 4.39 0.4	#55.3 mm Hg VALUE ENTERED 4.00 4.49 0.0	FINAL READING 4.01 4.49 0.0		TEMP
USYG 29.57 in INSTRUMENT Horiba U-53 Horiba U-53 Horiba U-53	INITIAL READING 4.22 4.39 0.4	VALUE ENTERED 4.00 4.49	4.01 4.49		
23.93 in INSTRUMENT Horiba U-53 Horiba U-53 Horiba U-53	INITIAL READING 4.22 4.39 0.4	VALUE ENTERED 4.00 4.49	4.01 4.49		
INSTRUMENT Horiba U-53 Horiba U-53 Horiba U-53	INITIAL READING 4.22 4.39 0.4	VALUE ENTERED 4.00 4.49	4.01 4.49		
INSTRUMENT Horiba U-53 Horiba U-53 Horiba U-53	INITIAL READING 4.22 4.39 0.4	VALUE ENTERED 4.00 4.49	4.01 4.49		
Horiba U-53 Horiba U-53 Horiba U-53	4.22 4.39 0.4	VALUE ENTERED 4.00 4.49	4.01 4.49		
Horiba U-53 Horiba U-53	<u>4.39</u> 0.4	4.49	4.49	0855	_ 68°F
Horiba U-53	4.0				-
200		0.0	0.0		
Horiba U-53	8 00				
	8.99		10,59		
Horiba U-53	1039	_	122.3		
Horiba U-53	315		314		
MiniRae 3000	_100	100	100		
	-		-		
	Horiba U-53	Horiba U-53 315	Horiba U-53 315 —	Horiba U-53 315 - 314	Horiba U-53 315 - 314



Project Numb Calibrating Personn Time of Calibration	el: Justin Coffey ^{MB} on: OS43	Matt Blover				
	ns: Cloudy, 69°F	761	402			
Barometric Pressu CALIBRANT	INSTRUMENT	es Hg x 25.4 = 761 INITIAL READING	.492 mm Hg VALUE ENTERED	FINAL READING	TIME	TEMF
pH 4	Horiba U-53	3.80	4.00	4.01		
Conductivity (mS/cm)	Horiba U-53	4.48	4.5	4.49		
Turbidity (NTU)	Horiba U-53	1.0	0.0	0.0		J e.
DO (mg/L)	Horiba U-53	7.51	4.3	9.27		
DO%	Horiba U-53	7	-			
ORP (mV)	Horiba U-53	363	363	362		-
Isobutylene	MiniRae 3000					
	-	_	_		-	-



Project Name:	FT BELVE	DIRY ARMY PEAS				Date: 9, 30/20
Project Number:	3000199	2.3000				
Calibrating Personnel:	Justin Coffe	у				
Time of Calibration:	POF5					
Weather Conditions:	609-	DUERCHST				
Barometric Pressure:	29.79"	inches Hg x 25.4 =	756.67 mm Hg			
CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	_4.00	4.00	4.00	60°F	0705
Conductivity (mS/cm)	Horiba U-53	4.51	4,49	4.50	1	1
Turbidity (NTU)	Horiba U-53	3.3	0.0	0.0		
DO (mg/L)	Horiba U-53	12.21	_	11.08		
DO%	Horiba U-53	127.6	_	110.6		
ORP (mV)	Horiba U-53	295	_	294		
Isobutylene	MiniRae 3000	9% વ	100			1
Notes:						



Project Number		DLIO				Date: 10 1
Calibrating Personn						
Time of Calibration	-0110					
Weather Condition	is: 604 OURICAS	31				
Barometric Pressur	re: <u>79.39</u> inch	es Hg x 25.4 =	mm Hg			
CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEI
pH 4	Horiba U-53	4.11	4.00	4.0	0710	60
Conductivity (mS/cm)	Horiba U-53	4.38	4.49	4.50		
Turbidity (NTU)	Horiba U-53	0,8	0.0	6.0		
DO (mg/L)	Horiba U-53	10.36	9.86 -	→ >		-
DO%	Horiba U-53	163.4	109.4	→		
ORP (mV)	Horiba U-53	322	324 -			
Isobutylene	MiniRae 3000	100	100	100		

-			Field Boring Log		
Project No.	rt Belvoir, Virginia Dakota Valle	Location: ilding 136	Soil Sampling Method: Grab Groundwater Sampling Method: Hole Diameters 2.5 inch	rack Mo	Surface Elevation: bunted Geoprobe Grab with SP-22 e Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate r Sample	Sample IDs and Notes
1300	Hand Auger 1 ft recovery	0.7-1	Topsoil - Fire to medium sandwith silt 30% subangular, poorly sorted, moist, loose, 7.5 yr sis high organics medium to coarse sand 90% some silt 10% 20%, gravel up to 7cm Coarse sand and pebbles 30% some silt, angular.		
	~	11/2	gravel up to 7cm Coarse sandand pebbles 30% some silt, angular, Poorly sorted, moist, loose, 7.57R 5/6, some gravel 5% up to cm	1.71.5.,	
		2 - 3	Fine sand 70% some silt 20% clay 10%, subangular, well sorted, moist, 1865e/blocky, trace gravelup to 3cm		
		4-9	Fine to medium sand 90% some gravel 10%, Sub rounded per well sorted, maist, loose, SYR19/6 gravel up to 4cm SAA	1 1	***************************************
	DPT IFtrec.	5-10 10-15 	No recovery - hard/gravel D-0.5. melium to coarse sund 80% somepebbles 20%, subangular, poorly sorted, moist, loose, 7.54R S/8 1.5-1 Fine Sand, subrounded, well sorted, moist,		

1005 e, 7,5 YR 518

			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	r Sample	Sample IDs and Notes
	1.5° rec.	=	0-0.5 graves 80% medium sand 20%, subangular, poorly sorted, quitt gravel, 7.5 yr 314 sand, the dry, loose, 0.5-1.5 Coarse sand 40% silt 30% pebbles 30%	o,		
	l'rec.	20-25	mottled 7,5 yr 414 and 5 xr 314 0-0.6 medium to coarse sund 85% some pebbles 15% sub angular, poorly sorted, little moisture, loose,	ž,		
	30-35	25 30 20-)5 40	0.6-1 medium to coarso sand, trace pobblos, Subangular, well sorted, moist, loose, 7.5 y R SIE Gray clay 18	3		
	i rec 		0-0,3 gray clay 2,3-1' Medium sand 70% silt 20% clay 10,0, we subangular, nell sorted, loose, moist, mottled 2,546/8 and 2,547/1			
	1.5'rec, 40-45	10-45 10-45	0-0.5 Gretclay 0.5-1.5 Coarse Sand; Subangular, well sorted, very moist, loose, 7.5 yr 5/6 1 inch lense of coarse sand 7.5 yr 8/4 at 0.5-0.6			
	45-5047	-	grey clay intruding on hole - 2 recovery 0-0,6 Clayond fine sand 30%, subangular,			
	34 rec, 47-50	55	well sorted, moist, dense, 10 YR 8/2, black ,	2000	eld	

006-1051 - medium sand, Subangular, wellsorted, Saturated, 104R 7/1, black mineral grains

	Field Boring Log							
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	r Sample	Sample IDs and Notes	
518		47-50 Conti	1,5-3 Fine Sand 65% siltand Clay 45%, Subangular, well sorted, moist, very dense, 10xR 7/3 Set Screen 45-149					
		65	set Screen 45-149					
		70						
		75						
		80						
		85						

				Field Boring Log
Client: US Project No.: Site: For logged by: Drilling Co.: Driller:	No.: 30001992.3DL10 Fort Belvoir, Virginia by: Dakota Valle			Boring ID: TBL-B1436-Op-S0 Date: Latitude: Longitude: Ground Surface Elevation: Drilling Method: DPT Total Depth of Boring: Reference Datum: Depth to First Encountered Water:
Time	Drill Notes		Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs and Notes
1340	Hanbauger I foot re	covery	0-0,3	Topsoil, Fine to medium Sand 10% ith silt 30% Subangular, Poorly Sorted, loose, moist, 2.5 x R 5/7, high organics medium to coarse Sand 70% some 5ilt 10% 20% Ar around and nobles septer 3cm annuar subangular.
	l foot re	covery		Poorly sorted/moist, loose, 7.5 xr/4/3, coarse sand and pebbles 30% some silt/0%, anywar, poorly sorted, moist 1005e: 7.57R 5/6, trace gravul
			15	grava
			20	
			25	



			Field Boring Log			
Project N	Fort Belvoir, Virginia by: Dakota Valle	Field Location: North Past	- m	Surface Elevation: ounted Geoprobe Grab with SP-22 de Datum:		
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
0830	Hand Auger	0-0.3	minor coarse sand, angular, moist, loose, 7.57R 4,2005, high organics, poorly sorted Fine to coarse sand with siltand gravel, subangular, poorly sorte gravel is subrounded, moist, loose, mostly 7.5 y R 5/4	,		
		1-1 2-3 3-3.5 10	mottled with 10 R 419 Same as above SAA - increasing siltand Clay content Fine sand 50% with siltand Clay 40% somegrovel 10% subangular, Pourly sorted, moist, loose, D.5 YR 5131	V	/	FTBL-NPF5-01-50- 09/27/20
		3.5-4 4-5 15	mottled with lok 514	1300 re	ro	
	DPT	1 2 1 2	No recovery hard material - could not retreives oil Ift. recovery - 0-0.3 - medium sandand gravel some subangular, poorly sorted, mostly dry, very dense, mottled 10R 4/4 and Syr 2.5/1 and 7.5 yr 4/4, gravel 0.05	,		F
		25	0.3-1 - Fine to medium Sand Solvand pebbles \$000 some grave 1 10%, subangular, poorly sorted, low moistures very (0050, 2.54 R 4/6 and 7.54 R 6/8			

			Field Boring Log				
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	admole	Sample IDs and Notes
111111			0.5' recovery - SAA				
		20-25	1.3 recovery - Coarse sand and gravely oto, Subangular,				
		30	ranges from 1 cm to 3 cm				
		25-28.5	2 recovery- coarse sand 75% some gravel 25%,				
		35	lense of fine to medium Sand, well sorted, subangular,	••••••			34
		28.5-35	1.3' recovery- 0-0.3-medium sund 30% coarse Sund 30% and grave 140, subangular, poorly sorted, moist, loose, loyR414	o			
		45	0.3-20 Coarse sand 75% and grave (25%; 5ab angular, poorly sorted, we till y R 5/6; 1005e 1:0-1-3 Fine and medium sand minor gravety pebble Subangular; 1005e, dry, 154 R 8/8		9	*	
		-	silt 10%, angular, poorly sorted, very moist, loose, 108, 518		0%		
		50	1.0'- 2.0' Course Sand 30% silt 20% grave (50)	6)		ļ	
	Screen 38'-42'		angular, poorly sorted, saturated, 1005e, 104R 5/6, gravel ranges from 1cm to 6cm. end soil 100 Screened 28-42	_			
		55	70				

1			Field Boring Log	
Project No.	ort Belvoir, Virginia Dakota Valle	d Location: Filding 436	Soil Sampling Method: Grab Groundwater Sampling Method: Hole Diameter: 2.5-inch	round Surface Elevation: rack Mounted Geoprobe Grab with SP-22 eference Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Sample IDs and Notes
1300	Hand Auger 1 ft recovery	10	subangular, poorly sorted, moist, loose, 7.5 yR2, 5 high organics melium to coarse sund 90% some silt 10% 20%, subangular, poorly sorted, moist, loose 75 yr, gravel up to 7cm Coarse sand and pebbles 30% some silt, angular, Poorly sorted, moist, loose, 7.5 yr, 516, Some gravel 5% up to cm	
		2 - 3	Fine sand 70% some silt 20% clay 10% of subangular, well sorted, moist, 1805el blocky, trace gravelup to 3cm	5 5.
		4-9		***************************************
	DPTIFFree		No recovery - hard/gravel D-0.5. Melium to coarse sund 80% some pebblos 20%, subangular, poorly sorted, moist, loose, 7.5tR 5/8 S-1 Fine Sand, subrounded, well sorted, moist,	

			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	1.5° rec.	30	0-0.5 graves 80% medium sind 20%, subangular, poorly sorted, quirtz gravel, 7.5 YR 3/4 sund, medry, loose, 0.5-1.5 Coarse sand 40% silt 30% pebbles 30%		5	
	l'rec.	20-25	mottled 7.5 yr 414 and 5xr 314 0-0.6 medium to coarse sand 85% some pebbles 159 346 angular, poorly sorted, little moisture, loose,			
	30-35 - 35-40	25-30 25-30 20-)6 40	0.6-1 medium to coarso sand, trace pobblos, Subangular, well sorted, moist, loose, 7.5 y RSI Gray clay 920	8		
	35-40	45	0-0.3 gray clay 1.3-1' Medium sand 70% 5:1+20% clay 18/0/ Subangular, nell sorted, loose, moist, mottled 2.546/8 and 2,547/1			
	l.S'rec, 40-45	15 50 0	1-0.5 Gretclay 25-1.5 Coarse Sand; Subangular, well sorted, very moist, loose, 7.5 yr 5/6 1 inch lense of coarse sand 7.5 yr 8/4 at 0.5-0.6			
	45-5047 5-55 34 rec. 47-50	43-60	rex clay intruding on hole - 2 recovery -0,6 Clayond fine sand 80%, subangular, well sorted, moist, dense, 10 YR 8/2, black,			

006- 651 - medium sand, Subangular, wellsorted, saturated, 104R 7/1, black mineral grains

Field Boring Log							
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes	
518		47-50 Conti	1,5-3 Fine Sand 65% siltand Clay 45%, Subangular, well sorted, moist, very dense, 10 xR 7/3 Set Screen 45-149	V 1			
			set Screen 45-149'				
		65					
		70					
		75					
		80					
		85					

				Field Boring Log
Project No	.: 30001992.3DL10 ort Belvoir, Virginia : Dakota Valle	Field Loca Build	ling 136	Boring ID: TBL-B1436-07-50 Date: Latitude: Longitude: Ground Surface Elevation: Drilling Method: DPT (+ or auger Drill Rig Model: Track Mounted Geoprobe Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22 Hole Diameter: 2.5-inch Total Depth of Boring: Reference Datum: Depth to First Encountered Water:
Time	Drill Notes		Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs and Notes
1340	Hanbauger I footre	covery	0-0,3	Topsoil, Fine to medium Sand Whith silt 30% FIBL-B1436-02-50. Subangular, Poorly Sorted, loose, moist, 7.5 xR 5/3, high organics medium to coarse Sand 70% some 5ilt 10% 20%
	l faot re		-	Poorly sorted/moist, loose, 7.8 xr 14/3, coarse sandand pebbles 30% some siltlo%, anywar, poorly sorted, moist 1005e: 7.5 xR 5/6, trace gravul
	:		15	trace gravul
			20	
			25	

			Field Boring Log				
Project N	Fort Belvoir, Virginia by: Dakota Valle	Field Location: North Past	Actitude: Longitude: Corilling Method: DPT Drill Rig Model: Ground Surface Elevation: Drill Rig Model: Track Mounted Geoprobe Groundwater Sampling Method: Grab with SP-22 Hole Diameter: 2.5-inch Depth to First Encountered Water:				
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	Sample IDs and Notes	
0830	Hand Auger	0-0.3	minor coarse sand, angular, moist, loose, 7.5 /R 4/2/s. high organics, poorly sorted Fine to coarse sand with silt and gravel, subangular, poorly sorte gravel is subrounded, moist, loose, mostly 7.5 y R 5/4				
		1-1 2-3 3-3.5	same as above SAA - increasing siltand Clay content Fine sand 50% with siltand tlay 40% somegrovel 10% subangular, Poorly sorted, moist, losse, D. 5 y R 5 13,	V	/	ETBL-NPF5-01-50- 09/27/20	
		4-5	mottled with lor 514 5AA Tine to medium sand 30% courses and 10%, sitt 10%, grave subangular, poorly sorted, 100se, lox R 4/2, some moistur Aravel ranging from 1 Cm to 0.2 feet No recovery hard material could not retreive soil	1304 e	vo		
	DPT	1	No recovery hard material - could not retreives it Ift. recovery - 0-0.3 - medium sand and gravel some subangular, poorly surted, mostly dry, very dense, mostlydry, very dense, gravel or 4/4 and Syr 2.5/1 and 7.5 yr 4/4,	,		*	
		25	50.3-1 - Fine to medium Sand Socoand pebbles \$000 some grave 1 10%, subangular, poorly sorted, low moistures very 60050, 2.54 R 4/6 and 7.54 R 6/8				

			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
		15-20	0.5' recovery - SAA			
		10-25	1.3' recovery - Coarse sand and grave 140%, Subangular,			
		25-28.	Subangular, poorly sorted, moist, 7.57 R 6/6, lense of fine to medium Sand mall color			
		18.5- <u>35</u>	1.3' recovery- 0-0:7-medium sund 30% coarse Sund 30% and grave 140, subangular, poorly sorted, moist, loose, 10 YR 4/4)		
			0.3-100 Coarse sand 75% and grave 125%; Sabrangular, poorly sorted, we filoy R 5/6; 1005e 1:0-1.3 Fine and medium sand minor gravet, pebble Subangular; 1005e, dry, 154 R 8/8	5		
		33-40	2f+ recovery - 0-0.0 Coarse soud 60% and pebble silt 10%, angular, poorly sorted, very moist, 100se, 104R 518	53	0%	3
		50	1.0'-2.0' Course Sand 30% silt 20% grave 1 50	(6)		
	Screen 38'-42'		angular, poorly sorted, saturated, wose, wyr s16, gravel ranges from Icm to Gcm. end soil 100 Screened 28-42	_		
	Julean 37 - 42	55	Screened 38-42			



			Field Boring Log			
Client: U Project No Site: Fo Logged by Drilling Co Driller:	o:: 30001992.3DL10 ort Belvoir, Virginia v: Dakota Valle	Field Location: North Post	Boring ID: FTBL-NPFS-01-50 Date: 09/27/20 Latitude: Longitude: Longitude: Drilling Method: OPT Itand Augur Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method Hole Diameter: 2.5-inch Total Depth of Boring: 3 f+ Depth to First Encountered Water:	Trac d: Refe	erence	urface Elevation: unted Geoprobe Grab with SP-22 e Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
0930	Hand Auger	0-0.3	Topsoil, Fine to medium sond 60% silt 30% coarse sund 10%, Subangular poorly sorted, moist, loose, 7.5 YR 414, high organies medium sund 30% silt 30%, gravel 30% 0.07, Coarse sand love, subangular, poorly sorted, moist, loose 7,5 YR 5/6, Same es above.	2		FTBL-NPFS-02-502
		2-3_ 10	Same es above.			
		15				
		20				
		25				

			Field Boring Log	
Client: Project Site: ogged Prilling Priller:	No.: 30001992.3DL10 Fort Belvoir, Virginia by: Dakota Valle	Field Location:	Soil Sampling Method: Grab Groundwater Sampling Method: Hele Diameter: 3.5 inch	Ground Surface Elevation: Frack Mounted Geoprobe Grab with SP-22 Reference Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Sample IDs and Notes
	Hand Auge	5	G-O.3 Topsoil, Finesand 60% and silt 40%, subongular, poorly sorted, moist, loose, 7,5 yR 4/2 3-1.0 fine tomedium sand 30% and silt 30%, sub grave angular, poorly sorted, moist, 100se, 7.5 yR 4/6 fine sand 60% and silt 40%, subrounded, well sorted, moist, bose and blocky, 3 xR 516, trace pebbles	
	DPT 4.4 i	S-10_	0-4.4 Silfand fine sand 10%, subengular, well sorted, moist, loose, 7500 SYR 4/6, lenses of medicine sand linch thick with sane properties and less silt, color change at to loy R 6/6 5-1.0 siltand Clay 20% fine sand log, moist.	
	4.6~	20	to loyr 6/6 5-1.0 siltend clay 20% fine sand 10%, moist, dense, mottled toyr 8/1, 5yr 5/6 -1.5 Returns to Siltand fine sand above -5-4.6 Same silkend sand with Minigher clay	
		25	content/ MS YR 5/6	

	Field Boring Log							
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	r Sample	Sample IDs and Notes	
	4.4 Rec	15-20	5/1+ 50% fine sond 35% clay 15%, Subangular, well Sorted, mais wet, loose, lenses and moth 5 y R 2.51/57R 7/1, 7.5 R 6/6/1enses of fine sand with less 5/1+ and Flor					
			3.6-3.8 medium sand an grave 170%; Subangular, poorly sorted, 7.5 YR 2,5/1 and 7,5/R 5/6 maist, dense					
		35	3.8-4.4 Coarse Sand 60% and grave 130% and			-		
	1.6 rec,	40	511+ 100%, Subangular, poorly Sorted, 7.57R 5/6 0-1.6 medium to coarse Sand 60% and gravel 40% subangular, pourly sorted, saturated, loose,					
			end soil lag well set at 19-23'					
		45	Well 5et at 19-23					
		50						
		55						

			Field Boring Log	
Project N Site: Logged	Project No.: 30001992.3DL10 Site: Fort Belvoir, Virginia Logged by: Dakota Valle Drilling Co.: JG Drilling		Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method	Ground Surface Elevation: Track Mounted Geoprobe d: Grab with SP-22 Reference Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Groundwate T Sample IDs and Notes
0730	Hand Auger		0-0.3-topsoil-Silt and fine Sand 55% trace medium Sand 5%; Sub angular, poorly sorted, moist, loose. 7.57R 2.5/1/highrost contentlorganics 0.3-1- Fine to medium Sand 60% and Silt 30%, grave subangular, poorly Sorted, moist, 10 yr 5/4, 0-0.3 SAA 0.3-1 Medium tocoarse sand 50% Silt 30% pebble subangular, poorly sorted, moist, loose, 7.5 x R 4/2 BAA- strong petroleum odor	el 10%
		4-5	0-0.3 - 54A 60% 0.3-1- Fine Sand and sil+ 30% pebbles 10%, subangular poorly Sorted, moist, loose, 107R 4/4, 12 etroleumo 0-1 Sil+ 70% fine Sand 20% clay 10%, subangular, poorly sorted, wet, mushy and sticky, 10x8 S/4	dor
	. Sft. Rec.	20	Poorly sorted, wet, mushyandsticky, 10xR siy Faint petroleum odor 0-1.6-Silt 65% medium Sand 25% Clay 10% Subangular, poorly sorted, moist, dense, mottled war 6/1 and loyR 5/4 1.6-4.7 Clay loyr 6/1 and 10xr5/4-m 4.7-5' medium to coarse sand 75% some siltzely and pebbles 5%, Subangular, pourly sorted, dense, Gley 1 8/N	rois dense

			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	3.6 Rec.	30	0-1.8' Coarse to medium Sand \$0% pebbles 40%, silt 20% Subangular, pourly sorted, moist, dense, Gley 18/N 80% Some silt 28%, Subangular, well surted, moist, dense,			
			0107 . 8/1/			
	5' Rec.	15-20	2.7-3.6 Coarse Sund, Subangular, wellsorted, wet, loose, 2.5 y 7/3 0-5 Coarse Sand, Subangular, well sorted, saturated, 1 loose and scupy, mottled 7.5 y R 8/1 / 7.5 y R 5/6			
		45				
		50				
		55				_



			Field Boring Log		
roject No	ort Belvoir, Virginia /: Dakota Valle	Field Location:	Boring ID: FTBL-05PF5-01-50 Date: 09/75/20 Latitude: Longitude: Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method: Hole Diameter: 2.5-inch Total Depth of Boring: 30° Depth to First Encountered Water:	Track od:	nd Surface Elevation: Mounted Geoprobe Grab with SP-22 ence Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate	Sample IDs and Notes
	Hand Auge	5	0-0,55AA	cle (10% gravel
	DPT 3,5° r	ec, 5-10	5.5-1 5ilt 60% fine Sand 30% clay 10%, Subangular, poorly sorted, moist, blacky, lowdensit 10 YR 6/4 0-1 Fine Sand 90% and 5ilt 20%, subangular, poorly sorted, moist, lowe, io YR 6/8 0-1.8- Fine Sand 75% and 5ilt 25%, Subangular, poorly 5 orted, moist, dense, mottled 10 YR 5/8, io YR 7/1 and 10 YR 5/4 1.8-3.5- Clay and silt, low plasticity,	Υ,	

and 10 R 4/6, plugs of medium sand 104 R 518



			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	4,3 rec.	30	0-2.8 SAA-coarsens to medium fine sand with depth. 2.8-4.3- Fine Sand 80% with silt 20%, subangular, well sorted, Moist, 1005e, Mottled log R 6/1; log R 5/6, and 10 R 5/6			
	015'rec.	-	Subangular, well sorted, Moist, 10052, Mottled lox 6/1; loy 8 5/6, and lo R 5/6 D-0.5 Medium Sand 60% with gravel 40% subangular, poorly sorted, moist, 1608e, 7.5 YR 5/8 Refusal and no recovery from 19'- 24' -> Coarse sund and gravel-very hard			
	3'rec.	25-3 <u>0</u> 40	0-0.4 Coarse sand and gravel, angular, poorly sorted, very wet, loose, 7.5 y R 6/8, gravel up to Jcm	4		
		45	0.4-3 Siltand clay, low plasticity, dense, moist, mottled 7.5 yr 6/8, 7.5 R 3/8, 7.5 yr 8/1			
		50				
		55				



			Field Boring Log	
ent: US	AEC	Field Location:	Boring ID: FTBL -0SPF5 - 02-50 Date: 09/28/26	2 10 feet Floretion
oject No.:			Latitude.	Ground Surface Elevation:
	rt Belvoir, Virginia		Drilling Method. Dr 1	Track Mounted Geoprobe
gged by:		1	Soil Sampling Method: Grab Groundwater Sampling Method	d: Grab with SP-22
illing Co.:			THOIR DIAMETER. 2.5-IIICI	Reference Datum:
iller:	Jeff Grant		Depth to First Encountered Water:	
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate r Sample IDs and Notes
	Hand Auger	0-1_	Topsoil- Fine Sand 70% and silt 30%, subungular poorly sorted, moist, loose, 7,5 YR 2.5/2, highorganics, tine Sand 40% silt 30% clay 10%, subangular, poorly sorted, moist loose and blocky, 7.5 YR 518	
			Fine Sand 40% silt \$0% clay 10%, subangular, poorly sorted, moist loose and worky, 7.5 xR 518	
		15		
		20		
		25		



				Field Boring Log			
Project N Site: F Logged b	Project No.: 30001992.3DL10 Site: Fort Belvoir, Virginia Sogged by: Dakota Valle Drilling Co.: JG Drilling			Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method	Trac	k Mou G	rface Elevation: nted Geoprobe rab with SP-22 Datum:
Time	Drill Notes		Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	E			0-0.2 - Topso: 1- Silt 00% fine sond 0%, subangular Poorly Sorted, moist, loose, 7.5 x R 2.511, high organiss 0:2-1 Silt 30% fine sand 50%, Subangular, poorly sorted, moist, blocky, 7.5 y R 4/3			
			23 _	0-0,3 SAA-10-15cm cobbles 0.3-1 Fine to medium Sand 80% somes[1+ 20%, subangular, well sorted, moist, loose, 7.57R516 0-15AA			
				6-1 medium Sand 85% some silt 15%, subangular, poorly sorted, very moist, 1005e, 7.5 YRS/6, gravel coarsens down withintroduction of gravel at 0.7°			
	3.4° 28/	reli	7-10	No recovery - gravel 90-3.0 Clay, moist, Slightly dense-playdough, 5 YR 5/6 untill 1.7, then mottled with Gley 6/100 becomes more dense at bottom	»Y,		
	4,71	rec.	10-15	0-0.8 SAA- fine sand 25% subangular, well sortes, Gley 6/10Gy, molst, dense, 0-8-4.7 Fine sand 85% silt 15%, well Sorted, Subangular, very moist, dense, Gley 6/10	64		

5'rec 15-20 0-5 5.AA - Saturated, soupy, coarsens last 1' to tine and medium sand



			Field Boring Log			
Client: USAEC Project No.: 30001992.3DL10 Site: Fort Belvoir, Virginia Logged by: Dakota Valle Drilling Co.: JG Drilling Driller: Jeff Grant			Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method	Surface Elevation: unted Geoprobe Grab with SP-22 e Datum:		
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
1320	Hand Auger	5_	0-0,2 topsoil-fine sand 70% silt 30%, Subangular, poorly sorted, moist, loose, 7.5 x R 2.511 night organics 6.2-1 Fine to medium sand 60% gravel 30% silt 10%			
		l-2_ 10	6.2-1 Fine to medium sand 60% gravel 30% silt 10% subangular, poorly sorted, moist, 100%, 7.5 yR 414, grave up to 5 cm			Sample 1334
		15				
	- *	20				
		25				

1330 Sample



			Field Boring Log			
Project No.	: 30001992.3DL10 rt Belvoir, Virginia Dakota Valle	Field Location:	Boring ID: FT&DAAF-02-50 Date: 09 28/20 Latitude: Longitude: Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method: Hole Diameter: 2.5-inch Total Depth of Boring: Depth to First Encountered Water:	Trac d:	ck Mo	Surface Elevation: unted Geoprobe Grab with SP-22 e Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
1345	Hand Auger	5	0-0.3 topsoil- fine sand 70% 5ilt 30%, Subangular, poorly sorted, moist, loose, 7.5 VR 2,5/11 high organics 0.3-1 Fine to medium Sand 60% gravel3%, 5ilt 10%, subangular, poorly sorted, loose 2.5 Yr 4/4, gravel up to Scm			
			511+ 10%, subangular, poorlysorted, loose 2,5 yr 4/4/ gravel up to Scm 0-1-5AA			1350 Sample
		15				
		20				
		25				



			Field Boring Log		
roject No.:	: 30001992.3DL10 rt Belvoir, Virginia Dakota Valle	ocation:	Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method	Track I:	nd Surface Elevation: Mounted Geoprobe Grab with SP-22 ence Datum:
Time	Drill Notes	Depth (feet bgs)		Soil Sample Groundwate	Sample IDs and Notes
	Hand Auger	6-1	0-0.2 Topsoil-Fine temedium sand 70% some silt 30%, subangular, poorly sorted, wet, loose, 7.5 yr 4/2; high organies 0.2-1 Medium sand 75% and James 11+ 25%		Fire training just he fore boring- surface met
		10	subangular, poorly sorted, very moist, loose, loyp 614, wood chips 0-0.5 Medium sand 50% silt So%, Subangular, well sorted, saturated, 10 y R 5/3.		
		2-3_	0.5-1 Fine to medium sand 80% some silt 20%, sub angular, well sorted, saturated, soupy and loose, 104R 6/3 modtled with 104R 8/1 5AA		Sample 1600
	lil'reci	20	3-0.7 - Fine to coarse sand 40% and grave 1 60%, Angular, poorly surted, wet moist Inspired was		
	i'rec.	10-15	0-7-1.1 Fine sand 80% 5:1+20%, Subangular, well softed, dense, moist, 107R4/1 0-0.6 Graver, pebbles 10%, Coarse sand 50%, angular, poorly sorted, Saturated, 2:34R4/8		



			Field Boring Log		
Client: USAEC Project No.: 30001992.3DL10 Site: Fort Belvoir, Virginia Logged by: Dakota Valle Drilling Co.: JG Drilling Driller: Jeff Grant			Drilling Method: DPT Drill Rig Model: Soil Sampling Method: Grab Groundwater Sampling Method	Track M I:	Surface Elevation: ounted Geoprobe Grab with SP-22 ce Datum:
Гime	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate	Sample IDs and Notes
	Hand Auger	3-4 10	Loarse tovery Coarse Sond 50% gravel 50%, Angular, poorly sorted, wet, loose, loy R 4/2, gravel up to 3cm Medium to coarse Sond 60%, silt 30% gravel 10%, sub angular, 1200rly Sorted, moist, blocky and medium density; loy R 5/3 0-0.8 SAA 0.8-1 Medium sand 75% silt 15% gravel 10%, Subangular, well sorted, moist, medium density, loy R 6/6 0-0.4 SAA 0.4-1 Fine to medium sand 80%, silt 10%, gravel 10%, Subangular, well sorted, Moist, loose, mottled 104 R 8/1 and 104 R 6/8		Hond Auger could not penetrate gravel from 1'-2.5'
	DPT 3:	mec 5-10	O-0.5 SAA O.S-3.7' Fine to medium Sand, 80%, silt 10%, subangular, well sorted, moist, dense, mottled		sumple 0900
A	y T	25	subangular, well sorted, mosst, dense, mottled 107R 413, 104R 811		



			Field Boring Log				
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Sroundwate	r Sample	Sample IDs and Notes
	i.9° rec.	30	Fine Sand 75% and silt 25%, subangular, well sorted, moist, dense, loy R 3/2, trace pebbles 0.9-1.9 fine Sand to coarse sund 60% gravel 40				
	3,2' re/,	15~‡ @ 35_	1005e, 10 YR 5/3 0-018' SAA, Saturated and color change to 10 YR 4/6				
			0,8-3,2' Fine sand 60% and silt 40%, subangular, well Sorted, moist, dense, Gley 1 5/1064				
		45		*********		••••	
	,	50					
		55					

			Field Boring Log	
Client: U	ISAEC	Field Location:	Boring ID: FTB1-12-03-56 Date: 9 1-8/20	
roject No	o.: 30001992.3DL10		Latitude: Longitude:	Ground Surface Elevation:
	ort Belvoir, Virginia		Drilling Method: DPT Drill Rig Model:	Track Mounted Geoprobe
ogged by			Soil Sampling Method: Grab Groundwater Sampling Method	and the second s
rilling Co				
riller:	Jeff Grant		Depth to First Encountered Water:	Trois of the Carterin
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate r Sample IDs and Notes
	Hand Auge	0-1 _ 	Fine to medium sand 75% silt 25%, Sub angular, poorly sorted, moist, losseard blocky, 10 YR 6/3	
		2-3		
			5AA color change to Gley i 7/10 x mothed with 7,57R 3/8 5AA	
	DPT 3.9	rec, 5-10	SAA 0-8.6 Fine to medium sand 90% silt 10%, Subangular, mell sorted, moist, 100se, 5 y 7/1 Clay plug at 0.8-1.1 2.5 yr 4/3 2.1-5;1+25% of fine Sand 25% wett subangular,	
	1.2	rec _i 10-15	well sorted, moist, dense, Gley 1 5/56-12, trace pebbles of coarsens to pebbles wi coarse sand; angular, poorly sorted, moist, Giey 1 5665 by	

1.0-1.7. - Graveland coarse sand 30% pourly sourced, angular, Saturated, Gley 1 415 07



	Field Boring Log									
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	Sample IDs and Notes				
	31 neci	15-10	Bt: Silt 80% some fine Sand, sub angular, well sorted, moist, dense, Gley 16/1064							
		35	well set 12-16							
		40								
		45								
		50								
	N. Committee of the com	55		>						

sample 1135@ 5-40

Page \perp of \underline{I}



			Field Boring Log			
roject No	o.: 30001992.3DL10 ort Belvoir, Virginia y: Dakota Valle	Field Location: Hangar 3145	Drilling Method: DPT Drill Rig Model: T Soil Sampling Method: Grab Groundwater Sampling Method:	Track :	Mou G	urface Elevation: inted Geoprobe Grab with SP-22 Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate	r Sample	Sample IDs and Notes
		0-1_	0-0.1 - Topsoil - Fine sand 50% silt 50%, Subangular, poorly sorted, moist, loose, 7.5 y R 2.5/1, highorganics 0.1-1 Fine to medium fine sand 70% with silt 30%, subangular, poorly sorted, dense, mottled			
			7.5 YR 5/1 and 7.5 YR 5/8, motorat roots to 0.5' SAA - Fine to medium sund with 10% gravelup			
		2-3 3-4 4-5_ 15	54A Sil+50% and fine sand 50%, subangular, well sorted, moist, dense, mottled 7.5 YR 5/8 and 7.5 YRS/1 SAA- linch colorchange to 10 R 5/6			
		rec. 5-10	O-4.7 fine Sand 50% and 5:1+ 50%, subangular, well sorted, moist, dense, Gley 1 5/100 Loarse tovery coarse sand plug at 0.4-0.5 7.54 R S/6 5 AA-fine sandy silt	64		
	5		2,5-5' clay-lowplasticity moist dense Gley 1 5/10gy mottled with 7,54R 2,5%	3		5ample 1135



			Field Boring Log
	USAEC	Field Location:	Boring ID: FT BL -B 3121-03-50 Date: 09/29/20
roject N		Building	Latitude: Longitude: Ground Surface Elevation:
ite: ogged l	Fort Belvoir, Virginia by: Dakota Valle		Drilling Method: DPT Drill Rig Model: Track Mounted Geoprobe
Orilling C		3121	Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22
Oriller:	Jeff Grant		Hole Diameter: 2.5-inch Total Depth of Boring: 23/5 Reference Datum: Depth to First Encountered Water:
Time	Drill Notes	Depth	
	Hans Auger	5	Dorly Sorted, subangular, moist, loose, 7.54 Signature, poorly sorted, moist, loose, O.5-1-Fine to coarse sand 50% gravel, angular, poorly sorted, moist, loose, 7.54R 514 gravel preventing
		~ .5	- 013-1 Medium sand- 60% 5ilt 35% 5% pebbles; trom 1-2,5
	DPT 2.	4'rec, 5-10	54A increased gravel to 10% Sample 1330 SAA-increased silt to 40%
	LD	15-6	psubangular, poorty Sorted, moist, dense, 7.5 YR 574 Medium to Coarse Sand 75% silt 25%, su bangular, poorly sorted, moist, dense, 10 YR 416 mottled with 10 yr 611
	4.5	rec, ls-	poorly sorted, moist, dense, 10 YR 4/6 mottled with 10 yr 6/1 o S/1+ 50% Clay 50% - medium plasticity. moist, mottled 10 YR 4/6 and 10 YR 6/1 medium sand 90% silt 10%, subangular, well 50rted, wet, loose, mottled alternating
	3 1	25	3.5 medium sand 90% silt 10%, subangular, well 50rted, wet, losse, mottled alternating

dominant colors between 2,5 YR 5/8 and 7,5 YR 8/1, plug of gravel and medium sand at 2,2-2.41



			Field Boring Log
lient: U	SAEC	Field Location:	Boring ID: FTBL-1980PC-01-50- Date: 09130/20
roject No	o.: 30001992.3DL10	1980	Latitude: Ground Surface Elevation:
ite: Fo	ort Belvoir, Virginia	plane	Drilling Method: DPT Drill Rig Model: Track Mounted Geoprobe
ogged by	r: Dakota Valle		Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22
rilling Co	.: JG Drilling	crash	Hole Diameter: 2.5-inch Total Depth of Boring: 44.5 Reference Datum:
Oriller:	Jeff Grant		Depth to First Encountered Water:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs and Notes
	Hand Auge		5-0.1-Topsoil-Siltond fine sand 60%, 5 ubungular, poorly sorted, moist, low density, 7,5482.5/2, high organies oil-O.4- Fine sand 70% and silt 30%,
		10	Subangular, poorly sorted, moist, medium density, 10 y R 5/4, some organies 0.4-1- Fine to medium sand 75% and silt 25%, subangular, poorly sorted, moist, medium density mattled to R 4/1, 10 R 5/4,
		1-2_ 2-3_ 3-4 15_	SAA - 10% gravel up to 3cm SAA
	Ď	1.8'rec 5-10 -	0-0.7 SAA 0.7-1 5ilt 90% fine sand 40% clay 10%, Plastic, moist, medium density, 107R 7/1 0-0.4 Silty 60% fine sand 40%, subangular, Pourly Sorted, plastic, very moist, low density,
			Pourly Sorted, plastic, very moist, low density, WYRS14, bottom O.1' medium coarse sand 104R412 0:4-2' Silf 60% fine to medium sand 30% clay 10%, Subangular, poorly sorted, moist, medium-high density, mottled 104R 711, 104R 516

19-23
23-27
27-3030-34



Field Boring Log							
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes	
	0.7 rel,	10-15	2'-2.8'- Fine to medium sand 70% silt 30%, Subangular, poorly sorted, moist low density loose mottled 704R 711 and 107R SIG 0-0.7' Silt with trace coarse sandiplastic,				
	415'rec.	15-19	o-3.7 tow density 2.8 y 4/2 Fine to medium sand 60% psilt 20% grave120% Fubangular, poorly sorted, little moisture, dense; 10 yR 4/6 3.7-4.5 - Fine to medium sand 85% silt 13%, Subangular, well sorted xmoist, dense, loy R 5/8) 			
	4.9'rec.	14-23	Subangular, well Sorte axmoist, dense, 10485/8 0-1.65AA 1.6-4.9'-51+70% clay 15% fine Sand 15%, low plasticity, dense, 11+the moisture, mottled 1048 4 nd 10 VP 518-Increases sand at 215' to 30%	41			
	3,9\rec.	23-27	0-1.65AA 1.6-4.9'-51+70% clay 15% fine sand 15%, low plasticity, Lense, 11+tle moisture, mottled loy R 4nd 10 y R 518-Increases sand at 2.15' to 30% 0-2.9- Fine sand 70% and silt 30%, subangular well sorted, moist, low density, 10 y R 8/1 mottled with 10 y R 6/6 2.9-3.9 Medium to coarse sand 50% and grave 150% subangular, poorly sorted, the same of	6			
	3.2°rec.	2 7 - 3 <u>0</u> - 50	nell sorted, moist, medium density, 54R 5/8 well sorted, moist, medium density, 54R 5/8				
	4.8'rec 3.1'rec	30-34	= Subangular, well sorted, moist, loose low density, = 10 y r 8/1 0-4.9 BAA 0-3.15AA - becomes very dense at bottom 2.8-			No recovery on 36-44.5	

verymoist



			Field Boring Log		
lient: US	SAEC	Field Location:	Boring ID: =TBL - 1980PC-02-SO_Date: 09/30/20		
roject No.		ra (/)		Ground	Surface Elevation:
_	ort Belvoir, Virginia	[980		Track N	Mounted Geoprobe
ogged by		Plane	Soil Sampling Method: Grab Groundwater Sampling Method	d:	Grab with SP-22
rilling Co.		crash	Hole Diameter: 2.5-inch Total Depth of Boring: 47		nce Datum:
Oriller:	Jeff Grant	CI	Depth to First Encountered Water:		
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate	Sample IDs and Notes
	Hand Auge	-	0-005 Fine to medium sand 80% some silt 20%; Affsubangular, poorly sorted, moist, Blocky, lowder 7.5 YR 416	sity,	
		5	0.5-1 Fine tomedium Sand 0% silt 30%, subangu poorly sorted, must, medium density, 7.5+P.61 Some organic material 0-1 Medium to coarse Sand 90% minor silt 10%, Subangular, poorly sorted, moist, loose landensity, 10 YR 6/4	lan I,	
		2- <u>3</u> 3- <u>4</u> 15	0-1' SAA-increased coarse sand content, mottled 7.5 YR S18 and 10 yR 614 0-0.5 Fine to medium sand 70% silt 20% gravello subungular, pourly sorted, loose londonsity, moist, mottled 7.5 YR 518 and to yA 674 0.5-1 Silty \$100 san fine Sand 30%, grave 130 medium plasticit. Subanaular	%,	
		4- <u>5</u>	moist, medium density, loyR 7/1		
	PPT 5	Trec: 5-10_	0-0.5- Fine to medium soud 60% and siltyon subangular poorly sorted, moist, dense, mottled 7.5 yr 7/1 and 2.5 yr 5/4 0.5-5' Clay with trace silt, low plasticity, dense, moist, mottled wyr 7/1 and 7.5 yr 4/2	0,	

Field Boring Log								
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	Sample IDs and Notes		
	3.5°re1.	30	0-0.4 Sitts Sandy M 60% silt 40%, subangular, well sorted, moist low density i moistrate medium 10 lasticity. 7,5 yr 7/1 0.4-2 Medium to fine Sand 90% silt 10%, subangular, well sorted, 5 x yr grimoist 2-3,5 Fine to coarse sand 45% trace silt 5%, subangular, well sorted, moist, 1005e, Subangular, well sorted, moist, 1005e, 7,5 yr 8/1	Z.las	se.			
	4 rec.	-	0-4 Medfum to coarse sond 90% somes[1]10% subangular, well sorted, losse, moist, 7.5 4 R 8/1, alinch clay plugs at 1'-1,1', 2'-2,1', 3,41-3,5'					
		20-25	0-2.7-5.4A - clay plugs intermittent at ranging from 0.2' to 0.4' 2.7-3.3 Fine to medium sand 80% with siltage					
	4.8 rec 3.3 rec	35-40'	Subrounded, well sorted, moist, loose, 2.5 YR8/1 5:AA - intermittent mottling from 7.5 yR 8/1 to 2.5 yR 0-16 5AA - very moist in upper 1.4 0-16 5AA - becomes wet 16-3:3 Coarse, Sand My to medium Sand, subungular,					
	2.8rec.	ърз.5- <u>чг</u>	clay, law plasticity, and dense, 7.5 yr 5/1 moist			Hard layer could not be retriived 40-43.		

Client.	LICAEC	Field Location:	Boring ID: FTBL- H 3132-01-6W Date: 04/30/20
	USAEC 30001992.3DL10	Field Location:	Boring ID: FTBL- H 3131-01-6W Date: 04/30/20 Latitude: Longitude: Ground Surface Elevation:
Project N Site:	Fort Belvoir, Virginia		Drilling Method: DPT Drill Rig Model: Track Mounted Geoprobe
Logged			Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22
Drilling C			Hole Diameter: 2.5-inch Total Depth of Boring: 15 Reference Datum:
Driller:	Jeff Grant	1	Depth to First Encountered Water:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs and Notes
	Itand auger	0-1	
		(-\)\[\tau\) \[\tau\] \[Subangular, poorly Sorted, moist, low density, 10TR 7161 0-1-SAA 0-1 SAA
		3-4_ - - - - - - 15	0-0.8 s AA 0.8-1 silt and fine sand 40%, subungular, poorly sorted moist, dense, 10 y R S/4 SAA
	DPT	4.8 rec, 5-9_	moist, dense, 10 y R S/4 SAA 0-3° Clay and silt, low plasticity, dense, moist mottled loy R 7/1 and 107 R 5/6, intermittent medium sand and 5/1+ 10 y R 5/6 3°-4.8°- Fine Sand, angular, we lisorted, wet loose 10 y R 6/4
			wet loose 10 y R 6/4 - 0-3.5- Coarse Sand and Gravel, angular, - poorly sorted, Seturated, loose, 10 y R 6/4 - 3.5-4.8° 5:1+y 85% fine Sand 15%, moderate





	<u>ei</u>		Field Boring Log			
Client: U	JSAEC Field Loca	tion:	Boring ID: FTBL- F BN AFS-01 - 10 Date: 10/1/20		-	
roject N				Gro	und S	Surface Elevation:
	ort Belvoir, Virginia					ounted Geoprobe
ogged b			Soil Sampling Method: Grab Groundwater Sampling Method	1:		Grab with SP-22
rilling C					erenc	e Datum:
riller:	Jeff Grant		Depth to First Encountered Water:			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	Hand Auger	0-1	0'-0:2' Fine sand 60% silt 40%, subangular, foorly sorted, moist, medium density, 10 yr \$13 0:2-1-Fine sand to vary Coarse sand, pebbles and			
	2.31	5	gravel, Subangular, pourly sorted, 160se low dens;	tyj		CEAUR L
	DPT 28 rec	5-16_	0.2-1-Fine Sand to very Coarse sand, pebbles and gravel, subangular, pourly sorted, 1605e low densi 107R 416 0-0.3 SAA 0-1.8' Fine to very coarse sand, pebbles, and gravel, Subungular, Pourly Sorted, Moist, loose/low density, 104R 5/8 0-1.5 SAA 0-0.8 SAA 0-0.8 SAA 0.8-2.2 - coarse sand, subangular, well sorted, loose low density, saturated, 104R 5/8			gravel cannot be hand augered and recovered from 2-5'
	1.5' rec.	10-15	0-1.5 SAA			
	2.2rec.	15-20	0-0.8 5AA 0.8-2.2 - coarse sand, subangular, well sorted,			
			loose low density, saturated, 107R 5/8			
		=				
		25				



				Field Boring Log			
	150	Field Location	on:	Boring ID: FTBL - FBNA 年5-03-50 Date: 10/1/20			
lient: USA		Field Locali	J11.	Latitude: Longitude:			rface Elevation:
roject No.:	30001992.3DL10			Drilling Method: DPT Drill Rig Model:			nted Geoprobe
	Belvoir, Virginia	1		Soil Sampling Method: Grab Groundwater Sampling Method	od:		rab with SP-22
ogged by:	Dakota Valle			Hole Diameter: 2.5-inch Total Depth of Boring: [. 5	Ref	erence	Datum:
rilling Co.:	JG Drilling	1		Depth to First Encountered Water:			
Time	Jeff Grant Drill Notes		Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	Hand Auger	9500 T) ~ 1) ~ 2 5	additional comments) additional comments) 0-0.7 Topsoil- Gilt 60% five sand 40% subangular, poorly sorted, loose/budensity/moist, 7.5 y R 4/2, organics 6.2-1 Loo fine to coarse sund, pebbles, and gravel, Subangular, poorly sortedy 10652 low density, moist 5 y R 5/8 0-0.5-SAA			
		O.Srec.	9- 3 -	GYR 518 0-05-SAA			
			15_				
			20				*
			20				



			FTBL - Field Boring Log			
Client: U	SAEC	Field Location:	Boring ID: FBNAF5 -02 -50 Date: 10/01/20			
Project No				Grou	und S	Surface Elevation:
	ort Belvoir, Virginia					ounted Geoprobe
Logged by			Soil Sampling Method: Grab Groundwater Sampling Method			Grab with SP-22
Drilling Co						ce Datum:
Driller:	Jeff Grant	Fire Station	Depth to First Encountered Water:		5, 5, 10	o Datain.
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	Hand Auger	5	0-0.6-Silt 60% fine sand 40%, subangular, Poorly sprted, moist, medium density, 10 y R S/4 0.6-I Fine to medium sand 60% and silt 30% gravellod subangular, poorly sorted, medium density/moist, 10 y R S/4	814		
	6.	2-3_	0-0,3' medium sand 65% silt 15% gravel and pebbles subangular, poorly sorted, low density, motst, 0-1' 10 YR S/6 medium and coarse sand 180%, with 5ilt 30%; gravel 10	20%		0,3-1 un recoverable Lue to pocks
		3-4 - - - 15	0-0.8' silfand Fine Sand 40% of subangular, poorly sorted, moist, blocky, medium density, 104 R 312, black coloring, wood fragments and gravel 0.8-1 Modium to coarse sand 80% osilt 30%, gravelz subangular, pourly sorted, moist, medium density inyr	3/8		
		3,5 rec. 5-10 -	0-1.6 5 AA 0-1.6 5 AA 1.6-3.3-5i 1+ 75% five sand 25%, Subangular, well sorted, plastic, wet, loose low density, 21554 472 mostled with 2.5x 516 trace gravel 0-2.8 3il+and medium to warso sand 15% 3il+25% trace gravel, subangular, well sorted, moist, lov 2.5x 514			
		3.3rec 10-14.5	0-2.8 3:1+and medium to coarso sand 15% 3:1+25% trace gravel, subangular, well sorted, moist, low 2:57 5/4 2.8 - 3.3 - Coarse Sand and grave (30%, subungular,	v des	isit	

pourly sorted, moist, low density, 2.5x 4/3

			Field Boring Log		
Гіте	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Groundwate r Sample	Sample IDs and Notes
	4.8'rec.	30	6-6.9 SAA- colorchange to lox R S18 0.9-4.8' Medium Sand 85% Silt 15% tracegrava, very moist, losse low density, lensed lox R S18, lox R 811, 10R 614 0-4'SAA-1.1-2.5 wet		
	4 rec.	=	0-4'SAA- 1.1-2.5 wet		
		35			
		45			
		50			
		55			

			Field Boring Log		
lient: USAEC	Fie	eld Location:	Boring ID: FTBL - 13 3/21-01-50 Date: 10/1/20		
				Ground	Surface Elevation:
	oir, Virginia	Building			ounted Geoprobe
		3121	Soil Sampling Method: Grab Groundwater Sampling Method	d:	Grab with SP-22
illing Co.:	JG Drilling	21			ce Datum:
	eff Grant		Depth to First Encountered Water:		
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample Groundwate	Sample IDs and Notes
Ha	nd Auger	10	0-0,2 Topsoil- 5:1+ 60% fine towarse sand 40% Subangular, poorly sorted, moist, low donsity, 7,5 x R 3/2, nigh organies 0,2-0,8 Siltipand Fine to medium sand 40%, subangular, poorly Sorted, moist, medium density, 7,5 x R 5/2 0.8-1 Fine to medium sand 80% silt 15% gravels%, subangular, poorly sorted, moist, dense, mottled 7.5 x R 5/2 and 7.5 x R 5/8 0-0,6-8AA 0.6-1 Siltsand medium sand soro, subangular, poorly sorted, moist, dense, mottled		
		15	7.34 R StI and 7.54 R S/8 0-0,5 SAA 0.5-1 Fine Sand 60% and Silt 40%, sub angular, Poorly sorted, moist, medium density, 7.54 R S/1 0-6.75AA-increased silt content w/depth 0.7-1 SAA mottled 7.54 R S/1 and 7.58 R S/8 0-0.6 SAA 0.6-1 Fine sand 80% and silt 15% 5% gravel, Jubungular, poorly sorted, moist, low density, black		

			Field Boring Log				
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	r Sample	Sample IDs and Notes
			0-0.4' SAA 0.4' \$\int 1.8 sift and fine sund grade 5 to course sand and gravel, mostly fine sand from 0.5-1.4', moist, loose low density 100 yr 6/4				
	i.9°rec.	35	0-0.4 - very coarse Sand and pebbles, subangular, poorly sorted, wet, low density loose, ioth 614 6.4-19. Fine Sand subangular, well sorted, saturated, low density, loose, motfled 10th 518, 10th 811, 10th 614				
		40					
		45				<u></u>	
		50					
		55					



Client: USAEC Project No.: 30001992.3DL10 Building So.: JG Drilling Co.: JG Drilling Method: Drill Rig Model: Track Mounted Geoprobe Latitude: Longitude: Ground Surface Elevation: Drilling Method: DPT Drill Rig Model: Track Mounted Geoprobe Coil Sampling Method: Grab With Sp-22 Hole Diameter: 2.5-inch Total Depth of Boring: JS Reference Datum: Depth to First Encountered Water: Soil/Rock Description (principal components and angularity; minor components and angularity; color; additional comments) Hand Auger Drill Notes Sample IDs and JG	
Latitude: Longitude: Ground Surface Elevation: Drill Rig Model: Track Mounted Geoprobe	
Drilling Method: DPT Drill Rig Model: Track Mounted Geoprobe Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22 Hole Diameter: 2.5-inch Total Depth of Boring: 15 Reference Datum: Depth to First Encountered Water: Soil/Rock Description	
Soil Sampling Method: Grab Groundwater Sampling Method: Grab with SP-22 Hole Diameter: 2.5-inch Total Depth of Boring: IS Reference Datum: Depth to First Encountered Water: Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Fand Auger O-1 O-0:3 TopSoil Sith Both fine to medium sand 20% plastic, very wety losse; 7.5 x R 2.5 / 1 Subungular, poorly sorted 31% of sith 7.5 x R 7/11 Time to medium sand and sith 70%, subungular, poorly sorted 31% of sith 7.5 x R 7/11 Time to medium density Joose moist Moist; medium density Joose moist Moist; medium density 7.5 x R 7/11 Time to medium density Joose moist Moist; medium density 7.5 x R 7/11 Time to medium density Joose moist	
Hole Diameter: 2.5-inch Total Depth of Boring: 15 Reference Datum: Depth to First Encountered Water: Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Fine Drill Notes Drill Notes Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs and Soil And	
Depth to First Encountered Water: Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Sample IDs an angularity of the standard of the s	
Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments) Hand Auger 0-1 0-0.3 Topsoil Silt 80% fine to medium soud 20%, plastic, very wet; losse, 7.54 R. 2, 5/1 R. 34 R. 2, 5/2 R. 34 R.	
Hand Auger 0-1 0-0,3 topsoil- Silt 80% fine to medium soud 20%, plastic, very wet, loose, 7.54 R 12/5/1 Subungular, poorly sorted 30/0 5 pubungular, poorly sorted, medium density Joose moist mottled 7.54 R 5/4 1-2 Fine to Cearse sand 20% silt 30%, subungular, poorly sorted, moist: medium density, 7.54 R 5/6, trace ground	d Notes
2-3 0-0 2'-544	
2-3 0-0,2'-SAA O.2'-1, Fine to coarse sand. 70% silt 20% gravel 10%, Subangular, poorly sorted, moist plack yand danse, 2.5 y 5/2	
DPT 0.5'rec 5-10 0-0.5' 514 90% and 50% Plastic, subangular, well sorted, low density, 2.57 5/3. very moist DPT 0.5'rec 5-10 0-0.5 5iHy 75% fine sond 25% ij Mastic, subangular, well sorted, low density, wet, 2.5 7 5/2	
DPT 0.5 rec 8-10 0-0.5 5itty 75% fine sond 25% ijlastic, subangular, well sorted, low density, wet, 2.5 y 5/2 3' rec. 10-15 0-1.3 5ilt 80% and sond 20% Plastic subangular, well sorted, low density, Gley 15/107; wetvery mais t	
25 Jane 11 Socied 1 line Longitus Glad 15/10/ 100 to the	

1.3-3'- Fine to medium sand, subangular, well sorted, wet, low density 1005e, saturated Gley 15/164



			Field Boring Log		
lient: l	JSAEC	Field Location:	Boring ID: # T B L- H 3 151-01+50 Date: 10/1/20		
roject N	o.: 30001992.3DL10		Latitude: Longitude:	Groun	ind Surface Elevation:
	ort Belvoir, Virginia	Hangar	9		k Mounted Geoprobe
ogged b			Soil Sampling Method: Grab Groundwater Sampling Method		Grab with SP-22
rilling C		3151			rence Datum:
riller:	Jeff Grant		Depth to First Encountered Water:	Kelei	Terice Datum.
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Sample IDs and Notes
	Hand Auger	3-4- 4-5-	Medium sand to fine sand 80% Siltio's, pebbles one Subangular, poorly sorted, moist, loose low density, 7,5 YR 2.5/2, organics 0:2-1 medium to coarse sand 60% silt 10% gravelso subangular, poorly sorted, maist, loose low density. Tis YR 6/8, gravel more prominent in 0:8-1 up to 5cm no recovery- nar & grave (layer pushed through which only medium to fine sand 80% silt 20%).) Yo,	
	790	20	61ey 15/1004 0.5-0.7-wood chips 0.7-1'- Medium to fine Sund 75% silt 25%, Subangular, poorly sorted, moist, blocky mediumden 2.57 6/2 0-0.2' clay nithsilt, low plasticity, dense, 2.57 5/1 0.2'-2.6' fine sand and silt 40%, subangular, Poorly sorted, moist, medium density, mottled	Sify	

gravel lense at 1.1-1.2

			Field Boring Log			
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
	Ч.4°rec.	10-15	0-61.0- Fine Sand; Subangular, well Sorted, wet, loose low bensity; Gley 1 6/567 1.0-4.4's: It so on a fine Sand 50%, plastic; subangular, well sorted, wet, Gley 17/1 untill 2:7; becomes 10xR 5/8 mattled with some			
		30	Cley 17/1			
		35				
		40				
		45				
		45				
		50				
		55				



			Field Boring Log			
Client: USACE Project No.: QH-39053782.00000 Site: Fort Belvoir, Virginia Logged by: Justin Coffey Drilling Co.: NA Caseade The Driller: NA			Drilling Method: HAND BUCER Drill Rig Model: NA (HAND A Soil Sampling Method: GRAB / HAND Groundwater Sampling Method	uce od:	R) NA	Surface Elevation: ce Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	Sample IDs and Notes
1/15	HAND ANGER 21 BGS	5	0.0-0.6 CRAVECT SAND (SAND 60% GRAVEL 40%) SUB- ROUNDED (COARSE TO MEDILLAM SAND) (MEDILUM CRAVEL) PROPRY SOUTED, SATURATED, SCAT/LOOSE 754R 5/8 STRONG BETWEN 0.6-1.2 SANDY CLAY (CLAY 60% SAND 40%) LOW PLASTICITY, WET, MEDILUM STIFF, 7.54R 5/8 STRONG BROWN MOTTLED W/7.54R 7/1 LIGHT GRAY. 1.2-2.0 SAND (70%) (CRAVEL 15%) SILTS (15%) SUBROUNDED MEDILUM TO FINE SAND WET, LOOSE, POORLY SOUTED 7.54R 5/8 STRONG BROWN MOTTLED W/7.54R 7/1 LT. GRAY			FTBL-81495-01-50-0310-21 © 1130
		20	2.0 END OF BOZING			



			Field Boring Log			
Client: USACE Field Location: Project No. Great 20053782.00000 Site: Fort Belvoir, Virginia Logged by: Justin Coffey Drilling Co.: Great Cascade NA Driller: NA			Drilling Method: NA (HAND AUGE) Soil Sampling Method: GLAD HAND Groundwater Sampling Method	aue	BE	Surface Elevation:) ce Datum:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate r Sample	Sample IDs and Notes
1245		5	0.0'-0.4' GRAVELY SALD SUBROLLED COARSE SAND (20% GRAVEL), MOIST, LOTS OF ORGANIC MATERIAL, 7.5 YR BLACK LODSE. 0.4'-2.0' GRAVELY SALD (30% GRAVEL) 70.5"-70:45"			F18L-81495-02-50-631021
		• • • • • • • • • • • • • • • • • • •	GRAVEL COARSE-MEDIUM SAND SUB- ROUNDED, POORLY SORTED, MOIST, LOOSE 75 YR 5/8 STRONG BROWN			
		10	Z' BELOW GROWND SHILFACE END OF BORING			
		15				
		20				
		25				



			Field Boring Log			
Project N Site:	No.: # 39953782.00000 Fort Belvoir, Virginia by: Justin Coffey	Location: XPPIZ.3DLIO	Drilling Method: NA (HAND AUGEL) Drill Rig Model: NA (HAND Soil Sampling Method: GRAB) HAND Groundwater Sampling Method	d: L	JA	Surface Elevation:
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description (principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)	Soil Sample	Groundwate	Sample IDs and Notes
1330	HAND AUGERED 2' BGS	10	D.O'-0.5' (SALD(80%), GRAVEL (10%), SILT(10%)) SUB- ROLLDED, PROKLY SOFTED (COARSE TO ME- PILLIM GRAIN SAND, 70.10" GRAVEL, SOFT LOSSE, 7.5 YR 2.5/1 BLACK - LOTS OF ORGANIC MATERIAL (MOIST) D.5'-1.0' (GRAVEL 50%) SAND (50%), SUB ROLLDED POORLY SORTED, SAND COARSE, MOIST SOFT LOOSE LARGE BITS OF GRAVEL >1"TO 3" (CLAYGO%), SAND (30%), GRAVEL (20%), COARSE TO MEDIUM SAND, FROM SORTED, MOIST SOFT, LOW PLASTICITY, 7.5 YR 5/8 STEONG POORLY SORTED, COARSE SAND, MOIST LUSSE, SOFT, SAND 50% SUBROLLDED, POORLY SORTED, COARSE SAND, MOIST, LOOSE, SOFT, SAME COLOR AS ABOVE. 2"BGS END OF BORING			FTBL-B1495-03-50-0310
		25				



			Field Boring Log			
	lo.: Q4-30053782.00000 Fort Belvoir, Virginia by: Justin Coffey	ocation: 12.3DLID	Drilling Method: MA (HAND AUGEL) Soil Sampling Method: GRAB/HAND Drill Rig Model: MA (HAND & Groundwater Sampling Method)	d:p	A A	Surface Elevation:
Time	Drill Notes	Depth (feet bgs)		Soil Sample	Groundwate	Sample IDs and Notes
1155	HAND AUGER 2' BGG	5	0.0-1.1 GEQUELY SAND (50% SAND (50% GRAVEL) SUB ARTEROLUDED, SATURATED, SOFT (LOOSE 75 YR/5/8 STROVE BROWN (LOARSE) 12-1.6 SANDY CLAY (60% SAND/40% CLAY) WET			
		10	MEDIUM STIFF / LOW PLASTICITY, SAME COLOR AS ABOUE. 1.6-2.0 GRAVELY SAND (SAND 75%) GRAVEL (15%) SILT (10%) SUBROUNDED (COARSE TO FINE) SAND POORLY SOUTED LOOSE			F1BC-B1495-04-50-031021 @1210
	*	15	ZFT END OF BORING			
		20			,	
		25				



FTBL-N			Page	of \
	PFS-0	Date	10 T T	7/20
rginia		Wear		ATTH COL
1"			Material	PVC SS Other
n in Well	A.16	Gallor	August 1	0.34
d:		Samp		
PDB Bladder		Metho	oc G	irab
Other Peristaltic	100		On/Off_ill?	
рН	ORP (mV)	Turbidity		ffey/M.Blower earance
= 00	107	(NTU)	Color	Odor
5.03	197	OVER	Beaut	NONE
4.87	161	OVER	- (1	- (1
4.91	155	370	34	- 11
492	144	193	- 11	(1
1.12	171	1+4		
		Number 2	Preservative	P
Well Locke	ed at Depa	rture: Ye		No No
	Well Lock	Well Locked at Depa	Average and the second	Well Locked at Departure: Yes /

N

Gallons/Foot

1" = 0.04 1.25" = 0.06

1.5" = 0.09 2.5" = 0.26 2" = 0.16 3" = 0.37

3.5" = 0.50 6" = 1.47 4" = 0.65



Groundwater Sample L	.og						Page	of 1
Project No.	30001992.3DL10		Well ID	TBL-BIY	136-01	GO Date	-	1/20
Project Name/Location	Army PFAS Pr	rogram SI - F						mostri claro
Measuring Pt. Description (circle one)	Screen 45'-4	19'	Casing Diameter (in.)				Material	PVC SS Other
Total Depth (ft-bmp) 51	Static Water Level (ft-bmp) 39.98	1	Water Colum	n in Well	9.00	Callen		
Calc.Gallons Purged 1.08	Pump Intake (ft-bmp)	. 1	Purge Method		1.0/).36 GALLOUS
Gallons Purged	MP Elevation	NM	r arge weared	PDB Bladder		Samp Metho		rab
Sample Time: Label	Replicate/ F18L-B1436		-092720	Other Peristaltic	V		On/Off 153	
Time Minutes Gallons Elapsed Purged	Depth to Water (ft) TOC (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidity	Appe	ffey/M.Blower earance
1536 0 0.00	Nm 28.23	0.133	1.20	5.50	97	(NTU)	Color CT GRAY	Odor
1541 5 0.25	NM 25.16	0.129	3.15	5.45	81	II	LI GICHY	11
1546 10 0.50		0.140	1.61	5.46	57	641	10	11
1551 15 0.75		0.138	1.90	5.51	73	437	11	16
1556 20 1.90	NM 22.96	0.138	2.00	5.52	78	442	ц	11
1600 - SAMPLES	D FTBL- B1436-01	- GW-	092720					
Constituents Sampled PFAS 18 Compounds (see lab re	port for details)	Container 250ml HDPf				Number 2	Preservativ	e
				Well L	ocked at A	rrival: Ye	s /	No

N

Gallons/Foot

1.25" = 0.06

2" = 0.16

2.5" = 0.263" = 0.37

3.5" = 0.50 6" = 1.47 4" = 0.65



3" = 0.37

			30001992	2.3DL10		Well ID	FIBL-	LVCF-0	1-60	Date _	9/2	7/20
Project Nam	e/Location			Army PFAS P	rogram SI - I	Fort Belvoir, V	irginia			Weathe	175° 6	rangy
Measuring P Description (circle one)		C/GS	Screen Setting (ft-b		31	Casing Diameter (in.)	_1"			Well Ma		PVC SS Other
Total Depth (ft-bmp)	23'	Static Water Level (ft-bm		1	Water Colum	ın in Well	4.19	i .	Gallons in	n Well O.	
Calc.Gallons	Purged 0	51	Pump Intal			Purge Metho				Sample		TIGHE
Gallons Purg	ed \.	25	MP Elevati	on	NM		PDB Bladder			Methoc_	G	irab
Sample Time	e: Label	1821	Replicate/ Code No.	FIBL-LUCE	-01-60	-192720	Other Peristaltic	V			n/Off <u>i 175</u> I by J. Cot	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbid (NTL	ity		arance
1759	0	0.00	NM	25.34	0.102	2.48	5.27	163	377	7	CLEAR	Odor
1804	5	0.25	NM	24.11	0.103	3.03	4.83	166	99.7		LUEAK	NOVE
1809	10	0.50	um	23.76	0.103	3.57	4.75	177	88.9		11	11
1814	15	0.75	NM	23.32	0.104	3.32	4.71	184	85.4		u	10
1819	20	1.00	na	23.19	0.105	3.45	4.70	18:7	80.7		11	-11
1822	- SAI	MPLED	FTBL-	LVCF-01	- GW-0		7		30.			
										_		
		1									T.	
										\neg		
										+		
onstituents	Sampled				Contains							
FAS 18 Com		ao lah ran	out for data:		Container				Number	P	reservative	9
710 10 0011	podrida (a	ee lab lepi	or for details	>)	250ml HDP	E		-	2	N	one	
										_		
								V-		_		
								T A		<u> </u>		
	-											
								-				
								-		_		
										-		
										_		
ell Informati	on			-				-				
ell Informati Well Loca		LEU	عاد داد	AGE CAR FI	RE		Well L		rrival:	Yes		No
Well Local	tion:		215 VILL		RE			ocked at A		Yes		No No
Well Local	tion:	(RE		Well Lock		rture:			No No
Condition of	tion:	(Good Condit	ion	RE		Well Lock	ed at Depa	rture:			0.0
Well Local Condition of Well Compl	tion:	(Good Condit	ion	RE		Well Lock	ed at Depa	rture:			0.0
Well Local Condition of Well Compl	tion:	(Good Condit	ion	RE		Well Lock	ed at Depa	rture:			0.0

4" = 0.65



Project No.			30001992	.3DL10		Well ID	FTBL	-B707	1-01-8V	V Date	091	28/20
Project Name	e/Location	1		Army PFAS F	Program SI -	Fort Belvoir, V					ner Cloud	
Measuring Properties Description (circle one)		C/GS	Screen Setting (ft-bi	mp) 14'-18		Casing Diameter (in.	111				Material	PVC SS
Total Depth (ft-bmp)	18'	Static Water	13 00	9	Water Colum	nn in Well	4.11	L	Callan	s in Well	Other
Calc.Gallons			Pump Intak	e (ft-bmp)	4'	Purge Metho				Sampl		1.16
Gallons Purg	ed O	62.5	MP Elevation		NM		PDB Bladder	_		Metho		Grab
Sample Time	3.0	0905	Replicate/				Other Peristaltic	V	\equiv			335/09
Time	Minutes Elapsed	1 2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi (NT	dity		offey/M.Blow pearance
0835	0	0	Nn .	14.88	0.269	0,31	4,47	168		0 1000	boun	Odor
0840	S	0,5	NM	19.14	0.266	0.00	4.45	136	1000		light brown	
0845	10	0.0	hw	19.11	0.267	0.00	4.39	134	325		Cloudy	
0850	15	0.5	NM	19.09	0.265	0,00	4.41	128	194		clouly	
	26	0.0	NW	1906	0,262	0,00	4,45	122	87		clear	
0905	25	3.6	NM	19:06	0.260	0.00	4.46	121	701		Clear	
0403	30	3,6	NM	19:17	0.260	0.00	4.47	122	16.	2	clear	
			50	npie o	905							
												-
			V							-		
onstituents	Sampled				Container				Number		Preservati	
FAS 18 Com	pounds (see lab rep	ort for details	s)	250ml HDP	E			2		None	ve
											None	
								-		100		
								-				
					-			_		т.		
								-		-		
								-		-		
ell Informati		13 1	115.	747								
Well Local Condition of	•		Iding	707				ocked at A		Yes		No
Well Compl			sh Mount	/ Stick Up		_		ed at Depa Number To		Yes	5 /	No
				or. op			riey i	vuiliber 10	VV CII.			

Well Casing Volumes Gallons/Foot

1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.16

2.5" = 0.26 3" = 0.37

3.5" = 0.50

4" = 0.65



Groundw	ater Sa	mple Lo	og							P	Page (of I
Project No.			30001992.	3DL10		Well ID	FTB	L- DA	AF-01	Gaid	09/2	18/20
Project Name	e/Location			Army PFAS P	rogram SI -	Fort Belvoir, V	irginia	*12	V	Veather		
Measuring P Description (circle one)		C/GS	Screen Setting (ft-bn		7	Casing Diameter (in.)	_1		٧	Well Mat	erial	PVC SS Other
Total Depth (ft-bmp)	20' BORN	Static Wate Level (ft-bmp			Water Colum	nn in Well	9.45	5' 6	Sallons in	Well 0	
Calc.Gallons	Purged	1.14	Pump Intak	e (ft-bmp) 14		Purge Metho		7.10		Sample	Wei <u>l</u>	. 50
Gallons Purg	ed \	.25	MP Elevation		NM		PDB Bladder			Methoc_	G	irab
Sample Time	e: Label	1335	Replicate/ Code No.	FTBL-DAAP	-01-GO	-092820	Other Peristaltic				n/Off 130	ffey/M.Blowe
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (nS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidit (NTU	ty		earance
1312	0.00	0.00	NM	26.22	0.180	0.31	6.07	29	OVER		J GRAY	HONE
1317	5	0.25	nm	24.53	0.183	15.0	6.23	-12	376			ч
1322	10	0.50	Nin	23.13	0.181	0.19	6.25	-14	364		- 11	VI
1327	15	0.15	Nm	27.96	0.177	0.12	6.26	-14	219		11	11
1332	20	1.00	nm	22.99 AAF-01-6	0.177	0.12	6.24	-14	ZIL		1(M
Constituents PFAS 18 Com			ort for details	5)	Container 250ml HDF	PE	9 23	20	Number 2		reservative	e
Well Informat			26.2				72.5			-,-		
Well Loca Condition o			Good Condit	E STATION				ocked at A		Yes		No
Well Comp		1 2 2	ish Mount	/ Stick Up			Well Lock Key I	led at Dep Number To		Yes	/	No
NOTES:												
Vell Casing V	olumes											

V Gallons/Foot

1" = 0.04 1.25" = 0.06

2" = 0.16 3" = 0.37

1.5" = 0.09 2.5" = 0.26

3.5" = 0.50 6" = 1.47 4" = 0.65



MA				and								
Groundw	ater Sa	mple Lo	og								Page \	of _
Project No.			30001992	2.3DL10		Well ID	FTBL-	12-01-	GW	Date	9/28/	20
Project Name	e/Location			Army PFAS F	Program SI -	Fort Belvoir, V				Weathe	er 909	SHAN
Measuring Popularies Properties P	t.	C/GS	Screen Setting (ft-b			Casing Diameter (in.	**			Well Ma	aterial	PVC SS Other
Total Depth (ft-bmp)	18	Static Wate Level (ft-bm	**************************************	9'	Water Colur	nn in Well	4.61	r	Gallons	in Well	0.18
Calc.Gallons	Purged	0.56	Pump Intal			Purge Metho				Sample		
Gallons Purg	ed \	.25	MP Elevati	on	NM		PDB Bladder			Methoc		rab
Sample Time	e: Label	1655	Replicate/ Code No.	F7BL-12-0	01-6W-G	91310	Other Peristaltic		_	Pump (27/165
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turb			arance
1630	0	0.00	nn	27.60	0.300		6.75	-69	OJE		Color	Odor
1635	5	0.75	NM	23.82	0.214	0.21	6.43	-44	11	_	DE GENY	11
1640	10	0.50	NM	22.63	0.274	0.19	6.32	-33	15		1)	11
1645	15	0.75	NN	22.43	0,271	0.14	6.28	- 17.	11		LIGRAY	11
1650	0.5	1.00	NM	22.42	0.277	0.08	6.22	-11	31	6	11	10
1655	- 5A	MOLEC	FIBL-	12-01-66	3-0928	20 -						
							/=					
Constituents	Sampled				Container	-			Number		Preservative	
PFAS 18 Con	npounds (s	see lab rep	ort for detail	s)	250ml HDF	PΕ			2		None	
				6								
					_							
Well Informat	tion									-		
Well Loca		T	DOAF FIN	ZE STATION)		Well	Locked at A	Arrival:	Yes	1	No
Condition o	f Well:		Good Condi					ked at Dep		Yes		No
Well Comp	letion:	Flu	sh Mount	/ Stick Up				Number To		. 55		
OTES:												

Well Casing Volumes Gallons/Foot

1" = 0.04 1.25" = 0.06

1.5" = 0.09 2" = 0.16

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1.25" = 0.06 2" = 0.16

3" = 0.37

Groundw	ater Sa	mple Lo	og								Page 1	of (
Project No.			30001992	2.3DL10		Well ID	FIBL	12-02	-610	Date	91	29/20
Project Name	e/Location			Army PFAS Pr	rogram SI - f	Fort Belvoir, \	/irginia			Weath	er 68°	FLUELLD
Measuring Pt Description (circle one)		C/GS	Screen Setting (ft-b	mp) 14'-18	,	Casing Diameter (in.)	4.,		Well Ma		PVC SS Other
Total Depth (ft-bmp)	18'	Static Water Level (ft-bm		1	Water Colur	nn in Well	4.90	,	Gallons	in Well	0.10
Calc.Gallons	Purged (0.60	Pump Intal	ke (ft-bmp)	14'	Purge Metho				Sample		
Gallons Purg	ed 1.	25	MP Elevati	on	NM		PDB Bladder			Methoc		Grab
Sample Time	e: Label	0945	Replicate/	FTBL-12-	02-60	-09292	Other Peristaltic		_		On/Off O	Coffey/M.Blow
Time	Minutes Elapsed	12 Ct. 15 Gt. 10	Depth to Water (ft) TOC	Temp.	Cond. (µmhos)	Dissolved Oxygen (mg/L)	рН	ORP (mV)		oidity		pearance
0922	0	0.00	na	21.76	0.398		6.63	-47	GUE		DIC. ER	
0927	5	0.25	NM	21.60	0:398	0.00	6.68	-89	li		11	11
0932	10	0.50	NM	21.47	0.399	0.00	6.61	-99			11	11
0937	15	0.75	NM	21.15	0.400	0.00	6.72	-102	4		*1	11
09142	20	1.00	Nim	22.11	0.390	0.00	672	-105		11		16
0945	SAr	naced	FTBL-	12-02-6	0.0979	700 -						
												11111111
	-					09/20	1/20					
					Joe							
					MY.							
					U		-					-
					1							
Constituents	Sampled				Container				Number		Preservat	ive
PFAS 18 Con	npounds (see lab rep	ort for detai	ls)	250ml HDF	PE			2		None	
										٠.		
	_					-						
				v.I	-							
							_	- D-		- II -		
				-								
				-20				-		d d	8"	
				:O 7						- 4		
								30 p. 3				
				8						-		
Well Informat	tion							- /-				
Well Loca	ation:	FIB	L-12				Well	Locked at A	Arrival:	Yes	5 /	No
Condition of	of Well:		Good Cond	ition			Well Loc	ked at Dep	arture:	Yes	s /	No
Well Comp	oletion:	FI	ush Mount	/ Stick Up			Key	Number To	Well:			
NOTES:												
Well Casing \ Gallons/Foot	Volumes 1" = 0.04	1.	5" = 0.09	2.5" = 0.26	3.5	5" = 0.50	6" = 1.47					

4" = 0.65

Project No.		AT 1	30001992	.3DL10		Well ID	FTBL-	12-03	-6W	Date	Page	8/20
Project Name	/Location			Army PFAS Pro	ogram SI - I	Fort Belvoir, V				Weath	ner 75°2	PARTY CICLO
Measuring Pt Description circle one)		(GS)	Screen Setting (ft-bi	mp) 12'-10	,	Casing Diameter (in.)	952	n		Well N	Material	PVC SS Other
otal Depth (f	t-bmp)	6'	Static Water	-	1	Water Colum	nn in Well	648	1	Gallon	s in Well	0.76
Calc.Gallons	Purged (2F.C	Pump Intak			Purge Metho				Samp		51.20
Sallons Purge	ed 1	.25	MP Elevation	on	NM		PDB Bladder			Metho		Grab
Sample Time		1850	Replicate/	F18L-12-0		820	Other Peristaltic				On/Off 187	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) mS/cm	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi (NT	dity	Name of the last o	ffey/M.Blower earance
1826	0	0	NM	24.88	0.204	0.9	6.28	31	PUE		GEAY	NOVE_
1831	5	0.25	NM	23.99	0.705	0.00	6.11	-18	11		11	11
1836	10	0.50	NM	23.5\	0.206	0.00	6.12	-24	- 1		L1	11
1841	15	6.75	NM	22.74	0.208	0.06	6.10	-26	1		11	11
1846	20	1.00	NM	22.63	0.206	0.00	6.10	-26	15		-ú	11
1850	-san	PLED	FIBL-	12-03-60	-0928	0 -						
										_		
							9/28	20				
					0	e	1					
					So							
					U							
onstituents	Sampled				Container				Number		Preservativ	/e
FAS 18 Com	pounds (s	see lab rep	ort for detail	s)	250ml HDF	PE			2		None	
*m	sims	*										

PFAS 18 Compounds (s	see lab report for details)	250ml HDPE			eservat	
Vell Information						
Vell Information Well Location:	FIBL-12		Well Locked at Arrival:	Yes		No
	FTBL-12 Good Condition		Well Locked at Arrival:	Yes Yes	1	No No

Well Casing Volumes

Gallons/Foot 1" = 0.04

1.25" = 0.06

1.5" = 0.09 2" = 0.16 2.5" = 0.26 3" = 0.37

3.5" = 0.50 4" = 0.65

3.5" = 0.50 6" = 1.47



A	30 -	ADIS	for natural a built assets	nd								
Groundwa	ater Sa	mple Lo	g								Page	of 1
Project No.			30001992	3DL10		Well ID	FIGL-H	3145-0	1-60	Date	9/29	lzo
Project Name	/Location			Army PFAS Pr	ogram SI - F	ort Belvoir, V	'irginia			Weathe	r 739	CLOUDY
Measuring Pt Description (circle one)		; / GS	Screen Setting (ft-br	np) 5-9		Casing Diameter (in.				Well Ma	aterial	PVC SS Other
Total Depth (f	t-bmp)	0'	Static Water Level (ft-bm)	1		Water Colun	nn in Well	3,7	91	Gallons	in Well 💍	.13
Calc.Gallons	Purged	0.39	Pump Intak	e (ft-bmp)		Purge Metho				Sample		
Gallons Purge	ed (.	25	MP Elevation	on	NM		PDB Bladder			Methoc	Gr	ab
Sample Time	: Label	1225	Replicate/	FIBL-H3149	5-01-W	J09292	Other Peristaltic		_		on/Off 1159	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen	рН	ORP (mV)	Turb (N	idity	Appea	
1200	0	0.00	NM	26.03	0.247	0.54	7.02	2	OVE		BROWN	MANE
1205	5	0.25	NM	25.81	0.244	0.32	7.00	-1	11		11	()
1210	10	0.50	NM	25.17	0.245	0.78	1.00	-3	624	1	- 11	ii
1215	15	0,75	Nm	24.84	0.248	14.0	7.00	-5	43		11	11
1220	20	0.95	NM	24.74	0.247	0.63	7.02	-9	67	9	CLEARNO	11
1225	- SA	moces	PTBL-	H3147-01	-GWØ	7920 -						
							9/29/	20				
					A	12	411					
					H							
	-				V		-					
Constituents PFAS 18 Con			port for detail	s)	Container 250ml HDF	PE			Number 2		Preservative None	
Well Informa)-	ANGAR.	3145			Well	Locked at	Arrival:	Yes	s /	No
Condition of			Good Cond	TATE NATIONAL PROPERTY.				cked at Dep		Yes	5 /	No
Well Comp	oletion:	FI	ush Mount	/ Stick Up			Key	Number T	o Well:			

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06

1.5" = 0.09 2" = 0.16

2.5" = 0.26 3" = 0.37

3.5" = 0.50 4" = 0.65



Groundwater Sample L	og						Pa	ge	of \
Project No.	30001992.3DL10		Well ID	FIBL-H	3151-01-	-GW 1	Date	10/1	20
Project Name/Location	Army PFAS P	rogram SI -	Fort Belvoir, V	'irginia		\	Weather	68°F 5	SWAY
Measuring Pt. Description TOC / GS (circle one)	Screen Setting (ft-bmp) 10'-19	4'	Casing Diameter (in.				Well Mate	rial	PVC SS Other
Total Depth (ft-bmp)	Static Water Level (ft-bmp) 11.04	1	Water Colun	nn in Well	2.91	0 (Gallons in V	Vell	0.12
Calc.Gallons Purged 0.36	Pump Intake (ft-bmp) 1.2		Purge Metho				Sample		
Gallons Purged ~0.50	MP Elevation	NM		PDB Bladder		^	Methoc	G	rab
Sample Time: Label 0925	Replicate/ Code No.	-01-GW	-10012O	Other Peristaltic					fey/M.Blower
Time Minutes Gallons Elapsed Purged	Depth to Temp. Water (ft) C TOC (F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidi (NTU	ty		arance Odor
00.00	NM 21.50	0.09)	5.86	4.95	142.4	249.2		BERWA	NOWE
Constituents Sampled PFAS 18 Compounds (see lab re	port for details)	Container 250ml HDF	10 1	20		Number 2	Pre	eservativ	e
Condition of Well: Well Completion:	Good Condition Jush Mount / Stick Up	(FIEL	D BLAU	Well Loci Key	Locked at A ked at Depa Number To	arture:	Yes Yes	1	No No

Gallons/Foot 1" = 0.04

1.25" = 0.06

2" = 0.16

1.5" = 0.09 2.5" = 0.26 3" = 0.37

3.5" = 0.504" = 0.65



Groundwa	ater Sa	mple Lo	og							P	age 1	of
Project No.			30001992	.3DL10		Well ID	FIBL- 05	PFS-6	1-60	Date _	9/2	9/20
Project Name	/Location			Army PFAS Pr	ogram SI - F	ort Belvoir, V	irginia			Weather		
Measuring Pt Description (circle one)		/ GS	Screen Setting (ft-bi		3'	Casing Diameter (in.)	_1"			Well Mate	erial	PVC SS Other
Total Depth (f	t-bmp)	23'	Static Water Level (ft-bm)			Water Colum	n in Well	2.7	17_	Gallons in	Well	0.11
Calc.Gallons	Purged (0.33	Pump Intak	(e (ft-bmp) 21		Purge Metho				Sample		
Gallons Purge	ed	.25	MP Elevation	on	NM		PDB Bladder			Methoc_		Grab
Sample Time	: Label		Replicate/ Code No.				Other Peristaltic	- V		Pump On		1728/175 Coffey/M.Blowe
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi (NT	idity		pearance Odor
1730	0	0.00	NIL	25.63	0.210	4.84	5.01	161	27			
1735	5	0.75	NN	24.07	0.216	2.80	4.95	156	19			
OPFI	10	0.50	MM	22.91	0.712	2.33	4.88	148	14			
1745	15	0.75	NN	22.38	0.225	2.26	4.90	139	10	1		
1750	20	1.00	NM	22.15	0.226	2.05	4.95	135	10	5		
1755	- SA	MPLEC	FIBL-	OSPFS-0	1-GW-	-09290	0-					
	-											
					-			_				
					06	9	24/20			-		
					11							
					0							
C	0 1											
Constituents PFAS 18 Com	Transfer of		ant for data!		Container				Number		reservat	ive
FFAS 16 COII	ipourius (s	see lab rep	ort for detail	S)	250ml HDP	E			2	. No	one	
										_		
					-					_		
										· -		
										_		
										_		
										_		
Well Informat	ion											
Well Loca							Well	Locked at	Arrival:	Yes	1	No
Condition o	f Well:		Good Cond	ition				ked at Dep		Yes	1	No
Well Comp	letion:	FI	ush Mount	/ Stick Up				Number To				
NOTES:												
,												
W 11 2 : .												
Well Casing \	olumes											

Gallons/Foot

1" = 0.04 1.25" = 0.06

2" = 0.16

1.5" = 0.09 2.5" = 0.26 3" = 0.37

3.5" = 0.50 4" = 0.65



Project Name/Location Measuring Pt. Description TOC / GS (circle one) Total Depth (ft-bmp) 14 Calc.Gallons Purged 5.63 Gallons Purged 1.25	Screen Setting (ft-bmp Static Water Level (ft-bmp) Pump Intake MP Elevation	Army PFAS Pr) 10-14 8:74 (ft-bmp) 10	<u> </u>	Casing Diameter (in.)	0	3121-01-		Date Weathe <u>r</u> Well Mate		SWUY
Measuring Pt. Description TOC / GS (circle one) Total Depth (ft-bmp) 14 Calc.Gallons Purged 6.63 Gallons Purged 1.2 Sample Time: Label	Screen Setting (ft-bmp Static Water Level (ft-bmp) Pump Intake MP Elevation	8:74 (ft-bmp) 10	<u> </u>	Casing Diameter (in.)	0					
Description TOC / GS (circle one) Total Depth (ft-bmp) 14 L Calc.Gallons Purged 6.63 F Gallons Purged 1.25 I Sample Time: Label	Setting (ft-bmp) Static Water Level (ft-bmp) Pump Intake MP Elevation	8.74 (ft-bmp) 10		Diameter (in.)	_10					
Total Depth (ft-bmp) 14 1 Calc.Gallons Purged 0.63 F Gallons Purged 1.25 F Sample Time: Label F	Level (ft-bmp) Pump Intake MP Elevation	(ft-bmp) 10		Water Colum						PVC SS Other
Gallons Purged 1.25	MP Elevation			Water Column in Well		5.26		Gallons in Well 0.24		
Sample Time: Label	 Renlicate/		Pump Intake (ft-bmp)			N		Sample Methoc Grab		
	Replicate/	MP Elevation NM			PDB Bladder					
	Code No. F	1BL-B3121-	Ø1-6W		Other Peristaltic	V			Off 122	8 1257 fey/M.Blowe
Time Minutes Gallons Elapsed Purged	Depth to Water (ft) TOC	Temp.	Cond. (umhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidi (NTU	ty		arance
1230 0 0.00	NM	8F.PS	0.116	4.18	5.19	110.5	276.4		BROWN	POUP_
1235 5 0.25	NM	23.50	0.114	2.56	4.97	113.5	426		11	11
1240 10 0.50	NM	23.32	0.114	2.30	4.95	119.1	782.		n	0.
1245 15 0.75	NM	23.15	0.113	1.93	4.93	113.1	190.7	7	LEADING	10
1250 20 1.00	MM	22.96	0.113	1.68	4.95	110.7	200.		11	11
1255 - SAMPLED	FIBL-B	3121-01-6	1001-CU	20 -						
			q	2	10/1/20	,				
Constituents Sampled PFAS 18 Compounds (see lab repo	rt for details)		Container 250ml HDP	Ë			lumber 2	Pro	eservativ ne	e
	SUDING 31					ocked at A	_	Yes	1	No No
Well Completion: Flush Mount / Stick Up				Well Locked at Departure: Key Number To Well:				163	-	110
NOTES: Well Casing Volumes										

Gallons/Foot 1" = 0.04

1.25" = 0.06

4" = 0.65

3.5" = 0.50 6" = 1,47



Project No.	aler Sa	mple Lo	30001992.	3DI 10		Well ID	~ n	2121 0	7 (1.)	Data	Page	of \
Project Name	e/l ocation				roorom CL I			3121-0	2-60	Date		20
Measuring P Description (circle one)	tTOC	/ GS	Screen Setting (ft-bn	np) 10'-14		Casing Diameter (in.)				Weath Well N	Material	PVC SS Other
Total Depth (4'	Level (ft-bmp			Water Colum	nn in Well	6.21	<u> </u>	Gallons	s in Well - O	28 CALLO
Calc.Gallons			Pump Intak	e (ft-bmp)		Purge Metho	d: PDB			Sampl		rab
Gallons Purg		25	MP Elevation	on	NM		Bladder Other					50/1105
Sample Time	e: Label		Replicate/ Code No.	F18L-8312	1-02-6	J-100120		V			ed by J. Co	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turb			arance Odor
1052	0	0.25	NM	24.32	0.561	4.34	6.03	6.1	284		BREEN	NOWE
1053	- we			TER PURGI							131-000	700.70
1100	- SAM	PLED I	TBL-B3	121-02-50	-10017	α —		20				
							101'			_		
						Done				-		
						0						
		/										
			1									
							7					Maria I
PFAS 18 Con			oort for details	s)	Container 250ml HDF	PE			Number 2		Preservativ None	e
Well Informa Well Loca Condition of Well Comp	ation: of Well:	FI	Good Conditush Mount	tion / Stick Up			Well Loc	Locked at ked at Dep Number T	arture:	Ye		No No
Well Casing	Volumes											

Gallons/Foot 1" = 0.04 1.25" = 0.06

1.5" = 0.09 2" = 0.16

2.5" = 0.263" = 0.37

3.5" = 0.50 4" = 0.65



Project No.			30001992	3DL 10		Well ID	CIBI -	33 171 0	3-6W Date	9/2	9/10
Project Name	/Location		00001002					2514-6			
Measuring Pt. Description (circle one)		/ GS	Screen Setting (ft-b			Casing Diameter (in.)					PVC SS Other
Total Depth (ft	-bmp)	21.5	Static Water Level (ft-bm)		s'	Water Colum	nn in Well	3	Gallo	ons in Well	0.12 GA
Calc.Gallons F	urged t	36	Pump Intak	(e (ft-bmp)	9'	Purge Metho			Sam		
Gallons Purge	d 1.	25	MP Elevation	on	NM		PDB Bladder		Meti	noc(Grab 1
Sample Time	Label	1445	Replicate/ Code No.	F18L-8321	-03-60	-69.2920	Other Peristaltic			p On/Off 1	HT NY
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidity (NTU)		earance Odor
ग्निस	0	0.00	NM	2280	0.243	0.68	6.56	-1	OVER	BROOK	
1424	5	0.65	NM	23.14	0.248	0.36	6.59	-12	362	CLEAR	11
1429	10	0.50	NM	23.22	0.251	0.00	6.68	-36	254	i,	1)
1434	15	0.75	Nm	23.24	0,251	0.00	6.69	15	214	11	11
1439	20	1.00	NW	22.93	0.250	0.00	6.73	98	198	13	t7
1446	~ SAn	pu	FIBL	B3121 -03-	GW-69	2920 -					
								17	ŝ		
								a 29/2			
						De	2				
						4					
						0					
Constituents PFAS 18 Com	15.35	ee lab rep	ort for detail	(s) -	250ml HDF	E			Number 2	Preservati None	ve
Well Informati											
Well Local			010					Locked at A		Yes /	No
Condition of Well Compl			Good Cond ush Mount					ked at Depa		Yes /	No
TTON COMP	ouoii.	Till	JOH WOUTE	/ Stick Up			ney	Number To	vveir.		

Well Casing Volumes Gallons/Foot

1" = 0.04 1.25" = 0.06

1.5" = 0.09 2" = 0.16

3" = 0.37

2.5" = 0.26

3.5" = 0.50

4" = 0.65



Groundw Project No.	ater Sa	mple Lo		2DI 40		W 1115	~	4.600.0			age	of
	n// anation		30001992.3			Well ID	FIBL-1	980PC				120
Project Nam Measuring P Description (circle one)	t. TOC	/GS	Screen Setting (ft-bm) Static Water		-44,5'	Casing Diameter (in.	1"			Weather Well Mat	erial	PVC \$S Other
Total Depth		15	Level (ft-bmp)		13	Water Colum				Gallons in	Well	
Calc. Gallons Gallons Purg			Pump Intake		NIM	Purge Metho	PDB			Sample Methoc_	G	irab
Sample Tim			Replicate/	1	NM		Bladder Other Peristaltic	CHECK		Pump Or		152/150
Time	Minutes	Gallons	Code No. Depth to	Temp.	Cond.	Dissolved		ORP		Sampled		ffey/M.Blow earance
	Elapsed	Purged	Water (ft) TOC		(µmhos) (mS/cm)	Oxygen (mg/L)	pН	(mV)	Turbid (NTU		Color	Odor
1451	0	0.50	NM	29.89	6.047	3,54	5,54	91	OVE	2	BEREW	HOVE
1500	-SAn	MPLED	FTBL-199	80PC - 01-	6W-093	3000 -						
										-	_	
										-		
							120			-		
							30/20					
				/	10							
	-				9							
		_			J					\rightarrow		
								-		-		
Constituents					Container				Number	Pi	reservativ	е
PFAS 18 Con	npounds (s	ee lab rep	ort for details)	,	250ml HDP	E			2	No	one	
					-			C 14		,—		
										-		
										_		
								100	_	-		
										_		
										- 7		
Well Information	tion											
Well Loca	ation:	FIBL	-1980FC	-DI			Well I	ocked at A	Arrival:	Yes	1	No
Condition of	-		Good Condition				Well Lock	ked at Depa	arture:	Yes	1	No
Well Comp	oletion:	Flo	ush Mount	/ Stick Up			Key	Number To	Well:			
NOTES:												
Noll Cesisor	/alumasa					7-77						
Well Casing \ Sallons/Foot	1" = 0.04	1.	5" = 0.09 2.5	5" = 0.26	3.5	" = 0.50	6" = 1.47					

1" = 0.04 1.25" = 0.06

2" = 0.16

3" = 0.37

4" = 0.65



Groundw	ater Sa	mple Lo	og								Page	of [
Project No.			30001992	3DL10		Well ID	F18L-19	SOPC-DE	2-60	Date	9/30	120
Project Name	e/Location			Army PFAS Pi	rogram SI - F	ort Belvoir, V	irginia			Weath	ier	
Measuring Pt Description (circle one)		/ GS	Screen Setting (ft-br	np) 34'-38	1	Casing Diameter (in.)	- 11			Well M	Material	PVC SS Other
Total Depth (ft-bmp)	38'	Static Water Level (ft-bmp	33.81		Water Colum	nn in Well	4.80	9'	Gallons	s in Well	0.19
Calc.Gallons	Purged	0.53	Pump Intak	e (ft-bmp) 34	1	Purge Metho				Sample	e	
Gallons Purg	ed 1.7	15	MP Elevation	on	NM		PDB Bladder			Method	dG	rab
Sample Time	e: Label	1	Replicate/ Code No.	FIBL-1980PC	-02-66	0.093020	Other Peristaltic				On/Off 12	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turb (N7	idity		arance
1210	0	6.00	NN	25.25	0.052	3.28	5,44	151	OVE		BROWN	NOWE
1215	5	0.75	NM	22.80	0.033	2.43	5.59	116	11	55.	и	1,
1220	10	0.50	NM	21.69	0.031	2.96	5.59	115	, it		11	11
1235	15	0.75	NM	20.99	0.030	3.19	5.56	116	1	1	N.	11
1236	20	1.00	m	20.95	0.030	3.72	5.55	117	1	, ,	11	N
1295	~ SAA	ipced	FTBL-19	80PC-DZ-0	(u) - 0 93							
						0/2	0/10					
					Vac	417	1				-	
					July							
					/		-					
									-			
Constituents PFAS 18 Com			ort for details	s)	250ml HDP	PE			Number 2		None None	е
Well Informat	ion									. ,		
Well Loca	ition:						Well	Locked at	Arrival:	Ye	s /	No
Condition o	-		Good Condit				Well Lock	ked at Dep	arture:	Ye	s /	No
Well Comp	letion:	Flo	ush Mount	/ Stick Up			Key	Number To	o Well:			
NOTES:												
Well Casing V	olumes											

Gallons/Foot

1" = 0.04 1.25" = 0.06 1.5" = 0.09

2.5" = 0.26 2" = 0.16 3" = 0.37

3.5" = 0.50 4" = 0.65



Groundw	ater Sa	mple Lo	og							Page	of (
Project No.			30001992	.3DL10		Well ID	FIBL-N	W-IR	Date	-	olza
Project Name	e/Location			Army PFAS Pr	ogram SI - I	Fort Belvoir, V	'irginia		Weat		Saucy
Measuring Properties Description (circle one)		C/GS_	Screen Setting (ft-bi			Casing Diameter (in.	2"		Well	Material	PVC SS Other
Total Depth (ft-bmp) is	4420'	Static Water Level (ft-bm)			Water Colum	nn in Well		M Gallor	ns in Well	NM
Calc.Gallons	Purged		Pump Intak	(e (ft-bmp) is		Purge Metho	od:		Samp		
Gallons Purg	ed		MP Elevation	on	NM		PDB Bladder		Metho)C	Grab
Sample Time	e: Label		Replicate/ Code No.	FIBL-MW-	IR		Other Peristaltic	V			073 1652 offey/M.Blower
Time	Minutes Elapsed		Depth to Water (ft) TOC	Temp.	Cond. (µmhos)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidity (NTU)		earance
1625	0	0.25	Nin	28.06	0.302	1.69	5.68	-12	168	CLEAR	NONE
1630	5	0.50	NM	26.44	0.282	0.88	5.63	-6	77	li li	11
1635	10	0.75	NN	25.43	0.294	0.73	5.42	-)	36	4	fi
1640	15	1.00	NH	24.22	0.298	0.68	5.44	-13	28	Ĥ,	11
1645	20	1.25	NM	24.13	0.304	0.63	5.46	22	12	1.1	11
1650	-SAN	PLED	FIBL-1	NW-12-00	3020						
							Las				
					Mar	3 91	30/20			1	
				1	fice						
				-	1						
					1						
Constituents	Sampled				Container				Normalian	D	
PFAS 18 Con			ort for detail	(2)	250ml HDF	DE .			Number	Preservativ	ve
		700 100 100	ore for dotain	5)	2001111101				2	None	
-											
		-									
Well Informat	tion										
Well Loca	ation:		HANGAR	3232			Well I	Locked at	Arrival: Y	es /	No
Condition o			Good Condi					ked at Dep		es /	No
Well Comp	ietion:	FI	ush Mount	/ Stick Up			Key	Number To	o Well:		
NOTES:											
Well Casing \	/olumes										

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2.5" = 0.26

2" = 0.16 3" = 0.37

3.5" = 0.50 4" = 0.65



Groundwa	ater Sa	mple Lo	g								Page	of
Project No.			30001992	.3DL10		Well ID	FIBL-H	7232-0	×-6W	Date	9/3	0/20
Project Name	e/Location		- P-	Army PFAS P	rogram SI - I	Fort Belvoir, V	irginia			Weath	er 65°F	SHENCY
Measuring Pt Description (circle one)		/GS	Screen Setting (ft-br		<u>. </u>	Casing Diameter (in.)	_1"			Well M		_PVC _SS Other
Total Depth (f	ft-bmp)	41	Static Water Level (ft-bm)	2	i	Water Colum	nn in Well	4.2	+	Gallons	in Well	0.16
Calc.Gallons	Purged (84.0	Pump Intak			Purge Metho				Sample	е	
Gallons Purge	ed 1.	25	MP Elevation	on	NM		PDB Bladder			Method		Grab
Sample Time	e: Label		Replicate/ Code No.	FTBL-H3232	-01-62	-0930ZO	Other Peristaltic	-/	_	Pump (53/1824
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (~F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi (NT	idity		offey/M.Blowe earance
\$7:55	0	0,00	NW	20.74	0.048	6-47	5:48	145.7	146		prown	Odor
18:00	5	0.25	NW	20,56	0.045	4.58	4.98	14.6	1461		1)	NONE
1805	10	0.50	NM	20.41	0.045	5.08	5.00	98.9	1459		35.	n
1810	15	0.75	NM	20.25	0.045	5.05	2.70	86.9	1457		31	31
1815	20	1.00	NM	20.18	0.044	5.04	2.48	94.9	1457	40.0	11	11
1850	- SAY	npled	FTBL-H	3232-01-0	W-093	020 -						
Constituents PFAS 18 Com		see lab rep	ort for detail	s)	Container 250ml HDF	20	130/20		Number 2		Preservativ None	ve
Well Informat	ation:						Well	Locked at A	Arrival:	Yes	s /	No
Condition o			Good Condi					ked at Dep	40000	Yes	s /	No
Well Comp	neuOII.	r)(ush Mount	/ Stick Up			Key	Number To	vvell:			
Well Casing V	/olumes		-									

Gallons/Foot 1" = 0.04 1.25" = 0.06

1.5" = 0.09 2" = 0.16

3" = 0.37

2.5" = 0.26

3.5" = 0.50 4" = 0.65



Groundwa	ater Sar	mple Lo	g								Page	of \
Project No.			30001992.	3DL10		Well ID	FIBL-FI	BUAFS-	01-60	Date	10/1	120
Project Name	/Location			Army PFAS Pr	ogram SI - F	Fort Belvoir, V	irginia			Weath	er 68°F	SUECCASH
Measuring Pt. Description (circle one)		/ GS	Screen Setting (ft-bm			Casing Diameter (in.)	_\"			Well M	aterial	PVC SS Other
Total Depth (fi	t-bmp)	19'	Static Wate Level (ft-bmp	1		Water Colum	n in Well	2.50	0	Gallons	in Well	0.10
Calc.Gallons		0.30	Pump Intak	A. A.		Purge Metho	d:			Sample		
Gallons Purge		30	MP Elevation		NM		PDB Bladder			Method	G	rab
Sample Time	: Label		Replicate/ Code No.	F			Other Peristaltic	-	_		On/Off 174	3/18/Z ffey/M.Blower
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbic (NT	dity		earance
1745	0	0.00	NM	22.43	0.083	6.21	4.61	173.4	1470		BROW	MOVE
1750	5	0.25	NA.	20.71	0.076	5.27	4.62	162.9	146	3.6	- 11	- 11
1755	10	0.50	NM	20.37	0.072	3.88	4.61	140.2	1459	,0	11	- 11
1800	15	0.75	NM	20.15	0.071	3.58	4.66	134.4	1456	p.7	16	It
1805	26	1.00	NM	19.98	0.070	3.31	4.72	130.0	466	.3	CLEAR	11
1810	-1 SAN	PLED	FYBL-F	BNAFS-01	-GW-11	0310						
								_				
							10/10		*		-	
	1				1	1	16/110					
					A				-			
					1						-	
										~~~	5	
Constituents				-1	Container				Number		Preservativ	/e
PFAS 18 Con	npounds (	see lab re	port for detail	(S)	250ml HDI	<u> </u>			2		None	
		-										
Well Informa	tion											
Well Loc	ation:		FBNA F	RE STATIO	)		Well	Locked at	Arrival:	Ye	es /	No
Condition of	of Well:		Good Cond				_ Well Loc	ked at Dep	parture:	Ye	es /	No
Well Com	oletion:	F	lush Mount	/ Stick Up			Key	Number T	o Well:			
NOTES:												
Wall Casing	Volumos											

Well Casing Volumes



Groundw	ater Sai	mple Lo	g								Page (	of \
Project No.			30001992.	3DL10		Well ID	FIBL-F	BUAFS-0	12-GW	Date	10/1/2	0
Project Name	e/Location			Army PFAS Pr	ogram SI - I	Fort Belvoir, V	irginia			Weathe	er 65%	CUERCAST
Measuring Pt Description (circle one)		/GS	Screen Setting (ft-bn		41	Casing Diameter (in.)	1"			Well Ma	aterial	PVC SS Other
Total Depth (	ft-bmp)	24'	Static Wate Level (ft-bmp			Water Colum	nn in Well	3.89	1	Gallons	in Well	0.16
Calc.Gallons	Purged (	8P.C	Pump Intak			Purge Metho				Sample	,	
Gallons Purg	ed 1.2	5	MP Elevation	on	NM		PDB Bladder			Methoc		rab
Sample Time	e: Label		Replicate/ Code No.				Other Peristaltic		_		On/Off 141 ed by J. Cof	3/1442 fey/M.Blower
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (nS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turb (NT	idity		Odor
1615	0	6.00	M	20.00	0.241	5.14	4.75	166.0		1.8	BROWN	HOUR
11620	5	0.25	NM	19.24	0.242	4.03	4.61	166.0	510		11	11
1625	10	0.50	M	19.37	0.241	3.32	4.61	163.1	805	.6	CLEHRNG	71
1630	15	0.75	NM	19.27	0.244	3.19	4.62	161.1	456	.3	- 11	is
1635	20	1.00	NM	19.2Z	0.246	2.88	4.67	155.5	186	.6	Vi	14
Constituents PFAS 18 Con			port for detail	s)	Container 250ml HD		iolitza		Number 2		Preservativ	е
Well Informa Well Loc Condition Well Com NOTES:	eation: of Well:	F	Good Cond lush Mount	ition / Stick Up			Well Loc	Locked at ked at Dep	arture: _	Ye Ye		No No
Well Casing	Volumes											

Well Casing Volumes

Gallons/Foot 1" = 0.04

1.25" = 0.06

1.5" = 0.09 2" = 0.16

2.5" = 0.26 3" = 0.37

3.5" = 0.50 4" = 0.65



Groundwa	ater Sa	mple Lo	og								Page 1	of 1
Project No.			30001992.	3DL10		Well ID	FIBL-MC	37- MUC	2	Date	10/1/2	20
Project Name	/Location			Army PFAS Pr	ogram SI - I	ort Belvoir, V	rginia			Weath	ner Partly	cloudy (
Measuring Pt Description (circle one)		C/GS_	Screen Setting (ft-br			Casing Diameter (in.)	2.0"				Material X	
Total Depth (f	t-bmp) 2	7.80	Static Water Level (ft-bmp	11/00/		Water Colum	n in Well	16.75	,	Gallon	s in Well 2	
Calc.Gallons			Pump Intak			Purge Metho				Sampl		
Gallons Purge	-	1.45	MP Elevation		NM	.,	PDB Bladder			Metho		rab
Sample Time	: Label	1102	Replicate/ Code No.	flow rate:	250nL/1	nin	Other Peristaltic		x			ffey/M.Blower
Time	Minutes Elapsed		Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi (NT	idity	-	arance Odor
1040	0	0	11.08	-	(me/em/	- WM			(14)	<u> </u>	COID	Oddi
1045	S	0.33	11.30	16.33	0.086	0.00	5.37	144	46.9	,	clear	Abop
1050	10	0.66	11.40'	16.05	0.085	0.00	5.30	141	87.		clear	None
1055	15	1.00	11.49'	15.87	0.085	0.00	5.27		17.3		Clear	None
1100	20	1.33	11.50'	15.40	0.085		5.26	138	11.5		Clear	None
1104	Purp	osf. 5	ample co	llected @	11:0	2.						
						1		-				
					/	with	h					
					6	1000						
Constituents	Sampled				Container				Number		Preservativ	0
PFAS 18 Com			ort for detail	s)	250ml HDF	PE			2		None	e
											110110	
					_							
			-									
								la la	_	4.	-	
Well Informat			11-1 0	100 51	- 10.11	-1 5						
Well Loca Condition o		See W		APP Figure	8 / Field	Change to		Locked at		(Ye	~	No
Well Comp		FI	Good Condi ush Mount	/ Stick Up				ked at Dep Number To	- D. N	(Ye	es /	No
NOTES:							ricy					
Well Casing V	olumes											

Gallons/Foot 1" = 0.04 1.5" = 0.09 1.25" = 0.06

2'' = 0.16

3" = 0.37

2.5" = 0.26

4" = 0.65

3.5" = 0.50 6" = 1.47



Groundw	ater Sa	mple L	og							Pa	ge [	of
Project No.			30001992	.3DL10		Well ID	FTBL-PS	A2609-11	V42	Date 0	9/30	126
Project Name	e/Location			Army PFAS F	Program SI - F	Fort Belvoir, V	/irginia			Weather	Sunn	4. 70°F
Measuring Pt Description (circle one)		gy GS	Screen Setting (ft-br			Casing Diameter (in.	2.0"	-		Well Mater	rial	PVC SS Other
Total Depth (	t-bmp) 29	1.90'	Static Water Level (ft-bm)	21.41		Water Colur	nn in Well	8.41		Gallons in V	Vell [	.35 gal
Calc.Gallons	Purged	1.33	Pump Intak	e (ft-bmp)		Purge Metho				Sample		
Gallons Purg	ed 1	.40	MP Elevation	on	NM		PDB Bladder			Methoc		Grab
Sample Time	: Label	14:07	Replicate/ Code No.	flow Rate:	= 250mL/m	in	Other Peristaltic		(		1	45/1409 offey/M.Blower
Time	Minutes Elapsed	100 100 100	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbid (NTU	dity		Dearance
1345	0	0	21.41			(11.51-)			1111	-	OOIOI	Oddi
1350	5	0.33	2195	20.01	0.084	19.38	4.82	292	50.5	, c	lear	None
1355	10	0.66	21.95	19.46	0.082	2.38	4.71	316	29.7	2 (	lear	None
1400	15	1.00	21.98	19.36	0.082	1.81	4.66	329	19.3	CI	lear	None
1405	30	1.33	22.02	19.25	0.081	1.56	4.62	336	10.8	Ck	901	None
1409	Pump	०६५.	Sample	collected	@ 14:0	77.						
										_	_	
					1	1/10						1
					stier	M	-					1
					7						-	
Constituents	Sampleo				Container				Number	Dec	eservati	iva
PFAS 18 Con			oort for detail	s)	250ml HDF	)F			2	Nor		ve
	,		ore for dotall		20011111111	_		- 1		1401	16	
										-		
										_ =		
										<u> </u>		
										_		
					-					_		
	-				-					-		
					-					· ·		
Well Informat	tion											
Well Loca			w.11.555.51					Locked at		(Yes)	1	No
Condition of Well Comp		XF.	Good Condi	/ Stick Up				ked at Dep Number T		(Yes)	1	No
NOTES:									<del>-</del>			
Well Casing V	/olum											

3.5" = 0.50

4" = 0.65



	-						FTBL- F.				0/20
Project Nam	e/Location			Army PFAS P	rogram SI - F	ort Belvoir, Vi	irginia		We	eather Sun	14, 750
Measuring P Description (circle one)		C/GS	Screen Setting (ft-br	mp)		Casing Diameter (in.)	2.0"		We	ell Material	PVC SS
Total Depth	(ft-bmp)	1.25	Static Water Level (ft-bmp			Water Colum	ın in Well	3.76	Gal	lons in Well O.	_Other
Calc.Gallons	Purged	1.8	Pump Intak	(e (ft-bmp)		Purge Metho				mple	
Gallons Purg	jed	. 5	MP Elevation	on	NM		PDB Bladder				Grab .
Sample Tim	e: Label	1103	Replicate/ Code No.	Flow Rate	: 280 AL	/rin.	Other Peristaltic		X	mp On/OffC	
Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidity (NTU)	200	Dearance
1051	0	0	15.49'						V		0.00
1056	5	.36	17.15'	26.09	1.92	28642	4.81	288	0.0	Clear	None
1101	10	.72	17.32	20.05	1.92	1.00	4.64	309	0.0	Clear	None
1101	20	1.08	17.78'	19.82	1.92		4.58	323	0.0	Clear	None
11005	-	.220	1-		1103	0.42	4.63	326	6.0	Clear	None
	1 curip	033.	Davible (	DIEGGE C	1105						
					1/,	11,		_			
				/	Just 10	an					
		_									
Constituents					Container				Number	Preservati	ve
PFAS 18 Con	npounds (	see lab rep	ort for details	s)	250ml HDP	E				None	
										-	
										-	
					_					-	
										-	
									-		
Well Informat	tion										
Well Loca	ation:	See &	APP Add	lendum Fig	que 8.		Well	Locked at	Arrival:	Yes /	No
			Good Condit	The state of the state of			Well Lock	ked at Dep	parture:	Yes /	No
Condition o		PE	ush Mount	/ Stick Up			Kev	Number T	o Well:		
Condition of Well Comp				100	C. 20		,				
			g Fairfax	100	orkway	entrance	ramp,				

Gallons/Foot

1.25" = 0.06

2" = 0.16

3" = 0.37

3.5" = 0.50

4" = 0.65



Groundw Project No.	ator of	inpic L		20140		W #16	PO / A	10012		Page /	of \
	o/l anation		30001992			Well ID		126-LTP			726
Project Name Measuring P		-	Screen	Army PFAS	Program SI -		/irginia			ther Sunny,	7 20 3 7 =
Description (circle one)		C/GS	Setting (ft-b	pmp)		Casing Diameter (in.	2.0"	_	Well	Material *	_PVC _SS
Total Depth (	ft-bmp) 2	2.75	Static Wat Level (ft-bm	er p) 3.68'		Water Colur	nn in Well	19.07	Gallo	ns in Well 3	Other
Calc.Gallons	Purged	1.33	Pump Inta			Purge Metho			Sam	_	1.
Gallons Purg	ed	1.30	MP Elevati	on	NM		PDB Bladder		Meth	юс	Grab
Sample Time	e: Label	0907	Replicate/				Other Peristaltic	_ X		p On/Off Of	
Time	Minutes		Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen	рН	ORP (mV)	Turbidity		offey/M.Blo earance
3845	0	0	3.68'	1.7	(IIIS/CIII)	(mg/L)			(NTU)	Color	Odor
0850	5	0.33	4.36	16.36	0.165	0.00	5.95	35	547	Yellow	Nemo
9855	10	0.66	4.37	16.31	0.163	0.00	6.00	48	299	Clear	More
000	15	1.00	4.37	16.13	0.164	0.00	6.03	42	66.9	Clear	None
0905	20		4.37	16.09	0.163		6.02		62.3	Clear	None
0907	Sam	ple fo	ten. F	ump off	@ 090						
						T					_
					1,	ml					
	-				1/1	flu					
					June						
	-										
onstituents					Container				Number	Preservativ	/e
FAS 18 Com	pounds (	see lab rep	ort for detail	s)	250ml HDP	E			2	None	
				, a				0			
	-					_					
					-						
								0 1			
					-						
							_				
ell Informati	ion										
Well Loca		See al	APP Add	endum Fil	gure 8		Mall	Landina d' au		3	7
Condition of			Good Condi		Jus 0			Locked at / ked at Dep	->	es) /	No
Well Compl	etion:		sh Mount	/ Stick Up				Number To		es	No
OTES:											
	*										
			1								

1" = 0.04 1.25" = 0.06

2" = 0.16

2.5" = 0.263" = 0.37

4" = 0.65



Groundw	ater Sa	ample L	.og							Page	of _
Project No.	-		30001992.	3DL10		Well ID	FTBL-1	M18-W	W31 Da	te <u>09/29</u>	120
Project Name	e/Location			Army PFAS P	rogram SI -	Fort Belvoir, \	/irginia		We	eather Cloud	dy, 69°
Measuring Properties Description (circle one)		C/GS	Screen Setting (ft-bri	np)		Casing Diameter (in	2.0"				PVC SS
Total Depth (	ft-bmp) IS	.20'	Static Wate			Water Colu	mn in Well	11.29	Gal	lons in Well	_Other .80 ga/
Calc.Gallons	-		Pump Intak	e (ft-bmp)		Purge Meth				mple	
Gallons Purg	ed	1.30	MP Elevation	on	NM		PDB Bladder				Grab
Sample Time		1612	Replicate/ Code No.				Other Peristaltic	x		mp On/Off_15	
Time	Minutes Elapsed	the second second second second	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbidity (NTU)		Dearance
第1550	0	0	3.91								
1555	5	0.33	4.01	19.92	0.001	11.20	9.05	90	255	Clour	Nonp
1600	10	0.66	4.04	19.34	0.000	9.72	8.89	92	241	Clear	None
1605	15	0.99	4.14	19.17	0.000	8.70	8.70	85	240	Clear	None
1610	- Sa	1.23	4.16	19.01	0.000	8.17	8.55	78	241	Clear	None
1012	- 30	papue (	collected	. Punp o	ff at	1614					
		-				/					
				N	Ma					-	
		1		J.							
										_	-
		/ =									
Constituents	Sampled				Container				Number	D	
			port for details	(;	250ml HDP	o E				Preservati	ve
				,	<u> LOOMIN NIDI</u>	_				None	
										-	
			-								
Well Informat	ion										
Well Loca	tion:	are an	PP Adden	dun Figur	68		Well I	Locked at	Arrival: (	Yes)	No
Condition of			Good Conditi				Well Lock	ked at Dep	arture:	Yes /	No
Well Compl	etion:	F	lush Mount	/ (Stick Up)			Key	Number To	o Well:		
NOTES:											
Vell Casing V	olumes										

V

Gallons/Foot 1" = 0.04 1.25" = 0.06

3.5" = 0.50

4" = 0.65



Project No.			30001992	2.3DL10		Well ID	AOPC20	-MWO2		Date	09/29/	20
Project Name	/Location			Army PFAS P	rogram SI -	Fort Belvoir, V						7801
Measuring Pt. Description (circle one)			Screen Setting (ft-b			Casing Diameter (in.		71			aterial X	PVC SS
Total Depth (fi	t-bmp) 23	.6g'	Static Wat	er 5.13'		Water Colum	nn in Well	18.47		Gallons i	n Well 2.	_Other
Calc.Gallons I	Purged	1.66		ke (ft-bmp)		Purge Metho		10-11		Sample		10 gal
Gallons Purge		1.62	MP Elevati		NM	, algo moule	PDB Bladder			Methoc		Grab
Sample Time	: Label	14:02	Replicate/ Code No.				Other Peristaltic	X				:40/1
Time	Minutes Elapsed	0.000	Depth to Water (ft) TOC	Temp.	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	рН	ORP (mV)	Turbi	dity	App Color	offey/M.Blo bearance
13:40	0	0	23.605		0.000	9.10	4.32	382	43		Clear	None
13:45	5	0.53	5.75'	23.88	0.000	8.00	4.21	371	422	_	Clear	None
13:50		0.66	5.93'	28.49	0.002	8.04	4.09	351	499		Clear	None
13:55	15	1.00	6.01	25.08'	0.002	7.39	4.07	317	473		Clear	None
14:00	20	1.33	6.09'	22.77	0.002	6.86	4.09	225	431		clear	None
14:62	Sample	tate	9. Puns		04				1			140-8
						/						
				,/	Who	1						
				Just	10.0	14.5						
												12
							_					
constituents :	1.00				Container				Number	F	reservati	ve
FAS 18 Com	pounds (s	see lab rep	oort for detail	s)	250ml HDF	PE			_ 2	1	None	
					-					_		
								A 11 (11 )		-		
										-		
					_					-		
					_			6.1		-		
					-			4 (3	-	-		
										-		
								1 10	-	n <del>é</del>		
ell Information												
Well Locat	tion:	See GA	PP Addendo	un Figure	#8		Well	Locked at	Arrival:	Yes	) /	No
	ochorn, all		Good Condi	tion			Well Loc	ked at Dep	arture:	Yes	5 1	No
Condition of	etion:	Fl	ush Mount	/ Stick Up			Key	Number To	o Well:			
Condition of Well Comple												

1.25* = 0.06

2" = 0.16

3" = 0.37

4" = 0.65



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Client	Report to	Conta	ct						1	PFI	10		Telep	hone	No.	/ E-m	ail						Quote No.
AKCADIS	AFTON			131	ug	IN	COF	FE		Em		_	JUS	110,	COF	FEY	EAK	choi	Sicol	m			
Address	Sampler's	Signa	ature	1									Analy	rsis (A	ttaci	h list i	more	space	is need	led)			1 4
9954 MAYLAND DR. SUITE 2400		(		100	0								6	-	-								Pageof
City State Zip Code VA 23233	Printed No.	ame	1			-							3										Lot # Bar Code (lab use only)
Project Name FOLT BELLIOIR ARMY PEAS SI PROGRAM	, ,	ust	110	a	TFE	EY							OnnPo				EF EF						
Project No. 30001997, 3000		rab	Λ	/latrix					Conta ervativ				180				150						- 4
Sample ID / Description Collection (Containers for each sample may be combined on one line.)  Collection Date(s)	Collection Time (Military)	G=Grab C=Composi	Aqueous	Non- Agusous	enough w	Unpres.	H2SO4	HNO3	HCI	NaOH	5035 Kit	Field	PFRS		2	Ha	GRAIL						Remarks / Cooler I.D.
TBL-NATS-01-50-092720 09/21/20	0915	6	X			4							X	X		X	X						
TBL-NPFS-02-50-0927200 09/27/20	0945	G	X										X										
FTBL-NPFS-O1-GW-092720 09/27/20	1140	6	X		1	2							$\times$			,	,						
FTBL-B1436-01-50-092720 09/27/20	1340	6	X		L	1		1					$\langle \rangle$	X		X	X						
FTBL-B1436-02-50-092720 09/27/20	1355	6	X			Ц																	Section Control
FIBL-B1436-01-GW-092720 09/27/20	1600	6	X		- 1	2							$\geq$		,								
FIBL-LYCF-01-50-092720 09/21/20	1730	6	X		t	4							X	X		X	X						
FIBL-LUCF-01-6W-092720 09/27/20	1822	6	X			2							X										
FTBL - B707-01-GW-1928200 09/18/20	0905	6	X			2		1					X										
TBL-DAAF-01-6W-092820 09/28/20	1335	G	X			6							X	1									*MS MSDX
Turn Around Time Required (Prior lab approval required for expedited TA  Standard   Rush (Specify)	Sample Disp		Dis	posal	by La							cation mable		Skin II	ritant	(q)	Poison	□ Un	known	QC	Require	ements	(Specify)
1. Relinquished by (Matt Blower)	Date 10/1/	20	Tir	ne 7	15	1	l. Re	ceive	ed by	,					1					Date	,	Tiı	me
2. Relinquished by	Date	1	Tir	ne	1	2	2. Re	ceive	ed by				1				\			Date	,	Tir	те
3. Relinquished by	Date		Tir	ne	1	3	B. Rei	ceive	ed by	123		1		1		1				Date	,	Til	me
4. Relinquished by	Date		Tir	ne		4	l. Lat	orat	tory r	ecei	ved I	by	\	1			1	1		Date	,	Tii	me
	Note: All samples are retained for four weeks from receipt unless other arrangements are made.									Y e (C	ircle,	) Ye	es I	No	Ice I	Pack	A	eceipt	Temp		°c		emp Blank 🗆 Y 🗆 N



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Client		Report to	Conta	ct									Tele	phone	No /	/ F-ma	ail					-	Quote No.
ARCADIS		AFTON			N	1511		re	CEY	1/2	PF I	ALL		SEE.									Quote 140.
Address		Sampler's	-	-	-16	4)11	2	u	T Nan J	10	1 1 1 1	1 1	_	alysis (A			f more	space	is need	ded)	,		/1
9954 MAYLAND DR. SUITE 2	400		/		à								1	ay old (r				opaco.	0 11000	,			Page 2 of 4
	ip Code	X	1	8	9	<			خ	11.7				N N									Lot # Bar Code
RICHMOND VA	23233	Printed Na												THE							, and		(lab use only)
Project Name ET BEWOIR ARMY PEAS SI	PROGRAM	I. Ji	SII	NC	OF	FE	1							DANS			E						
Project No. 30001992 - 3000	P.O. No.		G=Grab -Composite	N	latrix					ontain vative			-	2	J		RAIN SI						
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G=Con	Aqueous	Non- Aqueous	1 famous	Unpres.	H2SO4	HCI	NaOH	5035 K#	Fillered	2	778	201	Hd	GRA						Remarks / Cooler I.D.
F18L-DAAF-01-50-092820	09/18/20	1334	6	XX		u							X	X		X	X						
DUP-1=092820	09/18/20	-	6	>		Burton					N. Carlotte		×										
FTBL-DHAF-02-50-092826	09/28/20	1350	6	X		13	3						X										*MS MSD+
F1BL-12-01-50-092820	09/28/20	1600	G			1	1						X	$\times$		X	X						
F1BL-12-01-6W-092820	09/28/20	1655	6	X.		2			-				X										
DUP-1-092820	09/25/20		6	X		1	4						X	>									and the second s
F18L-12-03-6W-092820	09/28/20	1850	6	X		1	6						X										tms/mspt
FIBL-12-02-50-092920	09/29/20	0900	6				1		-				X										
F1BL-12-02-6W-092920	09/29/20	0945	G	Ă		1	2						X	>									
FIBL-H3145-01-50-092920	四月到120	1135	6	X		1							X	X	/	X	$\times$						
Turn Around Time Required (Prior lab approval required  Standard Rush (Specify)	for expedited TAT.)	Sample Disp		Disp	oosal	by Lat	1	1				tificati ımmab		Skin Ir	ritant		Poison	□ Un	known	QC	Requir	rements	s (Specify)
1. Relinquished by Matt	Blower)	Date	0/1/	Tin	ne 17:	15	1.	Rece	eived	by										Date	9	T	îme
2. Relinquished by	ne		2.	Rece	eived	by										Date	9	T	īme				
3. Relinquished by	ne		3.	Rece	eived	by										Date	9	T	īme				
4. Relinquished by	elinquished by Date Time									ry rec	eive	d by								Date	9	T	īme
Note: All samples are retained for four weeks from receipt unless other arrangements are made.								AB US			(Circ	de)	Yes	No	Ice P	Pack	F	leceipt	Temp			°C Te	emp Blank 🗆 Y 🗅 N



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Client		Report to C	Contac	t	-							Telen	hone No	) / F-m	ail						Quote No.
ARCADIS		AFTON			7.0	OF	EFY	10	FUS	51			FF F								Quote No.
Address		Sampler's				-	70.7	1	1 1 1 2			-	sis (Atta		-	space is	s need	led)			
9954 MAYLAND DR. SUITE ZHOD	>		1	2																	Page 3 of 4
City State Zip Code VA 232:		X	ne				•	-	-			LUIS									Lot # Bar Code (lab use only)
Project Name FORT BELWOIR   ARMY PEAS SI PRO		JU	STI	00	OF	FY					+	COMPE			LE						
Project No. P.O. 30001992.3010	No.		rab posite	Má	atrix				ontaine			(18)			不						
		llection Time (Military)	G=Grab C=Composi	Aqueous	Non- Aqueous	Unpres.	H2SO4	HNO3	NaOH	5035 Kit	Field	PFHS	10	H	CRAIN						Remarks / Cooler I.D.
F184-H3145-01-6W-092920 09	29/20 1	225	6	X		2						X									
FIBL-83121-03-50-092920 09/2	29/20 1	330	6	X		1						X									
FIBL- 83121-03-6W-092920 09/2	29/20 1	445	6	X		2						X									
FIBL-OSPFS-01-50-092920 04/2	19/20/1	615	6	X		4				-		X	X	X	X						
TBL-05PFS-02-50-092920 9/2	29/200 1	645	6	X		1						X									1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
FTBL-OSPFS-01-6W-092920 091	29/20 1	755	6	X		2						X									
DUP-3-0979700 09/2	29/20 -		6	(		Z						$\Delta$									
FTBL-1980PC-02-50-093010 09/	/ 1	900	6	X		1			100			X									
FTBL-1980PC-01-50-1093020 09/	130/20 1	1200	G	$\wedge$		4						X	X	X	X						
FTBL-1980PC-02-6W-09302009/		235	6			2						X									
Turn Around Time Required (Prior lab approval required for expense)  Standard   Rush (Specify)		ample Dispo		Dispo	sal by						<i>fication</i> nmable		Skin Irrita	int 🗆	Poison	□ Unkı	nown	QC I	Require	ments	(Specify)
1. Relinquished by (Matt Blower)		Date 10/1/2	20	Time	15		1. Red	ceivea	by									Date		Tii	me
2. Relinquished by		Date		Time	9		2. Red	eived	by	T T								Date	1 7 - 4	Tii	me
3. Relinquished by		Date		Time	)		3. Red	eived	by									Date		Tii	me
4. Relinquished by	elinquished by Date Time								ry rec	eived	by							Date		Til	me
	Note: All samples are retained for four weeks from receipt unless other arrangements are made.									Circle	e) Ye	es M	No Ice	Pack	R	eceipt Te	emp		°C		emp Blank 🗆 Y 🗆 N



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Client		Report to	Conta	ct	1			-11-		10	FA	<	Telep	phone No	. / E-n	nail						Quote No.
ARCADIS		ARIN			13	us:	11	COF	FEY	/E	MA	iL	1	EE P								
9954 MANUAND DR. SUITE	7400	Sampler's	Signa	iture		113							Analy	lysis (Atta	ch list	if more	space	is need	led)			Page 4 of 4
City State Zi	p Code	X	(	E	2	_					- 8		0	5								Lot # Bar Code (lab use only)
	23733	Printed Na	7			-							PENS	3						111		(lab use only)
FORT BEWUR ARMY PERS	SI PRECERN	y J	ust.	IA	) CT	XI	k	7					5	3								
Project No.	P.O. No.		rab posite	1	Matrix				o of Co Preserv				2/18	3								
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G=Grab C=Composit	Aqueous	Solid Non-		Unpres.	H2SO4	HCI	NaOH	5035 Kit	Field	pro									Remarks / Cooler I.D.
F18L-1980PC-01-6W-093070	09/30/20	1500	6	X			2						X									
FIBL-MW-12-093020	09/30/20	1650	G	X			2						X						, -			
FIBL-H3232-01-6W-093026	09/30/20	1820	G	X			2				.4.		X									
FTBL-66-68-01-5W-290920	09/29/20	1015	G	X		(	5						X									* MS/MSD*
FTBL-A0PC20 - NW02-290920	09/29/20	1402	6	X		(	2						X									
FTBL-M18-MW31-290920	09/29/20	1612	G	X		10	2						X									
510up-2-290920	09/29/20	-	6	X		10	2						X									
FTBL-M26-LTM-06-300920	09/30/20	0907	6	X		0	2						X									
FTBL-FATTS-LTM-NWO8-300920	09/30/20	1103	6	X		1	2						X									
FTBL- PSA2009-MW42-300920	09/30/20	1407	6	X		C	2						X									
Turn Around Time Required (Prior lab approval required  Standard   Rush (Specify)	for expedited TAT.	Sample Dispe		Dis	posal	by La			le Haz ı-Hazaı					Skin Irrita	nt 🗆	Poison	□ Ui	ıknown	QC	Require	ements	s (Specify)
1. Relinquished by Matt Blows	r)	Date 10/1/2	10	Tir	me 7-15		1.	Rec	eived	by				8					Date	9	Ti	me
2. Relinquished by	Date		Til	me		2.	Rec	eived	by				411-7					Date	9	Ti	me	
3. Relinquished by	me		3.	Rec	eived	by									Date	,	Ti	me				
4. Relinquished by	Relinquished by Date Time								orator	y rece	eived	by							Date	9	Ti	ime
	Note: All samples are retained for four weeks from receipt unless other arrangements are made.									VLY ice (	Circle	e) Y	es i	No Ice	Pack	,	Receipt	Temp		°(	C Te	emp Blank 🗆 Y 🗆 N



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Client	et g	Report to	Conta	ct	6									Teleph	one No	o. / E-m	ail			F			Quote No.
ARCAGAS	1	AFTOL			5/	Ju	51	IN	CO	FF	EY	1		804	1.87	प.न	814	10	SIN	.00	FFE	4	
Address 9954 MAHLAND DR SUIT	E 2400	Sampler's	Signa	ture						1				Analys	sis (Atta	ach list	if more	space	is need	ded)			Pageof
City State Z		X	me	LA CONTRACTOR	_		_	_				9	4	m)									Lot # Bar Code (lab use only)
Project Name PT BEWOIR ARMY PEAS F			TUS	TIL	0	OFF	E	1						S. C.		المكاد				1			
Project No. 30001992.3040	P.O. No.		irab iposite	M	atrix				o of C Preser					FAS (1	a								
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G=Grab C=Composite	Aqueous	Non- Aqueous		Unpres.	H2SO4	HNO3	HCI	NaOH	5035 Kit	Filtered	PF	TCLP	Terp							Remarks / Cooler I.D.
FTBL-10W-6W-100126	10/1/20	1940	C	X			4						1 %	X	X				1	61			
F18C-10W-50-100120	10/1/20	1940	6	X			3						-	X	X	X							
END OF RECORD							-			-	-		our Service									-	
															-								
																							- Arriva
			IK Y						À								1						
									R. F.					in.				36					
																		-					
											1				44	Mag			4			1	
Turn Around Time Required (Prior lab approval require	d for expedited TAT.	Sample Disp		Disp	oosal	by La		Possit							Skin Irrit	ant 🗆	Poison	□ Ui	nknown	QC	Requi	remen	ts (Specify)
1. Relinquished by		Date 7	120	Tin	ne 140	0	1	I. Red	ceive	d by	/									Dat	е		Time
2. Relinquished by		Date		Tin	ne		2	2. Red	ceive	d by	,									Dat	е		Time
3. Relinquished by		Date		Tin	ne		3	B. Red	ceive	d by	,									Dat	e		Time
4. Relinquished by		Date		Tir	ne		4	1. Lat	orato	ory r	recei	ved i	by							Dat	e		Time
	Note: All samples are retained for four weeks from receipt unless other arrangements are made.										Y ce (C	ircle	) Y	es M	Vo lo	e Pack		Receipt	t Temp.			°C	Temp Blank 🗆 Y 🗆 N



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ARCHOIS			1947																					
Client		Report	o Conta	act										Telep	hone N	lo. / E-	mail							Quote No.
9954 MAYLAND DE SUITE	2400	SEE	PA	6E	-1			N.			nie.			SI	EF F	AGI	EL			-101				
Address		Sample	r's Sign	ature										Analy	isis (At	tach lis	t if mo	re spa	ce is ne	eded,	)			Page 2 of 2
	ip Code 23233	X	Name	X								- 1911		SOUN	6									Lot # Bar Code (lab use only)
Project Name FT BELVOIR ARMY PENS P			Tus	(NV	JC	.OFV	EY	l						Crmbour			1	7						
Project No. 30001997 3DLIO	P.O. No.		Grab mposite		Mati	rix					tainer			SIS				2						
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Tin (Military)	1 6	Aqueous	Solid	Aqueous	Unpres.	H2SO4	HINO3	HCI	NaOH	5035 Kit	Field	PEAS	TOC	He		CEA						Remarks / Cooler I.D.
F16L-E8-02-100120	10/1/20	1435	6	X			2							X										
F1BL-EB-03-100120	10/1/20	1446	6	X			2							X										
FYBL- EB-04-100120	10/1/20	1445	6	X			2							X					3 20					, 11°
FTBL-EB-05-1001Z0	10/1/20	1450	6	X			2							X										
F1BL-FB-02-100120	10/1/20	1500	6	X			2							X										1000
FTBL-FBNAFS-02-100120	10/1/20		6	14	X		1						No.	X										
FTBL-FBNAFS-02-6W-100128	10/1/20		6	X		الم	2			and the				X				1						
F18L-FBUAFS-01-50-100120	10/1/20		6	1	X		4							X	X	X	X		N					
FIBL-FBNAFS-01-6W-100126	10/1/20		6	X			2							X										
FTBL-FBNAFS-03-50-100120	10/1/20		6		X		1						Vac.	X										
Turn Around Time Required (Prior lab approval required  Standard Rush (Specify)	for expedited TAT.	Sample Di		e D	ispos	al by l			Marie Control				cation mable		Skin Irri	tant [	Pois	on 🗆	Unknow		QC F	Require	ement	ts (Specify)
1. Relinquished by		Date 10	420		ime 14	00		1. Re	eceiv	ed b	y	19									Date		T	Time
2. Relinquished by		Date		7	ime			2. Re	eceiv	ed b	у							t		E	Date		T	Time
3. Relinquished by		Date		7	Time			3. Re	eceiv	ed b	у										Date		Т	Time
4. Relinquished by		Date			īme			4. La	bora	tory	recei	ved I	by								Date		T	Time
Note: All samples are retaine unless other arran			receip	ot					USE eived			ircle,	) Y	es I	No Id	e Paci	k	Rece	ipt Temp	0			C To	「emp Blank □ Y □ N



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Client		Report to	Conta	ct			-						Telep	hone N	o. / E-n	nail		4		1		Quote No.
ARCADIS	211-20	AFTOL	145	35	1711	STIN	CO	FFE	V	MR	PIPE		TUS	OD.	O. /E-M	67 E	CAD	ADI	5, CE	2M		
Address		Sampler's		-					- (		* * 1				ach list							
9954 MAYLAND OR SWITE ZU	100			1									8									Page of 2
City State Zi	p Code 23233	Printed No	me	1	-								PANTE									Lot # Bar Code (lab use only)
Project Name FT BELUDIE   AIRMY PEAS PO	ROGRAM	JU	ASTI	DO	OF	FEY							Com			TE.						
Project No. 30001992 · 3 DL10	P.O. No.		-Grab vmposite	N	latrix		b			tainer: tive Ty			5	J		215 N						
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G=Con	Aqueous	Non- Aqueous	Unpres.	H2SO4	HNOS	HCI	NaOH	5035 Kit	Field	PEAS	To	Ha	GRAIN						Remarks / Cooler I.D.
F18L-F8=01-100120	10/1/20	0855	6	X		2	,						X									
F18L-SB-01-100120	10/1/20	0900	6	X		2							X									13
F18L-MOT-MWOZ	10/1/20	1102	6	X		2							X	,								
FIBL-H3151-01-50-100120	10/1/20	0000	6	X)		4							X	X	X	X						
FTBL-H3151-01-6W-100120	10/1/20	0925	6	X		2							X									ST.
FIBL- B3121-02-50-106120	10/1/20	1045	6	)		1							$\times$									
F1BL- B3121 - 02-6W-100120	10/1/20	1100	6	X		2							X					V	4			
F1BL-B3121-01-50-100120	10/1/20	1230	6	X		4							X	X	X	X						
FIBL-83121-01-6W-100120	10/1/20	1255	6	X		2							X					*				
F18L-E8-01-100120	10/1/20	1430	6	X		1							X									
Turn Around Time Required (Prior lab approval required  Standard Rush (Specify)	for expedited TAT.,	Sample Disp		Disp	osal b	y Lab						cation mable		Skin Irrit	ant 🗆	Poison	□ Ur	known	QC	Require	ments	(Specify)
1. Relinquished by		Date 10/2	120	Tin	140	00	1. R	eceiv	red b	y									Date	•	Til	ime
2. Relinquished by	10/2/20									у			4.5						Date	9	Tit	ime
3. Relinquished by	telinquished by Date Tim									у									Date	,	Tit	me
4. Relinquished by										recei	ved t	by			7/10				Date	,	Tit	me
	Note: All samples are retained for four weeks from receipt unless other arrangements are made.									LY ce (C	ircle)	) Ye	es M	vo lo	e Pack	F	Receipt	Temp		°(		emp Blank 🗆 Y 🗆 N



106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.pacelabs.com

Client	1	Report to C	CEC	(2) W	( 12.2 m. F	1013		111	100	Add to be	こうようし				hone No								Quote No.
ARCADIS Address		Sampler's			UN	2111	4.0		3 6	41.5	11.0		A	naly	sis (Atta	ch list	if more	space	is need	ded)			
9954 MAYLAND DR. SLITE 2400		/	A	5		-																	Pageof
	Code	x ( 8	7	C							-		2										Lot # Bar Code (lab use only)
	3233	Printed Nat	me										3	0						11			
Project Name ARMY PEAS - FORT BELLIOIR SI		Ju	STIA	, 0	DPF	EY	-						N T M A	SATE.						1			
Project No. 30001992 3DL10	P.O. No.		arab nposite	N	latrix				No of Prese			ре	foca	No.									
Sample ID / Description (Containers for each sample may be combined on one line.)		lection Time (Military)	G=Grab C=Composit	Aqueous	Non- Aqueous		Unpres.	H2SO4	HNO3	HCI	NaOH	5035 Kit	Field	180				"					Remarks / Cooler I.D.
FIBL-81495 -01-50-031021	3holzı II	130	C	)	-		1						1	X									
FTBL-81495-02-50-031021	13	30<	1	>			1						-	X					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
FIBL-B1495-03-50-031021	1	100		/			1						-	X									
FTBL-B1495-04-50-031021	1 1	210	1	/			1							_									
EMP OF RECORD					-																		
		No.	1																				
Turn Around Time Required (Prior lab approval required  Standard   Rush (Specify)		ample Disp		Dis	posal	by L							ication mable		Skin Irrit	ant [	Poiso	n 🗆 U	nknowr		C Requ	ireme	nts (Specify)
1. Relinquished by	Lon	Date		Ti	me				eceiv		-									Da	ite		Time
2. Relinquished by	3/10/21 1530								eceiv	ved b	y				*					Da	ite		Time
3. Relinquished by	3/10/21 1530									ved t	ру									Da	ite		Time
4. Relinquished by	Iniquisited by									atory	rece	eived	by		113					Da	ate		Time
Note: All samples are retaine unless other arran	Note: All samples are retained for four weeks from receipt unless other arrangements are made.										ILY ice (	Circle	e) Ye	es	No le	ce Pac	k	Receip	ot Temp	)	-100	_°C	Temp Blank □ Y □ N



Document Control Number:TGM - 30001997.30L10, 27/09/2020
TGM + project number plus date as follows: xxxxxxxxxxxxxxxxx - dd/mm/year

	AILGAI	E HEALTH & S	AFETY	MEETIN	NG FORM	
					. Personnel who perform work ope heir attendance, at least daily.	erations on-
Project Name:			g and to do	Project Lo		
Date:   Time:	Conducted	d by:		Signature		
9/27/20 0740 Client:	Client Con	USUN COFFEY		Subanda	EWILDNIEUT S	CBINTIST
USACE	Control of the Contro	HRIS MANIKUS			nctor companies:	
TRACKing the Tailg						
<b>Think</b> through the Tasks (list the	tasks for the	e day):				
1 HAND AUGER		3 GW SI	AMPUN	G	5	
2 DPT DRILLING		4			6	
Other Hazardous Activities - 0  If yes, describe them here  How will they be controlled?	earty activities	x if there are any other as that may pose hazard				. Nave
Prework Authorization - check issuance or completion of a che		THE RESIDENCE OF THE PROPERTY		Doc#	Confined Space	Doc#
Energy Isolation (LOTO)		Excavation/Trench	ning		Hot Work	
Mechanical Lifting Ops		Overhead & Buried	d Utilities		Other permit	
Discuss following question	ONS (for some re	view previous day's post activitie	es). Check i	if yes :	Topics from Corp H&S to cov	/er?
Incidents from day before to	review?	Lessons learned fr	rom the day	before?	Any Stop Work Interventions	yesterday?
Any corrective actions from y	esterday?	Will any work dev	iate from pl	an?	deviations, notify PM & clie	
JSAs or procedures are avail	able?	Field teams to "dir	ty" JSAs, as	s needed?	All equipment checked & OK	?
Staff has appropriate PPE?		Staff knows Emerg			Staff knows gathering points	?
Comments:						
			red today a oving water) inders, wells)		ssess the Risks (Low, Medium, It them under the hazard category.  Mechanical (i.e., augers, motors)  Environment (i.e., heat, cold, ice)	
Sound (i.e., machinery, generators)	(L M H)	Personal (i.e. alone, r	night, not fit)	(L M H)	Driving (i.e. car, ATV, boat, dozer)	(LMH)



Document Control Number:TGM - 30001992.3DLID - 28 09 2020 TGM + project number plus date as follows: xxxxxxxxxxxxxxxxxxxxxx - dd/mm/year

I	AILGATE HEALTH	& SAFETY	MEETING	FORM	
This form documents the tailgate site during the da	e meeting conducted in accor y are required to attend this r				
Project Name:  FT BEWOLK: ARM  Date:  9 28 20 0715		neeting and to act	Project Local	tion: ELUOIR, UA le:	
Client: USACE	Client Contact: CHRIS MANIKA	S	Subcontracto	or companies: LING	HC SCIEDIFI
TRACKing the Tailga	ate Meeting				
${\color{red}{\sf T}}$ hink through the Tasks (list the	tasks for the day):				
1 HAND AUGER	3 60	U SAMPUN	6	5	
2 DRT DRILLING	4 DI	ECON		6	
Other Hazardous Activities - C p If yes, describe them here: How will they be controlled?	arty activities that may pose I			If there are non "None	ne, write e" here:
Prework Authorization - check issuance or completion of a check in the sum of		egins: Height	<u>Doc #</u>	Confined Space	Doc#
Mechanical Lifting Ops	Overhead &	Buried Utilities		Other permit	_
Discuss following questio  Incidents from day before to r  Any corrective actions from ye  JSAs or procedures are availa  Staff has appropriate PPE?  Comments:	esterday? Will any wo	arned from the day ork deviate from pla to "dirty" JSAs, as Emergency Plan	an?	Any Stop Work Interve	entions yesterday? 1 & client 1 & OK?
Recognize the hazards (check a risk level) - Provide an overall ass	essment of hazards to be end		nd briefly list th		tegory.
Electrical (i.e., utilities, lightning)  Chemical (i.e., fuel, acid, paint)		e., gas cylinders, wells) e., ticks, poison ivy)	(L M H) [	Environment (i.e., heat, c	
Sound (i.e., machinery, generators)	(L)M H) Personal (i.e	alone, night, not fit)	(L M H)	Driving (i.e. car, ATV, boat,	dozer) (L M H)



Document Control Number:TGM - 30001992.3DUD - 29 09 2020
TGM + project number plus date as follows: xxxxxxxxxxxxxxxxxxxxxxx - dd/mm/year

This form documents the tailgate	e meeting cor		ance with the Pr	oject HASP.	Personnel who perform work ope	erations on-
site during the da Project Name:	y are require	d to attend this me	eeting and to acl	knowledge the	eir attendance, at least daily.	
FI BELLOIR ARMY	PEAS				ELVOIR	
Date:, Time:	Conducted	by:		Signature/1		
9/29/20 08/5	JUS	HIN COFFEE!		(be	I EM SCIENCIST	
Client:	Client Cont			Subcontrac	ctor companies:	
USACE	CHRI	SMANIKUS		JC D	214146	
TRACKing the Tailga	ate Meet	ing				
<b>Think</b> through the Tasks (list the	tasks for the	day):				
1 HAMD AUGED		3 3	SAMPLIN	2	5	
2 DPT DRILLING		4			6	
Other Hazardous Activities - Op p If yes, describe them here How will they be controlled?	arty activities	if there are any o that may pose ha			If there are none, writ "None" here	
Prework Authorization - check issuance or completion of a check in the sum of			gins:	<u>Doc #</u>	Confined Space	<u>Doc #</u>
Energy Isolation (LOTO)		Excavation/T	renching		Hot Work	
Mechanical Lifting Ops		Overhead & I	Buried Utilities		Other permit	
Discuss following question	INS (for some rev	iew previous day's post	activities). Check	if yes :	Jepics from Corp H&S to co	ver?
Incidents from day before to	review?	Lessons lear	ned from the day	before?	Any Stop Work Interventions	yesterday?
Any corrective actions from y	esterday?	Will any wor	k deviate from pl	an?	If deviations, notify PM & clie	ent
JSAs or procedures are avail	able?	Field teams t	o "dirty" JSAs, a	s needed?	All equipment checked & Ok	(?
Staff has appropriate PPE?		Staff knows E	Emergency Plan	(EAP)?	Staff knows gathering points	?
Comments:						
Recognize the hazards (check a risk level) - Provide an overall ass		azards to be enco				
Lectrical (i.e., utilities, lightning)	(L M H)	Pressure (i.e.	gas cylinders, wells)	(L M H)	Environment (i.e., heat, cold, ice	(L M H)
Chemical (i.e., fuel, acid, paint)	(L M H)	Biological (i.e.	., ticks, poison ivy)	(L M H)	Radiation (i.e., alpha, sun, laser)	(L M H)
Sound (i.e., machinery, generators)	(L M H)	Personal (i.e.	alone, night, not fit)	(L M H)	Driving (i.e. car, ATV, boat, dozer)	(L M H)



Document Control Number:TGM - 30001992 3DLID-30 09 2020
TGM + project number plus date as follows: xxxxxxxxxxxxxxxxx - dd/mm/year

This form documents the tailgat			H & SAFET			perations on
					heir attendance, at least daily.	perations on-
Project Name:	00000			Project Lo		
Date: , Time:					BELLIOIR , VA	
Date: Time: 0715	Conducted by	N COFFE	~	Signature/	ENU. SCIENTIST	
Client:	Client Contac		-1	Subcomra	actor companies:	
USACE		MANIK	us	4	PEILLING	
TRACKing the Tailga						
Think through the Tasks (list the	tasks for the da	av):				
1		3	IIO In Aug Ca		5 610 5000 81 141	
			HAMDAUGER		EW SHITT CAN	2
2_ GAUGING	T I	4 DPT	SOIL SAMPL	NG	6	
If yes, describe them here	arty activities th		ny other Arcadis, e hazards to Arca		If there are none, w "None" he	erite  Aux
How will they be controlled?						
Prework Authorization - check issuance or completion of a check Not applicable			begins:	t <u>Doc#</u>	Confined Space	Doc#
Energy Isolation (LOTO)		Excavatio	n/Trenching		Hot Work	
Mechanical Lifting Ops		Overhead	& Buried Utilities		Other permit	
Discuss following question	NS (for some review	previous day's	post activities). Che	ck if yes :	Tepics from Corp H&S to c	cover?
Incidents from day before to	eview?	Lessons I	earned from the	day before?	Any Stop Work Interventio	ns yesterday?
Any corrective actions from y	esterday?	Will any	work deviate fron	plan?	deviations, notify PM & c	lient
SAs or procedures are avail	able?	Fleid tean	ns to "dirty" JSAs	, as needed?	All equipment checked & C	OK?
Staff has appropriate PPE?		Staff knov	vs Emergency PI	an (EAP)?	Staff knows gathering point	its?
Comments:						
Recognize the hazards (check a risk level) - Provide an overall ass	essment of haz	ards to be e	encountered toda	y and briefly lis	t them under the hazard catego	ry.
Gravity (i.e., ladder, scaffold, trips)	(L M H) L	Motion (i.e	., traffic, moving water	) (LMH)	Mechanical (i.e., augers, motor	s) (L M H)
Electrical (i.e., utilities, lightning)	(LMH)	Pressure	(i.e. gas cylinders, we	ls) (L M H)	Environment (i.e., heat, cold, id	ce) (LMH)
Chemical (i.e., fuel, acid, paint)	(LMH)	Biological	(i.e., ticks, poison ivy	(L M H)	Radiation (i.e., alpha, sun) aser	(L M H)
Sound (i.e., machinery, generators)	(LMH)	Personal	(i.e. alone, night, not fi	t) (L M H)	Driving (i.e. car, ATV, boat, doze	er) (LMH)



Document Control Number:TGM - 3001992 - 3DLID - 01 10 2020
TGM + project number plus date as follows: xxxxxxxxxxxxxxxxx - dd/mm/year

	GATE HEALTH & SAFET eting conducted in accordance with the	TY MEETING FORM  The Project HASP. Personnel who perform work operations	s on-
		o acknowledge their attendance, at least daily.  Project Location:	
FI BELVOIR ARNIY F	PRAS SI	FI BELVOIR, VA	
	nducted by:	Signature/Title:	_
10/1/20 0700	JUSTIN COFFEY	MO JEW SCIENTIST	
	ent Contact:	Subcontractor companies:	
USACE	CHRIS MANIKAS	JEDRILIAG	
TRACKing the Tailgate			
Think through the Tasks (list the task	s for the day):		
1 MOBILIZE	3 DPT PRILLING	5 DEMOBILIZE	
2 HAND AUGER	4 GW SAMPUN	)G 6	
	the box if there are any other Arcadis, activities that may pose hazards to Arca	"None" here:	E.
issuance or completion of a checklist	ities to be conducted that require perm or similar before work begins:  oc # Working at Height  Excavation/Trenching	Doc # Do  Confined Space  Hot Work	oc #
Mechanical Lifting Ops	Overhead & Buried Utilitie:		
Discuss following questions (reference of the following questions) and the following questions from day before to review and a procedure actions from yester and a procedures are available?  Staff has appropriate PPE?  Comments:	day? Will any work deviate fron	Any Stop Work Interventions yestern m plan?  If deviations, notify PM & client as, as needed?  All equipment checked & OK?	day?
risk level) - Provide an overall assessm		provided) and Assess the Risks (Low, Medium, High - clay and briefly list them under the hazard category.  (L M H) Mechanical (i.e., augers, motors) (L M	circle M H)
Electrical (i.e., utilities, lightning) (L	M H) Pressure (i.e. gas cylinders, we	rells) (L M H) Environment (i.e., heat, cold, ice)	М Н)
Chemical (i.e., fuel, acid, paint) (L	M H) Biological (i.e., ticks, poison ivy	ry) (LMH) Radiation (i.e., alpha, sun, laser) (L 🕻	(BH)
Sound (i.e., machinery, generators)	Personal (i.e. alone, night, not fi	fit) (L M H) Driving (i.e. car, ATV, boat, dozer)	и н)

Project Name: Fort Belvoir Project #: 2000 1997, 3 N I O	Start Date:	9/2/20	K
3000 1992. 3 DLIO	End Date:	9/2/20	-
Utility markings valid for 15 days. Initiate cle			rk
	WORK REQUIREMENTS		/ N
DigSafe 811 notified 48-72 hrs. in advance of w		Ticket #:	_
Ticket Expiration Date:		commongroundalliance.com/ma	an
Ticket(s) Attached(Y/N)? List ut	lity owners notified via Dig	Safe 811 & response status:	
* no ticket as of 9/2/20 low	()		
List addt'l. utilities requiring notification not inclu	ded in DigSafe811 Notice:		
Review task details w/ private utility location sub depth of clearance needed, types of features, un markings to confirm public utility clearance.	contractor. ID work areas, illities, anticipated/known/u	, clearance equipment needed, Inknown. Verify DigSafe 811	
Private Utility Locator Name, if used: GPRS	Colin Garnett	AUS onsite meeting (VN)?	
FIELDW	ORK REQUIREMENTS	20 6 - 5	
PM or designee prior to beginning intrusive work theavy equipment/mechanized intrusive work within 30-in. of point of work) REQUIRES pre-allocations. STOP WORK if the Arcadis Tolerand List work type & locations for utility location and thirties locate for bpt The PFAS SI Event. Management	in the Arcadis Tolerance Zoproval by Corporate H&S e Zone work has not been clearance as applicable to	prior to working at all such approved. this checklist:	
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/W)? Name(s)/Af	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw filliation(s):	ATION prior to starting any tutility clearance efforts.	nt.
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/Q)? Client Clearance (Y/Q)? Name(s)/Af Interviews (Y/Q)? Name(s)/Af	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw.filiation(s):	ATION prior to starting any tutility clearance efforts. subsurface work) and to a public ROW or easement None ings not provided (N)?	c/ <del>=</del> nt.
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/Q)? Client Clearance (Y/Q)? Name(s)/Af Interviews (Y/Q)? Name(s)/Af Specific subsurface feature types and dep	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw.filiation(s):	ATION prior to starting any tutility clearance efforts. subsurface work) and to a public ROW or easement None ings not provided (N)?	c/ <del>=</del> nt.
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/1)? Client Clearance (Y/1)? Name(s)/Af Interviews (Y/1)? Name(s)/Af Specific subsurface feature types and depin Details provided: Site Inspected (AN)? (document on Pg. 2.	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw filiation(s): This provided by person interprovided by	ATION prior to starting any tutility clearance efforts.  subsurface work) Int to a public ROW or easemer None sings not provided (Y/N)? -> 6/	nt. e pns
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evident Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/Q)? Client Clearance (Y/Q)? Name(s)/Af Interviews (Y/Q)? Name(s)/Af Specific subsurface feature types and depin Details provided:  Site Inspected (AN)? (document on Pg. 2. Public records/Client Dwgs/As-Builts (9/N)	react are with or EACH INTRUSIVE LOC. In boxes below to document frequired by State law for some when working in/adjace takes Other:  Maps/draw filiation(s): filiation(s): this provided by person interest of the provided by pe	ATION prior to starting any trutility clearance efforts.  Subsurface work) Int to a public ROW or easement ings not provided (MN)?   Carviewed (MN)?	nt. e pns
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/W)? Client Clearance (Y/W)? Name(s)/Af Interviews (Y/W)? Name(s)/Af Specific subsurface feature types and depin Details provided:  Site Inspected PN)? (document on Pg. 2. Public records/Client Dwgs/As-Builts PRAdio	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw filliation(s):  This provided by person interpretation of the person of the pers	ATION prior to starting any tutility clearance efforts.  subsurface work) Int to a public ROW or easement ings not provided (P/N)?   Crviewed (Y/N)?  Utilities & Structures > Place in the control of th	c/f
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/10)? Client Clearance (Y/10)? Name(s)/Af Interviews (Y/10)? Name(s)/Af Specific subsurface feature types and dep Details provided:  Site Inspected (Y/N)? (document on Pg. 2. Public records/Client Dwgs/As-Builts (Y/N)) List private locator tools used: Radio	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw filliation(s): This provided by person interpretation of the person	ATION prior to starting any tutility clearance efforts.  Subsurface work) Int to a public ROW or easemer None ings not provided (N)?  Serviewed (Y)()?  Utilities & Structures > Plot for sonde Other:	c/f
3 Reliable Lines of Evidence are REQUIRED for subsurface intrusive work. Check corresponding OneCall/DigSafe 811 Public Utility Locate 811 is only reliable as a Line of Evidence Marking type: Paint Pin Flags/S Client provided maps/drawings (Y/Q)? Client Clearance (Y/Q)? Name(s)/Af Interviews (Y/Q)? Name(s)/Af Specific subsurface feature types and dep Details provided: Site Inspected PN)? (document on Pg. 2. Public records/Client Dwgs/As-Builts Q/N) List private locator tools used: Radio Metal Detector Acoustic Pipe Lo	or EACH INTRUSIVE LOCATION to document frequired by State law for some when working in/adjaced takes Other:  Maps/draw filliation(s):  This provided by person interpretation of the person of the pers	ATION prior to starting any trutility clearance efforts.  Subsurface work) Int to a public ROW or easement with the provided PIN)?  Priority and the provided PIN)?  Carviewed (YIN)?  Utilities & Structures > Plant in the provided PIN)?  Electromagnetic	c/f

Rev. 17 5/12/2020

10f2 4 offset location if refused

Is	ng "YES" requires addt'l. investigation the utility present (Y/N)? Utility Cutilities entering/exiting structures?	olor Code	Is the	utility present (Y/N)?	Utility Color C
X	Intrusive work area marked out?	No Color		ence of stormwater network?	Green
* * *	Structural features above or below?	White		drains/catch basins/manholes?	Green
ia	Public natural gas line or meter?	White	Storm	nwater culverts, outfalls?	Green
	Private natural gas laterals/feeders?	Yellow	ABOVEG	ROUND Features Present?	
n_	Public electrical service?	Yellow	Trans	sportation tunnels/structures/ma	arkers present?
n _	Conduit from meter or on wall?	Red	Over	head electrical lines?	Red
./	Conduit from poles into ground?	Red		kV w/in 10 ft of work area?	Red
4	Poles/devices w/ no visible lines?	Red		200 kV w/in 15 ft of work area?	Red
	Overhead electrical lines?	Red		-350 kV w/in 20 ft of work area?	
	Solar arrays or wind turbines?	Red		-500 kV w/in 25 ft of work area?	
	Public water line(s)?	Red		-750 kV w/in 35 ft of work area?	
	Private water line(s) or lateral(s)?	Blue		-1000 kV w/in 45 ft of work area	? सिवरी
	Water meter onsite?	Blue		eground fire suppression?	Blue
	Fire hydrants/post indicator valves?	Blue		eground communications?	Orange
	Irrigation system control box/valve?	Blue		eground chases/racks/trays?	Orange
	Sprinkler heads, drip lines, vaults?	Blue		te/Remediation system lines?	Various
	Water dispensers, fill stations?	Blue		assed utilities/anomalies?	Pink
	Telecomm. overhead or buried?	the second secon	Warn	ning signs/stakes/markers prese	ent?
	Telecomm. ground box or relays?	Orange	Heav	y Equipment: Mark travel route	for overhead,
	Telecomm./security CCTV devices?	Orange	10100	ute, and/or under route (e.g. cru	sn risk) utilities
	Public sanitary sewer pipes?	Green	Ciana of -		
	Combined sanitary/storm pipes?	Green	Signs of o	ther utilities/ground disturbar	nce
	Private sanitary laterals/clean outs?	Green		s of asphalt or concrete disturba	
	Restrooms, kitchens, wash bays?	Green	Links	ground subsidence or change in own manholes or valve covers	vegetation?
Tip	s for Thorough Utility Location (HSS	100000	:		
1.	Don't forget to look up for utilities		1	Common Electrical Distri	7 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
2.	Be on-site with Private Utility Locator	rs.			Primary Wires up to 34,500 Volts of Electric
3. 1	Ask Private Locators to "confirm" oth	ner's marking	gs.	1	2
4.	Also clear alternate/backup locations	S	40		
	Mark all known utilities.	Land to the land		RI RI	ransformer educes Primary Volta o Secondary Voltage
sho	No hammering, no pickaxes, no digortcutting.	ging bars, no	2		Electric Service
	No excessive turning or downward for	oree of bond	toolo	TAN	to House up to 240 Volts
esp	ecially hand augers.	bice of flarid	toois,	Secondary Wires up to 240 Volts	
8. 1	Utilities may run in or directly under	asphalt/conc	rete		/ /
9.1	Heavy equipment may damage shall	low utilities.	Especially		
duri	ng clearing and grubbing.	1210 20000000		The state of the s	
10.	Use spotter for heavy equipment ne	ar abovegro	und	Phone & Cable	Phone & Cable TV Service Li
utilit	ies?	The state of the state of	20.0	Phone & Cable TV Lines	to House
	Tubilities & Charles Charlies	11 0	517		
$\vdash$	Utilities & Structures Checklist revi PM or Designee Name:	lewed by the	PM or Des	signee (Y/N)? If no, STOP	WORK call P
	ne and Signature of person complet		V 20 C		

KNOW! FORE OF STRIKE WITH A CONFIRMED RESPONSE FROM CORPORATE HAS

Project Name:	Baltimore Pistor		R TO BEGIN			K
_	30061181		d Date:	9/28/202		_
	gs valid for 15 days. Initi			rior to expiration for	20	-
Camby Themes	PRE-	FIELD WORK REC	LUDEMENT	rior to expiration for	r ongoing w	ork
DioSafe 811 no	tified 48-72 hrs. in advan			<b>T</b>	200500	
Ticket Expiratio			Laws: www.	commongroundallis	20650812	Direction of the last of the l
Ticket(s) Attach	ed(Y/N)? Y	List utility owners n	otified via Di	igSafe 811 & respo	onse status:	ap
List addt'l. utiliti	es requiring notification n	ot included in DigS	afe811 Notic	e: n	None	
depth of clearai	tails w/ private utility loca nce needed, types of feat nfirm public utility clearan	tures, utilities, antici	ID work area pated/knowr	as, clearance equip n/unknown. Verify L	ment neede DigSafe 811	d,
Private Utility L	ocator Name, if used:	Alex Williams (443)-404-63	07 / SoftDig	AUS onsite meet	ting (Y/N)?	Υ
4	FII	ELD WORK REQUI	REMENTS	A. JAKE WALL		- 15
Within 30-in. of locations. STO List work type & SC / 5/5 - 4 Conduct utilities I Per Arcadis Utility located within 30	ent/mechanized intrusive point of work) REQUIRE P WORK if the Arcadis T & locations for utility locate (1,57,47,59,60 ocate for DPT multi-media samp Location and Clearance guidelinches of a line marking (PINK).	S pre-approval by Colerance Zone work ion and clearance a logo of the colerance and colerance and colerance are selected as mesureed radally by seach proposed sampling	forporate H& has not bee is applicable undwater) at Ba ints must not pro oft Dig. Soft Dig g location.	S prior to working a en approved. to this checklist: Iltimore Piston Ring Fact occeed with subsurface to clear and mark 10x1	at all such lory in Baltimore work involving 0 radius zone a	e MD.
X OneCall/I 811 is o Marking type: X Client pro	ovided maps/drawings (Y/ earance (Y/N)? Nam	sponding boxes beloe Locate (required by Evidence when wor Flags/Stakes	State law for king in/adjace	ent utility clearance r subsurface work)	V or easeme	
Specific s  Details provide  X Site Inspect	subsurface feature types a	n Pg. 2.) Photo Doo tts (Y/N)? Type:	ument Marke	ed Utilities & Structi		
Metal Det Y Soft Dig M Air knife		Radio Freq. Detection  Pipe Locator  X Hand auger Potholing/Vacual of Yes, list here:	Downhole	ing Hand too	X GPF	

### ALL BOXES BELOW MUST BE COMPLETED BEFORE PROCEEDING Site inspection also requires investigating vicinity outside of the work area for structures and utilities. Noting "YES" requires addt'l. investigation. Utilities must be field marked prior to intrusive work. Utility Color Code Is the utility present (Y/N)? **Utility Color Code** Is the utility present (Y/N)? No Color Evidence of stormwater network? Green Utilities entering/exiting structures? Curb drains/catch basins/manholes? Intrusive work area marked out? White Green Green White Stormwater culverts, outfalls? Structural features above or below? Public natural gas line or meter? Yellow ABOVEGROUND Features Present? Transportation tunnels/structures/markers present? Yellow Private natural gas laterals/feeders? Public electrical service? Red Overhead electrical lines? Conduit from meter or on wall? Red Red < 50 kV w/in 10 ft of work area? Conduit from poles into ground? Red Red >50-200 kV w/in 15 ft of work area? Poles/devices w/ no visible lines? Red Red >200-350 kV w/in 20 ft of work area? Overhead electrical lines? Red Red >350-500 kV w/in 25 ft of work area? Solar arrays or wind turbines? Red Red >500-750 kV w/in 35 ft of work area? Public water line(s)? Blue Red >750-1000 kV w/in 45 ft of work area? Private water line(s) or lateral(s)? Blue Blue Aboveground fire suppression? Water meter onsite? Blue Aboveground communications? Orange > All utility Fire hydrants/post indicator valves? Blue Orange Aboveground chases/racks/trays? Irrigation system control box/valve? Blue Private/Remediation system lines? **Various** worked in Sprinkler heads, drip lines, vaults? Blue pink due to Unclassed utilities/anomalies? Pink Water dispensers, fill stations? Blue Warning signs/stakes/markers present? historical Telecomm. overhead or buried? Heavy Equipment: Mark travel route for overhead, next Drange regularitics to route, and/or under route (e.g. crush risk) utilities. Telecomm. ground box or relays? Orange Telecomm./security CCTV devices? Orange Public sanitary sewer pipes? Green Signs of other utilities/ground disturbance Combined sanitary/storm pipes? Green Signs of asphalt or concrete disturbance/repair? > Multiple Private sanitary laterals/clean outs? Green Any ground subsidence or change in vegetation? Restrooms, kitchens, wash bays? Green signs of Unknown manholes or valve covers in work area? Tips for Thorough Utility Location (HSS Section 5.6): concer Common Electrical Distribution Lines 1. Don't forget to look up for utilities disturbance 2. Be on-site with Private Utility Locators. Reparis 3. Ask Private Locators to "confirm" other's markings. SICE DIS ) 4. Also clear alternate/backup locations 5. Mark all known utilities. morked this 6. No hammering, no pickaxes, no digging bars, no locations in ctric Sen Pink wen shortcutting. 7. No excessive turning or downward force of hand tools. close to especially hand augers. 58/56 point 8. Utilities may run in or directly under asphalt/concrete 9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing. *no historical 10. Use spotter for heavy equipment near aboveground TV Lines rebor in utilities? 506-5106 site maps Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? If no, STOP WORK call PM 2 58 56 PM or Designee Name: Name and Signature of person completing the checklist: Pomts Date of checklist review / update:

50/53

ALL SUSPECT UTILITY STRIKES REQUIRE CORPORATE H&S NOTIFICATION WITHIN 24 hrs. OF KNOWLEDGE OF STRIKE WITH A CONFIRMED RESPONSE FROM CORPORATE H&S.

IHIS FOI	KM MUST BE ENT	IRELY COMPLETE	D PRIOR TO BEG	INNING ANY INTRUSIVE WORK
Project Name	Baltimo	re Piston Ring	Start Date:	9/28/2020
Project #:	30061181		End Date:	9/28/2020
Utility mark	ings valid for 15 da	ays. Initiate clearan	ce renewal 5 days p	prior to expiration for ongoing work
			RK REQUIREMEN	
		in advance of work?	X DigSafe	e Ticket #: 20650812
Ticket Expirat		/9/2020 Sta		.commongroundalliance.com/map
Ticket(s) Atta	ched(Y/N)?	List utility o	wners notified via D	DigSafe 811 & response status:
List addt'l. uti	lities requiring notif	cation not included	in DigSafe811 Notic	ce: None
markings to d	confirm public utility	clearance.	tractor. ID work areas, anticipated/know	as, clearance equipment needed, n/unknown. Verify DigSafe 811
Private Utility	Locator Name, if u	ised: Alex Williams (4	143)-404-6307 / SoftDig	AUS onsite meeting (Y/N)? Y
1 300			REQUIREMENTS	have a minimum of one year of field
locations. ST List work type SG   SC Conduct utilities Per Arcadis Utili located within 30	OP WORK if the Ai & locations for util カー 44 、 42 、 43 locate for DPT multi-m ty Location and Clearan D inches of a line markin	ity location and clea AGAS edia sample (soil gas, soi ce guidelines SB / SG sai g (PINK) as mesureed ra each proposed	val by Corporate H& ne work has not bee rance as applicable I, and groundwater) at Ba mpling points must not pr dally by Soft Dig. Soft Dig d sampling location.	to this checklist:  altimore Piston Ring Factory in Baltimore MD.  rocceed with subsurface work involving utilities g to clear and mark 10x10 radius zone around
X OneCall.  811 is Marking type: X Client pr Client Cl	/DigSafe 811 Publication only reliable as a X Paint Covided maps/drawiearance (Y/N)?	c Utility Locate (require of Evidence where the principle of Evidence with the principle of Evidence with the principle of Evidence with the principle of Evidence	pired by State law for the working in/adjace Other:  Maps/drawon(s):	eent to a public ROW or easement.  None wings not provided (Y/N)?
Specific	subsurface feature	types and depths p	rovided by person in	nterviewed (Y/N)?
Details provid	ed:			
X Site Insp	ected (Y/N)? (docu	ment on Pg. 2.) Pho	oto Document Marke	ed Utilities & Structures
A Public re	cords/Client Dwgs/	As-Builts (Y/N)? Typ	oe:	
Metal De	cator tools used:	Radio Frequencial Radio Freque		Electromagnetic X GPR
Y Soft Dig	Methods used (Y/N	I)? X Hand a		
Air knife	Hydro H	Knife Potholii	ng/Vacuum extraction	
Other so	ft dig tools used (Y	N)? If Yes, list h		

Utilities entering/exiting structures?	No Color	Is the utility present (Y/N)? Utility Color Code  Evidence of stormwater network? Green
✓ Intrusive work area marked out?	White	Curb drains/catch basins/manholes? Green
Structural features above or below?	White	Stormwater culverts, outfalls? Green
Public natural gas line or meter?	Yellow	ABOVEGROUND Features Present?
Private natural gas laterals/feeders?	Yellow	Transportation tunnels/structures/markers present?
Public electrical service?	Red	Overhead electrical lines?
Conduit from meter or on wall?	Red	< 50 kV w/in 10 ft of work area?
Conduit from poles into ground?	Red	>50-200 kV w/in 15 ft of work area?
Poles/devices w/ no visible lines?	Red	>200-350 kV w/in 20 ft of work area?
Overhead electrical lines?	Red	>350-500 kV w/in 25 ft of work area? Red
Solar arrays or wind turbines?	Red	>500-750 kV w/in 35 ft of work area? Red
Public water line(s)?	Blue	>750-1000 kV w/in 45 ft of work area? Red
Private water line(s) or lateral(s)?	Blue	Aboveground fire suppression? Blue
Water meter onsite?	Blue	Aboveground communications? Orange
Fire hydrants/post indicator valves?	Blue	Aboveground chases/racks/trays? Orange
Irrigation system control box/valve?	Blue	Private/Remediation system lines? Various
Sprinkler heads, drip lines, vaults?	Blue	V Unclassed utilities/anomalies?
Water dispensers, fill stations?	Blue	Warning signs/stakes/markers present?
Telecomm. overhead or buried?	Orange	Heavy Equipment: Mark travel route for overhead, next
Telecomm. ground box or relays? Telecomm./security CCTV devices?	Orange	to route, and/or under route (e.g. crush risk) utilities.
Public sanitary sewer pipes?	Orange	Signs of other utilities/seemed distrib
Combined sanitary/storm pipes?	Green	Signs of other utilities/ground disturbance
Private sanitary laterals/clean outs?	Green	Signs of asphalt or concrete disturbance/repair?  Any ground subsidence or change in vegetation?
Restrooms, kitchens, wash bays?	Green	Unknown manholes or valve covers in work area?
Tips for Thorough Utility Location (HSS	-	\
1. Don't forget to look up for utilities	0600011 0.0	Common Enterior Distribution Emer
2. Be on-site with Private Utility Locator	ors.	Primary Wires up to 34,500 Volts of Electricity
3. Ask Private Locators to "confirm" ot	her's marking	gs.
4. Also clear alternate/backup location	s	
5. Mark all known utilities.	and of the last	Transformer Reduces Primary Voltage to Secondary Voltage
<ol><li>No hammering, no pickaxes, no dig shortcutting.</li></ol>	ging bars, no	Electric Service
7. No excessive turning or downward f	oron of hono	to House up to 240 Volts
especially hand augers.	orce or mand	Secondary Wires up to 240 Volts
Utilities may run in or directly under	asphalt/cond	crete
9. Heavy equipment may damage shall	llow utilities.	
Especially during clearing and grubbing	j.	
10. Use spotter for heavy equipment ne	ear abovegro	1 A SELAIGE TIME?
utilities?		TV Lines to House
Utilities & Structures Checklist rou	iowad by the	PM or Decignos (VINI)2 If - OTOT
PM or Designee Name:	lewed by the	PM or Designee (Y/N)? If no, STOP WORK call PM

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KNOWLEDGE OF STRIKE WITH A CONFIRMED RESPONSE FROM CORPORATE H&S.

	RM MUST BE ENTIRELY CO		TO BEGINNIN	G ANY INTRUSIVE WOR	₹K
Project Name		Ring Start	Date:	9/28/2020	
Project #:	30061181	End	Date:	9/28/2020	_
Utility mark	kings valid for 15 days. Initiat	e clearance renewa	al 5 days prior to	o expiration for ongoing w	ork
		ELD WORK REQU	IREMENTS		
	notified 48-72 hrs. in advance		DigSafe Tick		
Ticket Expirat		State Utility L	aws: www.comr	mongroundalliance.com/m	ар
Ticket(s) Atta	ched(Y/N)?	ist utility owners no	tified via DigSaf	e 811 & response status:	
List addt'l. uti	lities requiring notification not	included in DigSaf	e811 Notice:	None	
markings to d	details w/ private utility location rance needed, types of featur confirm public utility clearance	res. utilities, anticipa	) work areas, cle ated/known/unk	earance equipment neede nown. Verify DigSafe 811	ed,
Private Utility	Locator Name, if used: A	lex Williams (443)-404-6307	/ SoftDig AL	JS onsite meeting (Y/N)?	Υ
	FIEL	D WORK REQUIR	EMENTS	- mark 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
within 30-in. (locations. ST List work type Conduct utilitie Per Arcadis Util located within 3		pre-approval by Co erance Zone work h n and clearance as (soil gas, soil, and grour s SB / SG sampling point mesureed radally by Sot ach proposed sampling l	rporate H&S prints not been applicable to the advater) at Baltimon its must not proceed to Dig. Soft Dig to cleocation.	for to working at all such proved. is checklist: e Piston Ring Factory in Baltimo d with subsurface work involving ear and mark 10x10 radius zone	re MD.
X OneCal 811 is Marking type X Client p Client C Intervie Specific Details provie X Site Ins X Public r List private Ic Metal D Y Soft Dig	rovided maps/drawings (Y/N) Clearance (Y/N)? Name(ws (Y/N)? Name(s subsurface feature types anded: pected (Y/N)? (document on ecords/Client Dwgs/As-Builts ocator tools used: petector Acoustic Pig Methods used (Y/N)?	conding boxes below becate (required by Stridence when workings/Stakes?  (s)/Affiliation(s): (d depths provided by Stakes)?  Pg. 2.) Photo Docuty/N)? Type: Radio Freq. Detection by Stakes	or to document ustate law for subsing in/adjacent to Other:    Maps/drawings	tility clearance efforts. surface work) to a public ROW or easem No s not provided (Y/N)?  tilities & Structures  tromagnetic X GF	PR
Air knife Other so		Potholing/Vacuu f Yes, list here:	um extraction		

Structural features above or below? Public natural gas line or meter? Private natural gas laterals/feeders? Public electrical service? Conduit from meter or on wall? Conduit from poles into ground? Poles/devices w/ no visible lines? Public water line(s)? Private water line(s) or lateral(s)? Water meter onsite? Fire hydrants/post indicator valves? Irrigation system control box/valve? Sprinkler heads, drip lines, vaults? Water dispensers, fill stations? Telecomm, overhead or buried? Telecomm, security CCTV devices? Private sanitary laterals/clean outs? Restrooms, kitchens, wash bays? Tips for Thorough Utility Location (HSS Section 5.6): 1. Don't forget to look up for utilities 2. Be on-site with Private Utility Locators. 3. Ask Private Locators to "confirm" other's markings. 4. Also clear alternate/backup locations 5. Mark all known utilities. 8. Utilities may run in or directly under asphalt/concrete	-
Utilities entering/exiting structures? Intrusive work area marked out?   White	de
Structural features above or below? Public natural gas line or meter? Private natural gas laterals/feeders? Public electrical service? Conduit from meter or on wall? Conduit from poles into ground? Poles/devices w/ no visible lines? Public water line(s)? Private water line(s) or lateral(s)? Water meter onsite? Fire hydrants/post indicator valves? Irrigation system control box/valve? Sprinkler heads, drip lines, vaults? Water dispensers, fill stations? Telecomm. overhead or buried? Telecomm. overhead or buried? Telecomm. security CCTV devices? Private sanitary laterals/clean outs? Restrooms, kitchens, wash bays? Tips for Thorough Utility Location (HSS Section 5.6): 1. Don't forget to look up for utilities 2. Be on-site with Private Utility Locators. 3. Ask Private Locators to "confirm" other's markings. 4. Also clear alternate/backup locations 5. Mark all known utilities. 6. No hammering, no pickaxes, no digging bars, no shortcutting. 7. No excessive turning or downward force of hand tools, especially hand augers. 8. Utilities sanitary under asphalt/concrete  Structural features above or below? Yellow Yellow Yellow Yellow Yellow Yellow Yellow Overhead electrical lines? Red	ae
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KNOWLEDGE OF STRIKE WITH A CONFIRMED RESPONSE FROM CORPORATE H&S.

# **APPENDIX L Site Inspection Field Change Reports**



Appendix L
Field Change Report Log
U.S. Army Environmental Command
Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection
Fort Irwin, California

Field Change Report Number	Summary ¹
FCR-FTBL-01	ARNG hangar Building 3121 was added as an AOPI and was sampled during the SI.
FCR-FTBL-02	A change was made to the monitoring well sampling approach for the FTBL-66 AOPI.
FCR-FTBL-03	Building 1495 was added as an AOPI and was sampled during the SI.
FCR-FTBL-04	Updated the AOPI names/building numbers for two AOPIs that had been transposed.
FCR-FTBL-05	Documented variations in soil sample collection intervals from what was provided in the QAPP Addendum.
FCR-FTBL-06	Documented samples erroneously not collected / analyses not done on samples collected at the Building 1495 AOPI.
FCR-FTBL-07	Documented a soil sample discrepancy at the Hangar 3151 AOPI.

#### Notes:

1. See individual Field Change Reports for more detailed descriptions.



Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

	Field Change Report No. <u>FCR-FTBL-01</u>
Installation Name: Fort Belvoir, Virginia	Event Date: 29 September 2020
Project/Task No: <u>30001992.3DL10</u>	Contract Number: W912DR-18-D-0004
Applicable Document: QAPP Addendum: V	/orksheet #18 and associate figure(s)
Prepared By: <u>Justin Coffey</u>	

#### DESCRIPTION

A new area of potential interest (AOPI) and three additional borings with co-located surface soil samples and groundwater samples were added at Building 3121 at Davidson Army Airfield. FTBL-B3121-01-SO/FTBL-B3121-01-GW is located approximately 500 feet northwest of Building 3121, FTBL-B3121-02-SO/FTBL-B3121-02-GW is located approximately 500 feet north of Building 3121, and FTBL-B3121-03-SO/FTBL-B3121-03-GW is located approximately 20 feet from the southwest corner of Building 3121. If a surface water receptor other than the retention pond can be located in the field, a surface water sample will also be collected.

#### REASON FOR CHANGE

The three additional boring locations at Building 3121 were added at the specific request of the U.S. Army Environmental Command to roll the Army National Guard hangar into the Army site inspection (SI). The preliminary assessment for Building 3121 was completed by a separate contractor and recommended the hangar for further investigation in an SI.

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

The project scope of work is increased to include a new AOPI (Building 3121) with three borings. Rationale for sampling follows the same rationale used for other AOPIs in the Final Quality Assurance Project Plan Addendum. Borings are located at the direct surface runoff locations of the aqueous film-forming foam release and as near the oil/water separator as possible similar to other hangars at the Davison Army Airfield.

#### REMARKS

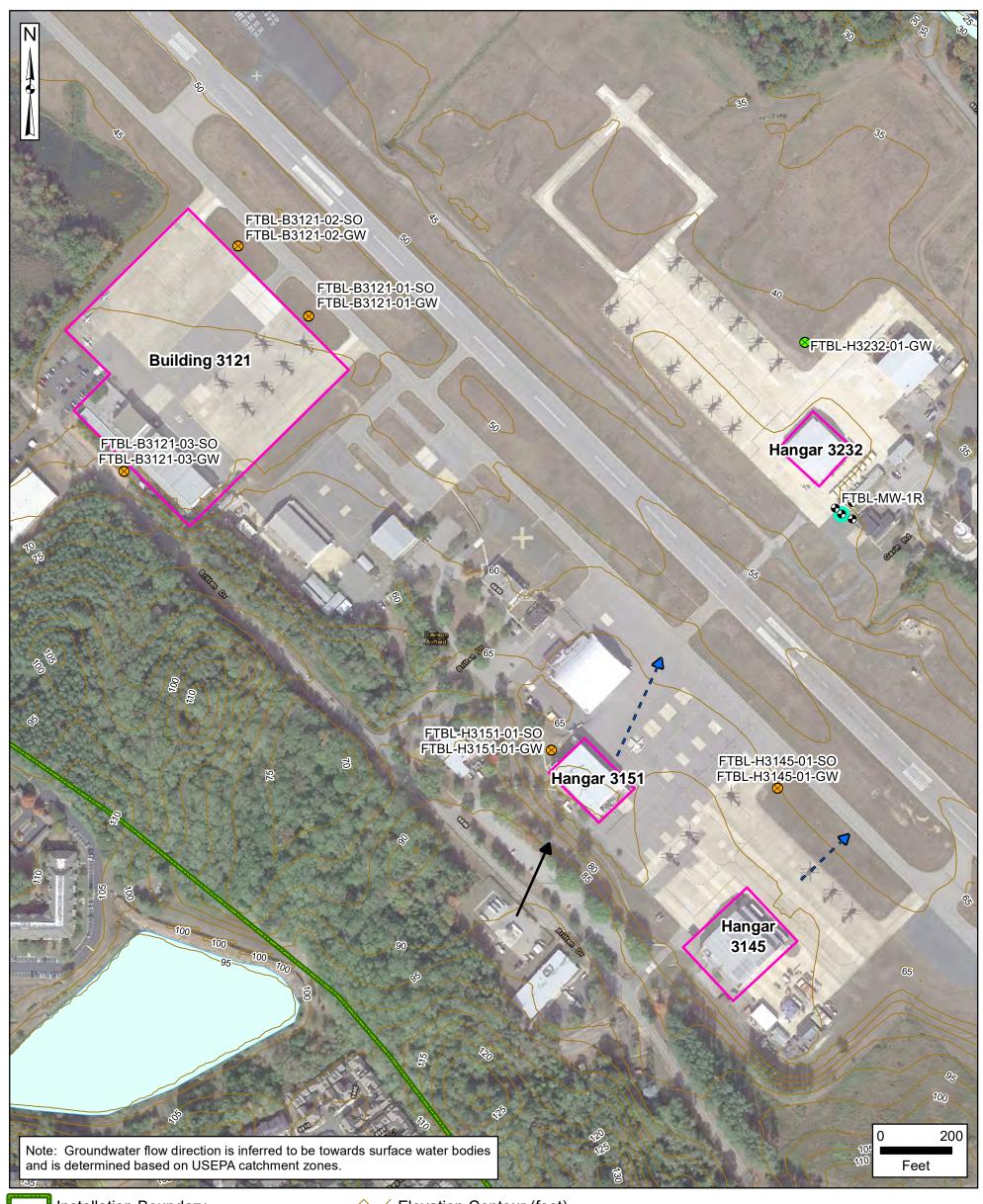
A revision to the Quality Assurance Project Plan Addendum is not planned, and this change will be reported in the Preliminary Assessment/SI report.



# Quality Assurance Project Plan Addendum USAEC PFAS Preliminary Assessment / Site Inspection Fort Belvoir, VA

# Figure 10 **Proposed Sampling Locations for AOPIs** Buildings 3121, Hangar 3145, Hangar 3151, and Hangar 3232





**Installation Boundary** 

Area of Potential Interest (AOPI)

River/Stream (Perennial)

Water Body

- **Shallow Groundwater Flow Direction**
- Surface Runoff Flow Direction

Elevation Contour (feet)

- Monitoring Well
- **Proposed Groundwater Sampling Location** 
  - Proposed Soil Boring to
- **Groundwater Sampling Location**
- **Proposed Groundwater Sampling** Location - Existing Well

Data Sources: Fort Belvoir, GIS Data, 2019 USGS, NHD, Water Bodies, 2019 USFWS, Wetlands, 2020 Google Earth, Aerial Imagery

Coordinate System: WGS 1984, UTM Zone 18 North



Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

	Field Change Report No. <u>FCR-FTBL-02</u>
Installation Name: Fort Belvoir, Virginia	Event Date: 01 October 2020
Project/Task No: 30001992.3DL10	Contract Number: W912DR-18-D-0004
Applicable Document: QAPP Addendum: V	Norksheet #18 and associate figure(s)
Prepared By: Rebecca Williams	

#### DESCRIPTION

Arcadis sampled monitoring well M07-MW02 instead of monitoring well M26-LTM-01 as planned on 01 October 2020. Monitoring well M07-MW02 is located within area of potential interest FTBL-66 and is approximately 575 feet north of the originally scoped well.

#### REASON FOR CHANGE

Monitoring well M26-LTM-01 could not be located after two separate attempts to do so on 30 September 2020. Monitoring well M26-LTM-01 had been selected for sampling because it is downgradient of one of the three identified potential locations of the fire response (possibly with aqueous film-forming foam [AFFF]) on the former overpass (there are no monitoring wells located downgradient of the other two identified potential overpass fire response locations). Therefore, monitoring well M07-MW02 was sampled because it is located within AOPC M-07 (Inactive Fire Equipment Test Area with known AFFF releases) and is upgradient of the five monitoring wells in which PFAS were detected during January 2017 sampling as part of a gap investigation (TriEco Tetra Tech, Joint Venture 2019).

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

Three large areas were identified as the potential location of the historical overpass vehicle fire. The objective had been to utilize monitoring well M26-LTM-01 to determine whether the overpass fire occurred in the most southeasterly of the three identified areas and utilized AFFF in the fire response. If a groundwater sample had been collected from monitoring well M26-LTM-01 and there were no detections of PFOS, PFOA, and/or PFBS, determining that the fire response occurred in the area immediately upgradient of this well or whether AFFF had been used in the fire response would not be likely. If there were detections in monitoring well M26-LTM-01, it would likely have been difficult to determine whether those detections were from the highway fire response (with AFFF) or if the detections were originating from an upgradient historical fire training area. Therefore, the inability to sample monitoring well M26-LTM-01 does not have an impact on the overall scope of project work.

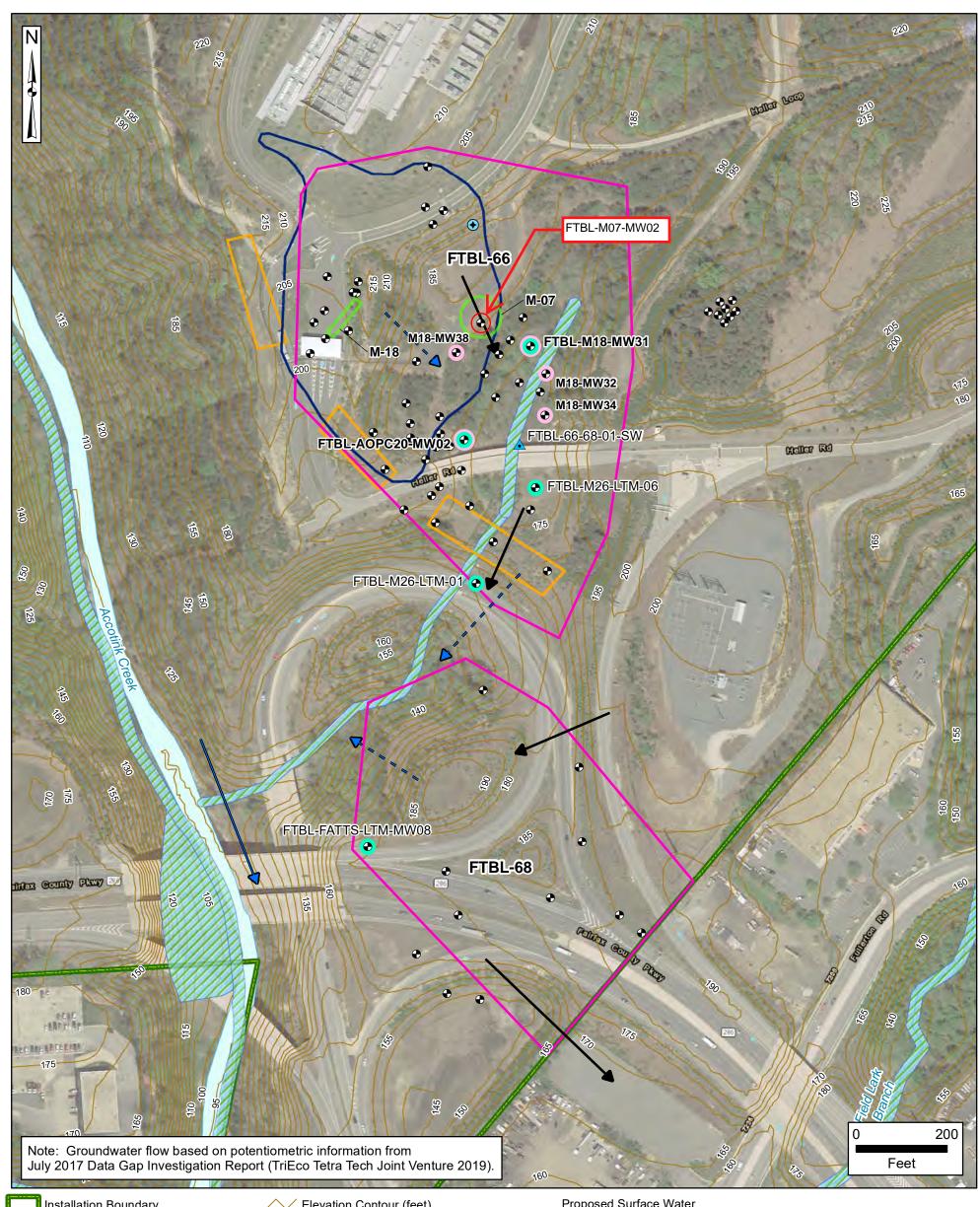
REMARKS		
No remarks or final comments.		



# Quality Assurance Project Plan Addendum USAEC PFAS Preliminary Assessment / Site Inspection Fort Belvoir, VA

## Figure 8 **Proposed Sampling Locations for FTBL-66 & FTBL-68**





Installation Boundary

Area of Potential Interest (AOPI)

SWMU Area

IRP Site (Former Fire Training Area)

Potential Location of Overpass Fire River/Stream (Perennial)

Stream (Intermittent)

Wetland

Elevation Contour (feet)

Shallow Groundwater Flow Direction

Surface Runoff Flow Direction

Surface Water Flow Direction

FBNA Potable Well

Monitoring Well

Well with Previous PFAS Detection

Proposed Surface Water Sampling Location

**Proposed Groundwater Sampling** Location - Existing Well

FBNA = Fort Belvoir North Area FTBL = Fort Belvoir IRP = Installation Restoration Program SWMU = Solid Waste Management Unit

Data Sources: Fort Belvoir, GIS Data, 2019 USGS, NHD, Water Bodies, 2019 USFWS, Wetlands, 2020 Google Earth, Aerial Imagery

Coordinate System: WGS 1984, UTM Zone 18 North



Field Change Report
U.S. Army Environmental Command
Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection
Fort Belvoir, Virginia

Installation Name: Fort Belvoir, Virginia

Event Date: 05 January 2021

Project/Task No: 30001992.3DL10

Contract Number: W912DR-18-D-0004

Applicable Document: QAPP Addendum: Worksheets #10, 17, 18 and 20

#### DESCRIPTION

Prepared By: Rebecca Williams

Building 1495 operates as a hazardous waste 90-day storage facility. It has an aqueous film-forming foam (AFFF) fire-suppression system that includes a 55-gallon AFFF storage tank. Initial acceptance testing of the AFFF fire-suppression system may have occurred after it was installed and before the building was occupied; however, this is not confirmed. Based on interviews during the preliminary assessment (PA) site visit, there have been no known releases or leaks from the AFFF fire-suppression system, and the system does not undergo routine testing.

Building 1495 was previously classified as an area not retained for further investigation; it has been reclassified as an area of potential interest (AOPI) and sampling is required to determine the absence/presence of per- and polyfluoroalkyl substances (PFAS) in media at Building 1495. One shallow soil sample is proposed for northwest (downgradient) of the north loading dock and one shallow soil sample is proposed for southwest (downgradient) of the south loading dock. Two additional shallow soil samples are proposed for the two outfalls (downgradient) of the stormwater line associated with Building 1495. (Note: The sampling locations associated with the building's two loading docks, and the location for the northern stormwater line outfall and associated shallow soil sampling location, have been revised following site reconnaissance.)

#### REASON FOR CHANGE

As stated in the September 2018 Army Guidance for Addressing Releases of Per-and Polyfluoroalkyl Substances (Army 2018), potential Army locations where releases of PFAS may have occurred and which merit evaluation include current or former AFFF storage locations. The guidance states site inspections (SIs) will be conducted at sites where the PA identified locations where further investigation is warranted to determine whether or not a release has occurred. In accordance with the September 2018 Guidance and as directed by Headquarters, Department of the Army, all current and former AFFF storage locations will be evaluated for the presence or absence of PFAS, regardless of whether a confirmed release was documented during the PA. Building 1495 was initially excluded from the SI scope because there were no known spills or releases. However, it was inadvertently not included when areas previously categorized not requiring further investigation were reevaluated and expanded to include AFFF storage locations.

Installation Name: Fort Belvoir, Virginia	Event Date: <u>05 January 2021</u>
Project/Task No: <u>30001992.3DL10</u>	Contract Number: W912DR-18-D-0004
Applicable Document: QAPP Addendum: V	Norksheets #10, 17, 18 and 20_
Prepared By: Rebecca Williams	

Field Change Report No. FCR-FTBL-03

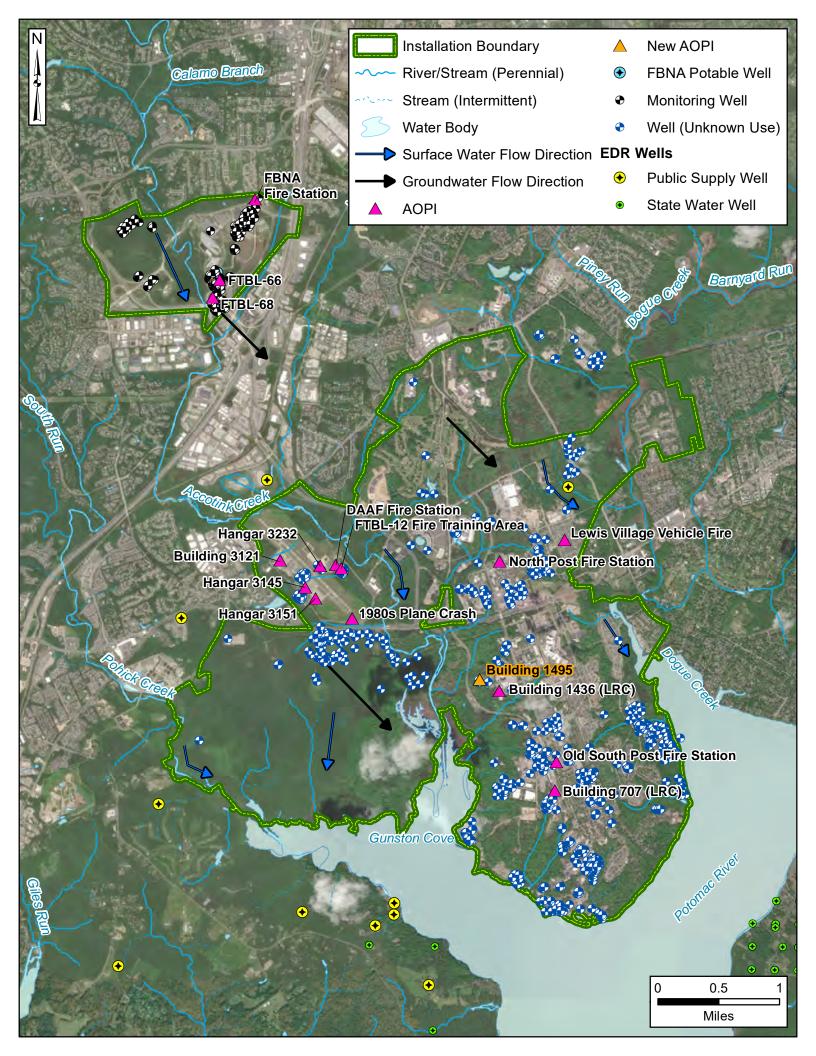
#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

No impact on the overall scope of project work beyond a delay in providing the draft PA/SI report for review is anticipated.

#### REMARKS

The Project/Data Quality Objectives (DQOs) (Worksheet #11), Sampling Design and Rationale (Worksheet #17), sampling methods within Worksheet #18, Field QC Summary (Worksheet #20), Field Standard Operating Procedures (Worksheet #21), and Field Equipment Calibration, Maintenance, Testing, and Inspection (Worksheet #22) as outlined in the September 2020 Fort Belvoir Final QAPP Addendum remain in place for the contents laid out in this addendum. The Preliminary Conceptual Site Model for the newly identified AOPI in this document will be updated and included in the PA/SI Report deliverable, but generally fit within the previously described conceptual site models in Worksheet #10 of the Fort Belvoir Final QAPP Addendum.







Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

	Field Change Report No. <u>FCR-FTBL-04</u>
Installation Name: <u>Fort Belvoir, Virginia</u>	Event Date: 11 March 2021
Project/Task No: <u>30001992.3DL10</u>	Contract Number: W912DR-18-D-0004
Applicable Document: QAPP Addendum: W	Vorksheets #17 and 18, and Figure 10
Prepared By: Rehecca Williams	

#### DESCRIPTION

The sampling approach for the Hangar 3145 area of potential interest (AOPI) and the Hangar 3151 AOPI were switched with each other during the site inspection (SI) field event. On the figures in the Preliminary Assessment/SI Report, the location labels for the Hangar 3145 AOPI and the Hangar 3151 AOPI are switched with each other (based on what was presented in Figure 10 of the Quality Assurance Project Plan Addendum.

#### REASON FOR CHANGE

The locations for the Hangar 3145 AOPI and the Hangar 3151 AOPI identified on Figure 10 of the Quality Assurance Project Plan Addendum are incorrect. The building identified as Hangar 3145 on Figure 10 is Hangar 3151, and the building identified as Hangar 3151 on Figure 10 is 3145. The location and hangar identifier for each of these two AOPIs were confirmed prior to commencing SI activities at the Hangar 3145 AOPI on 29 September 2020 and at the Hangar 3151 AOPI on 01 October 2020.

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

No anticipated impact on the overall scope of project work.

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No remarks or final comments.



Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

	Field Change Report No. <u>FCR-FTBL-05</u>	
Installation Name: <u>Fort Belvoir, Virginia</u>	Event Date: 11 March 2021	
Project/Task No: <u>30001992.3DL10</u>	Contract Number: W912DR-18-D-0004	
Applicable Document: QAPP Addendum: V	Vorksheets #17 and 18	
Prepared By: Rehecca Williams		

#### DESCRIPTION

The Quality Assurance Project Plan Addendum Worksheets #17 and #18 identified that shallow soil samples would be collected at an interval of 0 to 2 feet below ground surface (bgs). However, during the site inspection field event (27 September through 01 October 2020 and 10 March 2021), shallow soil samples were collected at intervals ranging from 0 to 2 feet bgs to 3 to 5 feet bgs.

#### REASON FOR CHANGE

The field team understood that the shallow soil samples should be collected from the top 2 feet of "native" soil. At many of the areas of potential interest, the field team encountered various thicknesses of nonnative material before reaching "native" soil; therefore, the 2-foot sample intervals varied.

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

No anticipated impact on the overall scope of project work.

#### REMARKS

No remarks or final comments.



Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

Field Change Report No. FCR-FTBL-06

Installation Name: Fort Belvoir, Virginia Event Date: 19 March 2021

Project/Task No: 30001992.3DL10 Contract Number: W912DR-18-D-0004

Applicable Document: QAPP Addendum: Worksheet #20, FCR-FTBL-03

Prepared By: Rebecca Williams

#### DESCRIPTION

Building 1495 operates as a hazardous waste 90-day storage facility. It has an aqueous film-forming foam fire-suppression system that includes a 55-gallon aqueous film-forming foam storage tank.

The sampling approach for the Building 1495 area of potential interest (AOPI) investigation was documented in Field Change Report FCR-FTBL-03: One shallow soil sample is proposed for northwest (downgradient) of the north loading dock and one shallow soil sample is proposed for southwest (downgradient) of the south loading dock. Two additional shallow soil samples are proposed for the two outfalls (downgradient) of the stormwater line associated with Building 1495. (Note: The sampling locations associated with the building's two loading docks, and the location for the northern stormwater line outfall and associated shallow soil sampling location, have been revised following site reconnaissance.)

The four shallow soil samples were collected on 10 March 2021. One of these samples was not identified on the chain of custody as requiring additional analyses (total organic carbon [TOC], pH, and grain size). No field duplicate sample and no equipment blank sample(s) were collected.

#### REASON FOR CHANGE

On 19 March 2021, it was realized that FCR-FTBL-03 did not identify that (1) a larger volume of soil would be collected for one of the four shallow soil samples to allow analysis for TOC, pH, and grain size, (2) a field duplicate sample would be collected, and (3) an equipment blank(s) would be collected. Due to the lack of full documentation of required sampling at the Building 1495 AOPI in FCR-FTBL-03 and an oversight during field activities, only the four normal parent samples were collected and they were shipped to the lab for analysis of per- and polyfluoroalkyl substances only.

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

A field duplicate sample and equipment blank sample(s) inadvertently were not collected; this does not affect the data quality objectives.

#### REMARKS

The Building 1436 (LRC) AOPI is located approximately 0.16 mile southeast of Building 1495. The TOC, pH, and grain size data are collected at each AOPI to show fate and transport. The geology encountered at Building 1436 (LRC) is very similar, if not identical, to that encountered at Building 1495. Therefore, the TOC, pH, and grain size data collected for the Building 1436 (LRC) AOPI (FTBL-B1436-01-SO-092720) will be used to show fate and transport (if necessary) at the Building 1495 AOPI.



Per- and Polyfluoroalkyl Substances Preliminary Assessment/Site Inspection

Fort Belvoir, Virginia

	Field Change Report No. FCR-FTBL-07	
Installation Name: <u>Fort Belvoir, Virginia</u>	Event Date: <u>24 March 2021</u>	
Project/Task No: <u>30001992.3DL10</u>	Contract Number: W912DR-18-D-0004	
Applicable Document: QAPP Addendum: W	orksheets #17 and 18	
Prenared By: Rehecca Williams		

#### DESCRIPTION

There is a discrepancy in the soil sample collection interval for the single soil sample to be collected from Hangar 3151 on Worksheets #17 and #18 (identified as Hangar 3145 on Worksheets #17 and #18; see FCR-FTBL-04). Worksheet #17 identifies that a "shallow soil sample (0 to 2 feet below ground surface) will be collected…" Worksheet #18 identifies that a soil sample will be collected at a depth of greater than 5 feet.

A soil sample (FTBL-H3151-01-SO) was collected in a grassy area to the northeast of Hangar 3151 from a soil interval of 1 to 3 feet below ground surface (the top 2 feet of native soil) on 1 October 2020. There was no reason to collect the soil sample at a depth greater than 5 feet.

#### **REASON FOR CHANGE**

There is a discrepancy in the soil sample collection interval for the single soil sample to be collected from Hangar 3151 on Worksheets #17 and #18 (identified as Hangar 3145 on Worksheets #17 and #18; see FCR-FTBL-04). It was determined that the soil sample depth provided for FTBL-H3151-01-SO on Worksheet #18 was an error and the correct interval was the top 2 feet of native soil.

#### IMPACT ON PRESENT AND COMPLETED WORK

(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)

No anticipated impact on the overall scope of project work.

REMARKS		
No remarks or final comments.		

# **APPENDIX M Data Usability Summary Report**



# USACE Baltimore PFAS PA/SI Fort Belvoir, Virginia

# DATA USABILITY SUMMARY REPORT

2020-2021 Sampling Events

June 14, 2021 Revised December 13, 2021

# DATA USABILITY SUMMARY REPORT

2020-2021 Sampling Events

Prepared for:

U.S. Army Environmental Command
U.S. Army Corps of Engineers Baltimore District
Fort Belvoir, Virginia

Lyndi Mott

**Program Chemist** 

nd le mos

Prepared by:

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Contract W912DR-13-D-0019

Arcadis Project: 30001992.3DL10

Date: June 14, 2021

Revised December 13, 2021

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#### DATA USABILITY SUMMARY REPORT

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# **TABLES**

Table 1. Data Usability Summary Table

# **ATTACHMENTS**

Data Validation Reports

#### **ACRONYMS AND ABBREVIATIONS**

%D percent difference

%R percent recovery

Arcadis U.S., Inc.

DoD Department of Defense

DUA data usability assessment

DUSR data usability summary report

DVR data validation report

EIS extracted internal standards

ELAP Environmental Laboratory Accreditation Program

ICV/CCV initial calibration verification/continuing calibration verification

LCS/LCSD laboratory control sample/laboratory control sample duplicate

LOQ limit of quantitation

MS/MSD matrix spike/matrix spike duplicate

NELAP National Environmental Laboratory Accreditation Program

PACE Pace Analytical South Carolina

PACE GC Pace Analytical Gulf Coast

PFAS per/polyfluoroalkyl substances

PQAPP Programmatic Uniform Federal Policy-Quality Assurance Project Plan

QAPP Quality Assurance Project Plan

QSM Quality System Manual

RPD relative percent difference

SDG sample delivery group

TOC total organic carbon

USDOD United States Department of Defense

USEPA United States Environmental Protection Agency

#### **EXECUTIVE SUMMARY**

This Data Usability Summary Report (DUSR) for Fort Belvoir located in Virginia for the 2020 through March 2021 sampling events describes the findings of the data review and validation and is provided to document the quality of the analytical data used for project decisions. A Data Usability Summary Table at the end of this DUSR lists the data that was qualified and the reason for qualification. Only the sample locations associated with this site and sampling event in the associated laboratory data packages and data validation reports are addressed in this report. The text below adds details where further discussion is warranted. The project-specific sampling and analysis, overall quality control (QC), and quality assurance protocols are presented in the Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP Arcadis 2019), and the Uniform Federal Policy-Quality Assurance Project Plan Addendum for Fort Belvoir, Virginia (QAPP Addendum Arcadis 2020).

Samples were shipped to Pace Analytical (Pace) located in West Columbia, South Carolina for analysis. The total organic carbon (TOC) analyses were subcontracted to Pace Gulf Coast (Pace GC) located in Baton Rouge, Louisiana. Pace and Pace GC are United States Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) and National Environmental Laboratory Accreditation Program (NELAP) accredited laboratories. The analytical sample delivery groups (SDGs) and associated Arcadis validation reports are listed in the table below. Summaries of the sample IDs and their associated laboratory IDs, SDGs, sampling dates, and analyses performed are provided in the laboratory reports and data validation reports (DVRs). Note the result pages in the DVRs may have a red line through specific or all compounds to indicate those results are not reportable. Results will be reported from either the initial, diluted, or re-extracted analysis.

In accordance with the project QAPP data review requirements, Stage 3, and 10 percent Stage 4 validation of the analytical data was performed by Arcadis project chemists that are independent of the project team. The validation was performed in accordance with the guidelines and control criteria specified in the following documents:

USDOD. Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3 May 2019.

USDOD. DoD General Data Validation Guidelines, November 2019.

USDOD. DoD Final Data Validation Guidelines Module 3: PFAS, May 2020.

Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP Arcadis 2019).

The laboratory data packages and validation reports that were reviewed for this DUSR are listed below.

Sample Delivery Groups (SDG)	Validation Report	Matrix	Parameters	Validation Level
VJ02021 220101411	39013R	Soil/Water	PFAS, TOC, Soil pH	Stage 3: 32 field samples, 4 field duplicates; Stage 4: 4 field samples

Sample Delivery Groups (SDG)	Validation Report	Matrix	Parameters	Validation Level
VJ05046 220101408	39091R	Soil/Water	PFAS, TOC, Soil pH	Stage 3: 10 field samples; Stage 4: 2 field samples
WC11006	41574R	Soil	PFAS	Stage 3: 3 field samples; Stage 4: 1 field sample

#### **PRECISION**

Precision is expressed as a relative percent difference (RPD) between the results of replicate sample analyses: sample duplicates, laboratory control sample duplicates (LCSDs), and matrix spike duplicates (MSDs). The RPD limit for LCSDs and MSDs is 30 percent. Field duplicates were collected at a frequency of 5 percent. Unless documented below or in the Data Usability Summary table, the RPD between the parent samples and associated field duplicates were within acceptable limits of 35 percent for water matrix and 50 percent for soil matrix.

Soil sample FTBL-DAAF-01-SO-092820 was identified as the parent sample to field duplicate DUP-1-092820. The evaluation of the parent sample and field duplicate indicate precision was within criteria of 50 percent RPD except for perfluorohexanesulfonic acid. An additional nine PFAS compounds were detected and met field duplicate criteria. Therefore, non-homogeneity is not suspect. The cause for the RPD exceedance is unknown.

Groundwater sample FTBL-12-01-GW-092820 was identified as the parent sample to field duplicate DUP-1-GW-092820. The evaluation of the parent sample and field duplicate indicate precision was within criteria of 35 percent RPD.

Groundwater sample FTBL-OSPFS-01-GW-092920 was identified as the parent sample to field duplicate DUP-3-092920. The evaluation of the parent sample and field duplicate indicate precision was within criteria of 35 percent RPD.

Surface water sample FTBL-66-68-01-SW-092920 was identified as the parent sample to field duplicate DUP-2-092920. The evaluation of the parent sample and field duplicate indicate precision was within criteria of 35 percent RPD.

#### **ACCURACY**

Accuracy is demonstrated by recovery of target analytes from fortified blank and sample matrices, LCS/LCSDs and MS/MSDs, respectively. The recovery of target analytes from fortified samples is compared to acceptance criteria. The criteria are listed in DoD QSM 5.3 Appendix C, Table C-44 and C-45. The criteria for EIS recoveries are 50 to 150 percent. In addition, Stage 4 validation of initial and continuing calibration results provide information on analytical accuracy. Unless documented below or in the Data Usability Summary table, the recoveries of LCS, MS/MSD, and extracted internal standards (EIS), and calibration criteria, were within acceptable limits.

As noted in the Data Usability Summary Table, EIS recoveries were outside control limits for many samples. Since EIS are associated with specified compounds, only a few compounds per sample may be qualified. Where EIS recoveries were less than 20 percent, and qualified as "X", a discussion of the potential impact on the reported results is in Conclusions.

#### **REPRESENTATIVENESS**

Representativeness is the degree to which sample data accurately and precisely represent site conditions and is dependent on sampling and analytical variability and the variability (or homogeneity) of the site itself. The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data.

All samples were collected and submitted for analysis in accordance with the procedures and sampling plan specified in the site QAPP and field SOPs. Analysis of samples was in accordance with the USACE PFAS PA/SI PQAPP, DoD QSM, and laboratory SOPs. All hold times were met except for soil pH as noted in the Data Usability Summary Table.

#### **SENSITIVITY**

Sensitivity describes the relationship between the laboratory quantitation limits and the project action limits. Reported laboratory quantitation limits are compared to the project detection limits to ensure that the analytical methods are capable of quantifying target analytes to a level that would satisfy DQOs.

The detection limits for the soil samples were elevated due to correction for percent moisture.

Sample locations FTBL-12-03-GW-092820 and FTBL-12-02-GW-092920 have elevated detection limits for PFAS compounds. An undiluted analysis was not reported due to the high concentration of target compounds.

The overall analysis is performed utilizing the isotope dilution procedure. Dilutions were needed to bring some compounds within the instrument calibration range. The laboratory refortified the extractable internal standards for the diluted analysis. This refortification negated the EIS isotope dilution, affecting the results in the diluted analysis. The diluted results are not representative of the original analysis performed as an isotope dilution; therefore, the diluted results have been qualified as estimated (DJ).

#### COMPLETENESS

The completeness for this data set met the criteria of 90 percent. Two results were qualified as potentially unusable with an "X" qualifier. The "X" qualifiers were due to extracted internal standards (EIS) exhibiting recoveries less than 20%, which is indicative of matrix interferences. A discussion of the affected results is below in Conclusions.

#### CONCLUSIONS

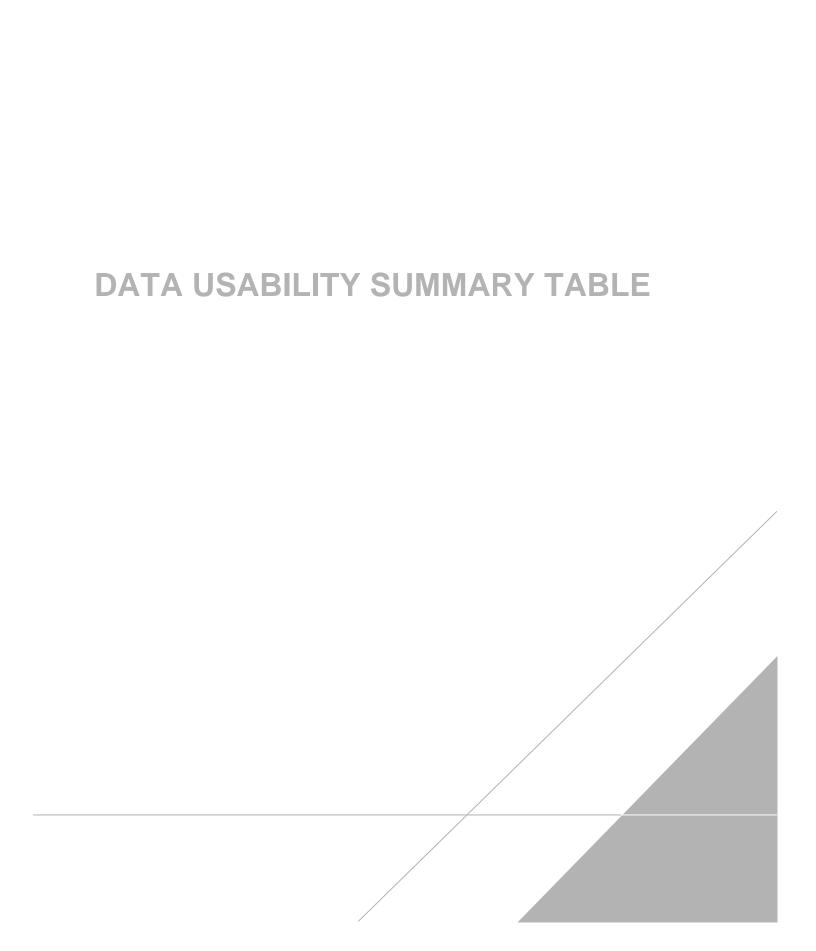
The overall assessment of the field samples, QA/QC data review by manual validation of the 2020 data set from Fort Belvoir met project requirements and completeness goals. Based upon the Stage 3 and Stage 4 data validation, all results are considered valid and usable except for the data qualified as "X".

#### DATA USABILITY SUMMARY REPORT

The results that are qualified as estimated are usable with caution. As the goal of these sampling events is to determine the presence or absence of PFAS, the detections are valid, but the reported concentration may be biased. If the data is evaluated against screening criteria, qualified results at or near the screening criteria should be evaluated considering the possible bias in the reported results.

The perfluorotetradecanoic acid results for sample locations FTBL-NPFS-01-GW-092720, and FTBL-B1436-01-GW-092720, were qualified "X" due to EIS recoveries less than 20%. Since perfluorotetradecanoic acid was not detected in these samples, it is recommended that these results should be rejected.

A decision to reject the "X" qualified data was agreed upon by the project team and USACE Chemist. Therefore, the "X" qualifier was revised to "R" for the perfluorotetradecanoic acid results for sample locations FTBL-NPFS-01-GW-092720, and FTBL-B1436-01-GW-092720.



### DATA USABILITY SUMMARY TABLE Fort Belvoir; 2020 – March 2021 Sampling Events

Sample Locations	Compound	Qualifier	Reason
FTBL-NPFS-01-GW-092720	Perfluorotetradecanoic acid	R	Extracted Internal Standard (EIS) %R less than 20%.
FTBL-H3232-01-GW- 093020 FTBL-H3151-01-GW- 100120	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
FTBL-B3121-02-GW-	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
100120	Perfluorooctane sulfonic acid	J+	LIO /orc less triair 50 /u.
	8:2 FTS N-EtFOSAA N-MeFOSAA Perfluorodecanoic acid Perfluorododecanoic acid Perfluorotridecanoic acid Perfluoroundecanoic acid	UJ	EIS %R less than 50%.
FTBL-B1436-01-GW-	Perfluorononanoic acid	J+	
092120	Perfluorotetradecanoic acid	R	EIS %R less than 20%.
			Secondary dilution. The isotope dilution was negated due to dilution and refortification
	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
FTBL-12-01-GW-092820	6:2 FTS Perfluorobutane sulfonic acid Perfluorobutanoic acid Perfluoroheptanoic acid Perfluorohexane sulfonic acid Perfluorohexanoic acid Perfluorooctane sulfonic acid Perfluorooctanoic acid Perfluoropentanoic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
DUP-1-GW-092820	6:2 FTS Perfluorobutane sulfonic acid Perfluorobutanoic acid Perfluoroheptanoic acid Perfluorohexane sulfonic acid Perfluorohexanoic acid Perfluorooctane sulfonic acid Perfluorooctanoic acid Perfluoropentanoic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification

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Sample Locations	Compound	Qualifier	Reason
FTBL-OSPFS-01-GW-	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
092920 DUP-3-092920	6:2 FTS Perfluorohexane sulfonic acid Perfluorooctane sulfonic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
	6:2 FTS 8:2 FTS N-EtFOSAA N-MeFOSAA Perfluorodecanoic acid Perfluorotetradecanoic acid Perfluorotridecanoic acid Perfluorotridecanoic acid Perfluoroundecanoic acid	UJ-	EIS %R less than 50% and Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
FTBL-1980PC-02-GW- 093020	Perfluorohexane sulfonic acid Perfluorooctanesulfonic acid	J+	EIS %R less than 50% and Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
	Perfluorobutanoic acid Perfluorobutane sulfonic acid Perfluoroheptanoic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluorooctanoic acid Perfluoropentanoic acid	UJ- non detects J- detects	Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
	N-EtFOSAA N-MeFOSAA Perfluorododecanoic acid Perfluorotetradecanoic acid Perfluorotridecanoic acid	UJ-	EIS %R less than 50% and Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
	Perfluorooctanesulfonic acid	J+	EIS %R less than 50% and Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
FTBL-1980PC-01-GW- 093020	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid Perfluorohexane sulfonic acid Perfluorobutanoic acid Perfluorodecanoic acid Perfluoroheptanoic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluoroctanoic acid Perfluoropentanoic acid Perfluoropentanoic acid Perfluoroundecanoic acid	UJ- non detects J- detects	Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
FTBL-MW-1R-093020	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid	J-	EIS %R greater than 150%.
	Perfluorohexane sulfonic acid Perfluorooctane sulfonic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification

Sample Locations	Compound	Qualifier	Reason
	8:2 FTS	J+	MSD %R; high bias
FTBL-DAAF-01-GW-092820	6:2 FTS Perfluorohexane sulfonic acid Perfluorooctane sulfonic acid Perfluoropentanoic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
FTBL-DAAF-02-SO-092820	Perfluoroheptanoic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluorooctanoic acid	J-	MS/MSD %R; low bias
	8:2 FTS	UJ	MS/MSD %R/RPD; low bias
FTBL-66-68-01-SW-092920	Perfluoropentanoic acid	J+	MS/MSD %R; high bias
	N-EtFOSAA N-MeFOSAA Perfluorododecanoic acid Perfluorotetradecanoic acid Perfluorotridecanoic acid	UJ-	Sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Possible low bias
FTBL-12-03-GW-092820	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid Perfluorobutanoic acid Perfluorodecanoic acid Perfluoroheptanoic acid Perfluorohexane sulfonic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluoroctane sulfonic acid Perfluoropentanoic acid Perfluoropentanoic acid Perfluoroundecanoic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
FTBL-12-02-SO-092920	Perfluorohexane sulfonic acid Perfluorooctane sulfonic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
FTBL-12-02-GW-092920	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid Perfluorobutanoic acid Perfluorodecanoic acid		Secondary dilution. The isotope dilution was negated due to dilution and refortification
FTBL-FBNAFS-01-GW- 100120	Perfluoropentanoic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and refortification
FTBL-DAAF-01-SO-092820 DUP-1-092820	Perfluorohexane sulfonic acid	J	Field duplicate RPD
FTBL-12-01-SO-092820 FTBL-1980PC-01-SO- 093020 FTBL-B1436-01-SO-092720 FTBL-DAAF-01-SO-092820 FTBL-H3145-01-SO-092920	рН	J	Hold time exceedance

Sample Locations	Compound	Qualifier	Reason
FTBL-LVCF-01-SO-092720 FTBL-NPFS-01-SO-092720 FTBL-OSPFS-01-SO-092920 FTBL-B3121-01-SO-100120 FTBL-FBNAFS-01-SO-100120 FTBL-H3151-01-SO-100120	рН	J	Hold time exceedance

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation.
- J+ (Estimated; may be biased high): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation and may be biased high.
- J- (Estimated; may be biased low): The compound or analyte was analyzed for and positively identified by the laboratory; however, the reported concentration is estimated due to non-conformances discovered during data validation and may be biased low.
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however, the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- UJ- (Non-detected estimated; may be biased low): The compound or analyte was reported as not detected by the laboratory; however, the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation and may be biased low.
- DJ (Estimated; diluted): The compound was analyzed for and positively identified by the laboratory. However, the concentration was greater than the calibration range. The result is reported from a secondary dilution that is within calibration range. The dilution required refortification of EIS, which negated isotope dilution. Therefore, reported result is an estimate.
- UB (Non-detect; contamination): Compound considered non-detect at the listed value due to associated blank contamination.
- BJ+ (Estimated; contamination): The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect and reported result may be biased high.
- X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
- R The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Rejection of the data was decided by the project team and USACE chemist.





# Fort Belvoir PFAS PA/SI

# **DATA REVIEW**

# Fort Belvoir, Virginia

Perfluoroalkyl Substances (PFAS), Total Organic Carbon, and Soil pH Analyses SDGs # VJ02021 and 220101411

Analyses Performed By:
Pace South Carolina
formerly Shealy Environmental Services
West Columbia, South Carolina

Report #39013R1

Review Level: Stage 3/4 Project: 30001992.3DL10

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # VJ02021 and 220101411 for samples collected in association with the Fort Belvoir Site. The review was conducted as a Stage 3/4 evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample		Ar	nalysis	
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	PFAS	тос	рН
FTBL-NPFS-01-SO-092720	VJ02021-001	Soil	9/27/2020		Х		Х
FTBL-NPFS-02-SO-092720	VJ02021-002	Soil	9/27/2020		Х		
FTBL-NPFS-01-GW-092720	VJ02021-003	Water	9/27/2020		Х		
FTBL-B1436-01-SO-092720	VJ02021-004	Soil	9/27/2020		Х		Х
FTBL-B1436-02-SO-092720	VJ02021-005	Soil	9/27/2020		Х		
FTBL-B1436-01-GW-092720	VJ02021-006	Water	9/27/2020		Х		
FTBL-LVCF-01-SO-092720	VJ02021-007	Soil	9/27/2020		Х		X
FTBL-LVCF-01-GW-092720	VJ02021-008	Water	9/27/2020		Х		
FTBL-B707-01-GW-092820	VJ02021-009	Water	9/28/2020		Х		
FTBL-DAAF-01-GW-092820	VJ02021-010	Water	9/28/2020		Х		
FTBL-DAAF-01-SO-092820	VJ02021-011	Soil	9/28/2020		Х		X
DUP-1-092820	VJ02021-012	Soil	9/28/2020	FTBL-DAAF-01-SO-092820	Х		
FTBL-DAAF-02-SO-092820	VJ02021-013	Soil	9/28/2020		Х		
FTBL-12-01-SO-092820	VJ02021-014	Soil	9/28/2020		Х		Х
FTBL-12-01-GW-092820	VJ02021-015	Water	9/28/2020		Х		
DUP-1-GW-092820	VJ02021-016	Water	9/28/2020	FTBL-12-01-GW-092820	Х		
FTBL-12-03-GW-092820	VJ02021-017	Water	9/28/2020		Х		
FTBL-12-02-SO-092920	VJ02021-018	Soil	9/28/2020		Х		
FTBL-12-02-GW-092920	VJ02021-019	Water	9/29/2020		Х		
FTBL-H3145-01-SO-092920	VJ02021-020	Soil	9/29/2020		Х		X
FTBL-H3145-01-GW-092920	VJ02021-021	Water	9/29/2020		Х		
FTBL-B3121-03-SO-092920	VJ02021-022	Soil	9/29/2020		Х		
FTBL-B3121-03-GW-092920	VJ02021-023	Water	9/29/2020		Х		
FTBL-OSPFS-01-SO-092920	VJ02021-024	Soil	9/29/2020		Х		Х
FTBL-OSPFS-02-SO-092920	VJ02021-025	Soil	9/29/2020		Х		
FTBL-OSPFS-01-GW-092920	VJ02021-026	Water	9/29/2020		Х		

		Sample			Analysis		
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	PFAS	тос	рН
DUP-3-092920	VJ02021-027	Water	9/29/2020	FTBL-OSPFS-01-GW-092920	Х		
FTBL-1980PC-02-SO-093020	VJ02021-028	Soil	9/30/2020		Х		
FTBL-1980PC-01-SO-093020	VJ02021-029	Soil	9/30/2020		Х		Х
FTBL-1980PC-02-GW-093020	VJ02021-030	Water	9/30/2020		Х		
FTBL-1980PC-01-GW-093020	VJ02021-031	Water	9/30/2020		Х		
FTBL-MW-1R-093020	VJ02021-032	Water	9/30/2020		Х		
FTBL-H3232-01-GW-093020	VJ02021-033	Water	9/30/2020		Х		
FTBL-66-68-01-SW-092920	VJ02021-034	Water	9/29/2020		Х		
FTBL-AOPC20-MW02-092920	VJ02021-035	Water	9/29/2020		Х		
FTBL-M18-MW31-092920	VJ02021-036	Water	9/29/2020		Х		
DUP-2-092920	VJ02021-037	Water	9/29/2020	FTBL-66-68-01-SW-092920	Х		
FTBL-M26-LTM-06-093020	VJ02021-038	Water	9/30/2020		Х		
FTBL-FATTS-LTM-MW08-093020	VJ02021-039	Water	9/30/2020		Х		
FTBL-PSA2009-MW42-093020	VJ02021-040	Water	9/30/2020		Х		
FTBL-NPFS-01-SO-092720	22010141101	Soil	9/27/2020			Х	
FTBL-B1436-01-SO-092720	22010141102	Soil	9/27/2020			Х	
FTBL-LVCF-01-SO-092720	22010141103	Soil	9/27/2020			Х	
FTBL-DAAF-01-SO-092820	22010141104	Soil	9/28/2020			Х	
FTBL-12-01-SO-092820	22010141105	Soil	9/28/2020			Х	
FTBL-H3145-01-SO-092920	22010141106	Soil	9/29/2020			Х	
FTBL-OSPFS-01-SO-092920	22010141107	Soil	9/29/2020			Х	
FTBL-1980PC-01-SO-093020	22010141108	Soil	9/30/2020			Х	

#### Notes:

- 1. Stage 4 validation was performed on sample locations FTBL-B1436-01-SO-092720, FTBL-12-03-GW-092820, FTBL-OSPFS-01-GW-092920 and FTBL-MW-1R-093020.
- 2. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample locations FTBL-DAAF-01-GW-092820, FTBL-DAAF-02-SO-092820, FTBL-12-03-GW-092820 and FTBL-H3232-01-GW-093020.

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	orted		mance ptable	Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		Х	
Master tracking list		Х		Х	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

The Arcadis field crew instructed the laboratory to revise the sample identification for the last five samples listed on page 4 of 4 of the chain of custody (coc). The coc listed the date in the sample identification as 290920 and 300920. The sample identification was revised to 092920 and 093020, During the revision, field duplicate DUP-2 (VJ02021-037) collected on 092920 was inadvertently logged in as 'DUP-2-093020.' Hence it is corrected as 'DUP-2-092920' for this data validation report.

During data validation, it was noted that field duplicate identification DUP-1-092820 was used twice; once for the soil and once for groundwater. The groundwater field duplicate was revised internally as DUP-1-GW-092820, and the soil field duplicate identification remains unchanged.

#### **ORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with USEPA Method 537, Pace (Shealy) Laboratories SOP ME00213-12 Determination of Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS (Isotope Dilution) QSM 5.3 Table B-15, Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, DoD Final Data Validation Guidelines Module 3: PFAS, May 2020, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified, and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes:

- Concentration (C) Qualifiers
  - U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The reported result was an estimated value with an unknown bias.
  - J+ The result was an estimated quantity, but the result may be biased high.
  - J- The result was an estimated quantity, but the result may be biased low.
  - UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

#### PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA modified	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
537 DoD QSM 5.3	Water	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

The holding time has been changed from the original holding time documented in EPA 537 of 14 days to extraction hold time that has now been changed to 28 days. This was documented in EPA Technical Brief EPA/600/F-17/022h Updated January 2020. Utilizing the new guidance of 28 days all samples were analyzed within the specified holding time criteria.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Calibration

Mass calibration and system performance were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration,  $r^2 \ge 0.99$ . Analytes must be within 70-130% of their true value for each calibration standard.

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with the initial and continuing calibrations were within the specified control limits.

#### 4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 70 to 130%.

All compounds associated with ISC recoveries were within control limits.

#### 4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.3 Table B-15.

The ion transitions were as specified in DoD QSM 5.3.

#### 5. Isotopically labeled Standards

#### 5.1 Extracted Internal Standards (EIS)

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to 150%.

Samples associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

Sample ID	EIS	Associated Compounds	EIS %R	
FTBL-NPFS-01-GW-092720	13C2_PFTeDA	PFTeDA	< 20%	
	13C2_8:2FTS	8:2 FTS	< 50% but > 20%	
	4202 DED-A	PFDoA	4 F00/ hut > 200/	
	13C2_PFDoA	PFTrDA	< 50% but > 20%	
	13C2_PFTeDA	PFTeDA	< 20%	
FTBL-B1436-01-GW-092720	13C6_PFDA	PFDA	< 50% but > 20%	
	13C7_PFUdA	PFUdA	< 50% but > 20%	
	13C9_PFNA	PFNA	< 50% but > 20%	
	d5-EtFOSAA	EtFOSAA	< 50% but > 20%	
	d3-MeFOSAA	MeFOSAA	< 50% but > 20%	
FTBL-12-01-GW-092820	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
DUP-1-GW-092820	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
FTBL-OSPFS-01-GW-092920	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
DUP-3-092920	13C2_PFTeDA	PFTeDA	< 50% but > 20%	

Sample ID	EIS	Associated Compounds	EIS %R	
	13C2_6:2FTS	6:2FTS	< 50% but > 20%	
	13C2_8:2FTS	8:2FTS	< 50% but > 20%	
		PFDoA		
	13C2_PFDoA	PFTrDA	< 50% but > 20%	
	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
FTBL-1980PC-02-GW-093020	13C3_PFHxS	PFHxS	< 50% but > 20%	
	13C6_PFDA	PFDA	< 50% but > 20%	
	13C7_PFUdA	PFUdA	< 50% but > 20%	
	13C8_PFOS	PFOS	< 50% but > 20%	
	d5-EtFOSAA	EtFOSAA	< 50% but > 20%	
	d3-MeFOSAA	MeFOSAA	< 50% but > 20%	
	1000 PED 4	PFDoA	. 500/ 1 1 2 000/	
	13C2_PFDoA	PFTrDA	< 50% but > 20%	
FTBL-1980PC-01-GW-093020	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
11BE 13001 0 01 0W-030020	13C8_PFOS	PFOS	< 50% but > 20%	
	d5-EtFOSAA	EtFOSAA	< 50% but > 20%	
	d3-MeFOSAA	MeFOSAA	< 50% but > 20%	
	13C2_6:2 FTS	6:2 FTS	> 150%	
FTBL-MW-1R-093020	13C2_8:2 FTS	8:2 FTS	> 150%	
	13C3_PFBS	PFBS	> 150%	
FTBL-H3232-01-GW-093020	13C2_PFTeDA	PFTeDA	< 50% but > 20%	
FTBL-AOPC20-MW02-092920	13C2_6:2FTS	6:2FTS	> 150%	

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
4500	Non-detect	No Action
> 150%	Detect	J-
500/ 1 / 000/	Non-detect	UJ
< 50% but > 20%	Detect	J+
	Non-detect	Х
< 20%	Detect	X

#### 6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the DoD QSM 5.3

acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be  $\leq 30\%$ .

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on samples where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Samples associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample ID	Compounds	MS Recovery	MSD Recovery
	8:2 FTS	AC	> UL
	6:2 FTS	SR>4X	SR>4X
	PFHxS	SR>4X	SR>4X
	PFHpA	SR>4X	SR>4X
FTBL-DAAF-01-GW-092820	PFHxA	SR>4X	SR>4X
	PFNA	SR>4X	SR>4X
	PFPeA	SR>4X	SR>4X
	PFOS	SR>4X	SR>4X
	8:2 FTS	AC	< LL but > 10%
	PFHxS	SR>4X	SR>4X
	PFHpA	AC	< LL but > 10%
FTBL-DAAF-02-SO-092820	PFHxA	< LL but > 10%	AC
	PFNA	AC	< LL but > 10%
	PFOA	< LL but > 10%	< LL but > 10%
	PFOS	SR>4X	SR>4X
FTBL-12-03-GW-092820	All target PFAS compounds	D	D
FTBL-66-68-01-SW-092920	PFPeA	> UL	> UL

#### Notes:

AC Acceptable

D Spiked compounds were diluted out

LL Lower control limit

SR>4X Sample result is greater than 4 times the added spike

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
	Non-detect	No Action
> the upper control limit (UL)	Detect	J+
< the lower control limit (LL) but > 10%	Non-detect	UJ

Control Limit	Sample Result	Qualification	
	Detect	J-	
. 40%	Non-detect	X	
< 10%	Detect	J-	
SR>4X: Parent sample concentration > four times the MS/MSD	Detect	No Action	
spiking solution concentration.	Non-detect		
D: Sample, MS, and MSD analyzed at dilution due to concentration of	Detect		
target compounds; spiked compounds diluted below detection limit	Non-detect	No Action	

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample ID	Compounds
FTBL-DAAF-02-SO-092820	8:2 FTS

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
000	Non-detect	UJ
> 30%	Detect	J

#### 7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

## 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 50% for soils is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

Results for field duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compounds	Sample Result (mg/kg, ng/l)	Duplicate Result (mg/kg, ng/l)	RPD
	PFHxS	0.016	0.027	51.1%
	PFBA	0.0021	0.0024	AC
	PFDA	0.00072 J	0.0010 J	AC
	PFHpA	0.0063	0.0077	20.0%
FTBL-DAAF-01-SO-092820 /	PFHxA	0.016	0.021	27.0%
DUP-1-092820	PFNA	0.0015	0.0022	AC
	PFOA	0.0036	0.0051	AC
	PFPeA	0.013	0.016	20.7%
	PFUdA	0.00077 J	0.0012 J	AC
	PFOS	0.045	0.066	37.8%
	8:2 FTS	35	29	AC
	6:2 FTS	10000	10000	0.0%
	PFBS	730	740	1.4%
	PFHxS	16000	16000	0.0%
	PFBA	960	940	2.1%
	PFDA	12	11	AC
FTBL-12-01-GW-092820 / DUP-1-GW-092820	PFHpA	1700	1700	0.0%
20. 1 011 002020	PFHxA	6400	6400	0.0%
	PFNA	340	340	0.0%
	PFOA	12000	12000	0.0%
	PFPeA	5800	5700	1.7%
	PFUdA	2.3 J	2.2 J	AC
	PFOS	6200	5900	5.0%
	8:2 FTS	59	60	1.7%
	6:2 FTS	980	1000	2.0%
	PFBS	91	94	3.2%
FTBL-OSPFS-01-GW-092920 /	PFHxS	680	600	12.5%
DUP-3-092920	PFBA	160	150	6.4%
	PFHpA	140	130	7.4%
	PFHxA	450	410	9.3%
	PFNA	24	26	8.0%

Sample ID/Duplicate ID	Compounds	Sample Result (mg/kg, ng/l)	Duplicate Result (mg/kg, ng/l)	RPD
	PFOA	160	150	6.4%
	PFPeA	550	560	6.4%
	PFOS	1100	840	26.8%
	PFBS	5.7	4.5	AC
	PFHxS	8.1	8.0	AC
	PFBA	11	9.5	AC
	PFHpA	6.9	5.5	AC
FTBL-66-68-01-SW-092920 / DUP-2-092920	PFHxA	12	9.3	AC
20. 2002020	PFNA	2.9 J	2.3 J	AC
	PFOA	11	9.2	AC
	PFPeA	14	14	AC
	PFOS	8.3	7.2	AC

NOTE:

AC Acceptable NC Not compliant

The compound PFHxS associated with samples FTBL-DAAF-01-SO-092820 and DUP-1-092820 exhibited a field duplicate RPD greater than the control limit. The associated sample results from samples for the listed analyte were qualified as estimated.

The calculated RPD and results between the parent sample FTBL-12-01-GW-092820 and field duplicate DUP-1-092820 were acceptable.

The calculated RPD between the parent sample FTBL-OSPFS-01-GW-092920 and field duplicate DUP-3-092920 were acceptable.

The results between the parent sample FTBL-66-68-01-SW-092920 and field duplicate DUP-2-092920 were acceptable.

#### 9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compounds	Original Analysis	Diluted Analysis	Reported Analysis
	Perfluorohexanesulfonic acid (PFHxS)		1100	1100 DJ
	Perfluoro-n-butanoic acid (PFBA)		1200	1200 DJ
FTBL-B1436-01-GW-	Perfluoro-n-hexanoic acid (PFHxA)		3000	3000 DJ
092720	Perfluoro-n-octanoic acid (PFOA)		270	270 DJ
	Perfluoro-n-pentanoic acid (PFPeA)		5500	5500 DJ
	Perfluorooctanesulfonic acid (PFOS)		1400	1400 DJ
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		970	970 DJ
FTBL-DAAF-01-GW- 092820	Perfluorohexanesulfonic acid (PFHxS)		1900	1900DJ
	Perfluoro-n-pentanoic acid (PFPeA)		1300	1300 DJ
	Perfluorooctanesulfonic acid (PFOS)		2500	2500 DJ
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		10000	10000 DJ
	Perfluoro-1-butanesulfonic acid (PFBS)		730	730 DJ
	Perfluorohexanesulfonic acid (PFHxS)		16000	16000 DJ
FTBL-12-01-GW-092820	Perfluoro-n-butanoic acid (PFBA)		960	960 DJ
	Perfluoro-n-heptanoic acid (PFHpA)		1700	1700 DJ
	Perfluoro-n-hexanoic acid (PFHxA)		6400	6400 DJ
	Perfluoro-n-octanoic acid (PFOA)		12000	12000 DJ
	Perfluoro-n-pentanoic acid (PFPeA)		5800	5800 DJ
	Perfluorooctanesulfonic acid (PFOS)		6200	6200 DJ
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		10000	10000 DJ
DUP-1-GW-092820	Perfluoro-1-butanesulfonic acid (PFBS)		740	740 DJ
	Perfluorohexanesulfonic acid (PFHxS)		16000	16000 DJ
	Perfluoro-n-butanoic acid (PFBA)		940	940 DJ
	Perfluoro-n-heptanoic acid (PFHpA)		1700	1700 DJ
	Perfluoro-n-hexanoic acid (PFHxA)		6400	6400 DJ
	Perfluoro-n-octanoic acid (PFOA)		12000	12000 DJ

Sample ID	Compounds	Original Analysis	Diluted Analysis	Reported Analysis
	Perfluoro-n-pentanoic acid (PFPeA)		5700	5700 DJ
	Perfluorooctanesulfonic acid (PFOS)		5900	5900 DJ
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)		270	270 DJ
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		15000	15000 DJ
	Perfluoro-1-butanesulfonic acid (PFBS)		3100	3100 DJ
	Perfluorohexanesulfonic acid (PFHxS)		60000	60000 DJ
FTBL-12-03-GW-092820	Perfluoro-n-butanoic acid (PFBA)		2600	2600 DJ
	Perfluoro-n-decanoic acid (PFDA)		44	44 DJ
	Perfluoro-n-heptanoic acid (PFHpA)		4700	4700 DJ
	Perfluoro-n-hexanoic acid (PFHxA)		20000	20000 DJ
	Perfluoro-n-nonanoic acid (PFNA)		2700	2700 DJ
	Perfluoro-n-octanoic acid (PFOA)		52000	52000 DJ
	Perfluoro-n-pentanoic acid (PFPeA)		12000	12000 DJ
FTBL-12-02-SO-092920	Perfluorohexanesulfonic acid (PFHxS)		0.44	0.44 DJ
	Perfluorooctanesulfonic acid (PFOS)		1.2	1.2 DJ
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)		44	44 DJ
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		8500	8500 DJ
	Perfluoro-1-butanesulfonic acid (PFBS)		1600	1600 DJ
	Perfluorohexanesulfonic acid (PFHxS)		14000	14000 DJ
FTBL-12-02-GW-092920	Perfluoro-n-butanoic acid (PFBA)		1400	1400 DJ
	Perfluoro-n-decanoic acid (PFDA)		9.8 J	9.8 DJ
	Perfluoro-n-heptanoic acid (PFHpA)		2000	2000 DJ
	Perfluoro-n-hexanoic acid (PFHxA)		9500	9500 DJ
	Perfluoro-n-nonanoic acid (PFNA)		290	290 DJ
	Perfluoro-n-octanoic acid (PFOA)		9200	9200 DJ
	Perfluoro-n-pentanoic acid (PFPeA)		7500	7500 DJ

Sample ID	Compounds	Original Analysis	Diluted Analysis	Reported Analysis
	Perfluorooctanesulfonic acid (PFOS)		4300	4300 DJ
FTBL-OSPFS-01-GW- 092920	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		980	980 DJ
	Perfluorohexanesulfonic acid (PFHxS)		680	680 DJ
	Perfluorooctanesulfonic acid (PFOS)		1100	1100 DJ
DUP-3-092920	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)		1000	1000 DJ
	Perfluorohexanesulfonic acid (PFHxS)		600	600 DJ
	Perfluorooctanesulfonic acid (PFOS)		840	840 DJ
FTBL-MW-1R-093020	Perfluorohexanesulfonic acid (PFHxS)		800	800 DJ
	Perfluorooctanesulfonic acid (PFOS)		1400	1400 DJ

Note: the lab didn't report the original analysis; only the diluted result.

Sample location FTBL-12-03-GW-092820 was analyzed at a 20-fold and 200-fold dilution. Therefore, all detected results are qualified as DJ.

Sample location FTBL-12-02-GW-092920 was analyzed at a 5-fold and 50-fold dilution. Therefore, all detected results are qualified as DJ.

The overall analysis is performed utilizing the isotope dilution procedure. A dilution was needed to bring the compounds presented in the table above within the instrument calibration range. The dilution required the laboratory to refortify the extractable internal standard. This refortification negated the EIS isotope dilution, affecting the results in the diluted analysis. The diluted results are not representative of the original analysis performed as an isotope dilution; therefore, the diluted results have been qualified as estimated (J).

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range. The isotope dilution was negated due to dilution and refortification.	DJ

#### 10. System Performance and Overall Assessment

The case narrative notes that samples FTBL-NPFS-01-GW-092720, FTBL-B1436-01-GW-092720, FTBL-LVCF-01-GW-092720, FTBL-DAAF-01-GW-092820, FTBL-12-01-GW-092820, DUP-1-092820, FTBL-12-03-GW-092820, FTBL-12-03-GW-092920, FTBL-12-03-GW-092920, FTBL-12-03-GW-092920, FTBL-12-03-GW-092920, FTBL-1980PC-01-GW-093020, FTBL-1980PC-01-GW-093020, FTBL-MW-1R-093020, FTBL-H3232-01-GW-093020, FTBL-AOPC20-MW02-092920, FTBL-M18-MW31-092920 and FTBL-M26-LTM-06-093020 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were

spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <10mL and reconstituted to 10mL using MeOH by transfer pipet.

For samples FTBL-12-03-GW-092820 (and MS/MSD), FTBL-1980PC-02-GW-093020 and FTBL-1980PC-01-GW-093020, sample matrix prevented full volume from being extracted, precluding method mandated bottle rinse. Elution solvent was aliquoted directly into the reservoir, rinsing the inside. Therefore, all PFAS compounds are qualified as estimated (UJ-, J-) for samples FTBL-12-03-GW-092820 (and MS/MSD), FTBL-1980PC-02-GW-093020 and FTBL-1980PC-01-GW-093020.

The perfluorotetradecanoic acid results for sample locations FTBL-NPFS-01-GW-092720 and FTBL-B1436-01-GW-092720 were qualified "X" due to EIS recoveries less than 20%. After review with the project team and USACE chemist, the results were rejected and the final qualifier has been revised from "X" to "R" on December 13, 2021.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## **DATA VALIDATION CHECKLIST FOR PFAS**

PFAS: 537M/DoD QSM 5.3		oorted		rmance ptable	Not		
	No	Yes	No	Yes	Required		
LIQUID CHROMATOGRAPHY/MASS SPECTROME	LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)						
Stage 2 Validation							
Holding times		Х		Х			
Reporting limits (units)		Х		Х			
Blanks		1					
A. Method blanks		Х		Х			
B. Equipment blanks	Х				Х		
C. Field blanks	Х				Х		
Laboratory Control Sample (LCS) %R		Х		Х			
Laboratory Control Sample Duplicate (LCSD) %R	Х				Х		
LCS/LCSD Precision (RPD)	Х				Х		
Matrix Spike (MS) %R		Х	Х				
Matrix Spike Duplicate (MSD) %R		Х	Х				
MS/MSD Precision (RPD)		Х		Х			
Field Duplicate (RPD)		Х	Х				
Extracted Internal Standard %R		Х	Х				
Dilution Factor		Х		Х			
Moisture Content		Х		Х			
Stage 3/4 Validation		1					
Instrument tune and performance check		Х		Х			
Initial calibration %RSDs		Х		Х			
Continuing calibration %Ds		Х		Х			
Instrument sensitivity check		Х		Х			
lon transitions used		Х		Х			
Compound identification and quantitation							
A. Reconstructed ion chromatograms		Х		Х			
B. Quantitation Reports		Х		Х			
C. RT of sample compounds within the established RT windows		х		х			
D. Ion Ratio %D		Х		Х			

PFAS: 537M/DoD QSM 5.3		orted		mance ptable	Not					
	No	Yes	No	Yes	Required					
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)										
E. Transcription/calculations acceptable		Х		Х						
F. Reporting limits adjusted to reflect sample dilutions		х		Х						

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

#### **INORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 9045D and 9060A. Data were reviewed in accordance with Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes:

- Concentration (C) Qualifiers
  - U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.
  - J The reported value was obtained from a reading less than the limit of detection (LOQ), but greater than or equal to the detection limit (DL).
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
- Validation Qualifiers
  - J The reported result was an estimated value with an unknown bias.
  - J+ The result was an estimated quantity, but the result may be biased high.
  - J- The result was an estimated quantity, but the result may be biased low.
  - UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
  - UB Analyte considered non-detect at the listed value due to associated blank contamination.
  - X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

#### **GENERAL CHEMISTRY ANALYSES**

## 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation		
Total Organic Carbon (TOC) by SW846 9060A	Soil	28 days from collection to analysis	Cool to <6 °C.		
pH by SW846 9045D	Soil	Within 24 hours of receipt at laboratory	Cool to <6 °C.		

The analyses that exceeded the holding time are presented in the following table.

Sample ID	Holding Time	Criteria
FTBL-NPFS-01-SO-092720 FTBL-B1436-01-SO-092720 FTBL-LVCF-01-SO-092720	9 days from collection; 5 days from receipt	
FTBL-DAAF-01-SO-092820	16 days from collection; 13 days from receipt	
FTBL-12-01-SO-092820	8 days from collection; 5 days from receipt	Within 24 hours of receipt at laboratory
FTBL-H3145-01-SO-092920 FTBL-OSPFS-01-SO-092920	7 days from collection; 5 days from receipt	
FTBL-1980PC-01-SO-093020	6 days from collection; 5 days from receipt	

Sample results associated with samples analyzed by analytical method SW-846 9045D were qualified, as specified in the table below. All other holding times were met.

	Qualification
Criteria	Detected Analytes
Analysis completed past holding time	J

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

TOC was not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

pH: The initial and continuing calibration criteria were within the acceptance criteria of  $\pm$  0.05 SU of the true value.

#### 4. Matrix Spike (MS)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

#### 4.1 MS Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS recovery control limits do not apply for MS performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater.

A MS analysis was not performed for TOC.

#### 4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the LOQ. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of one time the LOQ is applied for water matrices and two times the LOQ for soil matrices.

The difference between the sample result and the laboratory duplicate result must be within QAPP specified control limit of less than or equal to 0.1 su. for pH.

A laboratory duplicate analysis was not performed for TOC and pH.

#### 5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of three times the LOQ is applied for soil matrices.

A field duplicate was not collected on a sample for TOC and pH analysis.

#### 6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

#### 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## **DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY**

General Chemistry: SW846 9045D/9060A	Rep	orted		Performance Acceptable		
	No	Yes	No	Yes	Required	
Miscellaneous Instrumentation						
Stage 2 Validation						
Holding times		X	X			
Reporting limits (units)		X		X		
Blanks						
A. Method blanks		X		X		
B. Equipment blanks	Х				Х	
Laboratory Control Sample (LCS) %R		X		Х		
Laboratory Control Sample Duplicate (LCSD) %R	Х				Х	
LCS/LCSD Precision (RPD)	Х				Х	
Matrix Spike (MS) %R	Х				Х	
Matrix Spike Duplicate (MSD) %R	Х				Х	
MS/MSD Precision (RPD)	Х				Х	
Lab Duplicate (RPD)	Х				Х	
Field Duplicate (RPD)	Х				Х	
Dilution Factor		Х		Х		
Moisture Content		Х		Х		
Stage 3/4 Validation pH only						
Initial calibration		X		Х		
Continuing calibration %R		Х		Х		
Raw Data		Х		Х		
Transcription/calculations acceptable		Х		Х		
Reporting limits adjusted to reflect sample dilutions		Х		Х		

## Notes:

%R - percent recovery

RPD - relative percent difference

VALIDATION PERFORMED BY: Pruthvi Kumar C, Arcadis

SIGNATURE:

DATE: November 12, 2020

PEER REVIEW: Lyndi Mott, Arcadis

DATE: November 16, 2020/ December 13, 2021

# Stage 3 / 4 PFAS Calibration Standards

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 1

 Project:
 Fort Belvoir
 Validated by:
 PK

**Method:** EPA modified 537 per DoD QSM 5.3

Instrument : LCMSMS02

PFHxS 10/6/2020 Calibration Page 721-731 of SDG VJ02021

1111/3 10/	0/ 2020 Calibi	ation			Tuge 721 7	31 01 300	V302021			_
						Calc		%R Calc		
						Amount		Amount/	Reported	
Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	RF	ng/L	Tvalue ng/L	Tvalue	%R	
45.5	9542	198794	1000	0.047999	1.091143	43.99	45.5	96.68	96.7	MATCH
91	19561	198221	1000	0.098683	1.091143	90.44	91	99.38	99.4	MATCH
182	38756	206960	1000	0.187263	1.091143	171.62	182	94.30	94.3	MATCH
455	95332	195328	1000	0.488061	1.091143	447.29	455	98.31	98.3	MATCH
910	203983	194975	1000	1.046201	1.091143	958.81	910	105.36	105	MATCH
1820	414126	201634	1000	2.05385	1.091143	1882.29	1820	103.42	103	MATCH
4550	899394	188048	1000	4.78279	1.091143	4383.28	4550	96.34	96.3	MATCH
9100	1887391	178671	1000	10.5635	1.091143	9681.13	9100	106.39	106	MATCH
13650	2828303	190133	1000	14.87539	1.091143	13632.85	13650	99.87	99.9	MATCH
18200	3711152	186975	1000	19.84839	1.091143	18190.45	18200	99.95	100	MATCH

Calculated Amount pg/ml = ((Area Ratio x EIS Conc)/RF)

# Stage 3 / 4 PFAS ICV CCV Standards %R

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 2

 Project:
 Fort Belvoir
 Validated by:
 PK

**Method:** EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02 File ID: 100620017.d

ICV 500_SVLC-1109 10/6/2020 13:41:31 Page 915-916 of SDG VJ02021

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFHpS	488.71	475	102.89	103	MATCH
PFNA	511.35	500	102.27	102	MATCH
PFOS	432.79	462.75	93.53	93.5	MATCH

Instrument: LCMSMS02 File ID: 100820045.d

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFHpS	891.34	952	93.63	93.6	MATCH
PFNA	1093.96	1000	109.40	109	MATCH
PFOS	946	928	101.94	102	MATCH

Stage 3 / 4 PFAS LCS

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 3

 Project:
 Fort Belvoir
 Validated by:
 PK

**Method:** EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02

LCS VQ69283-002 Page 722 & 2061-2065 of SDG VJ02021

File ID: 100920014.d

							Extract						
						Calculated	Final	Extracted					
			EIS Conc			Amount	Volume	Sample	Calculated	Tvalue	Calculated	Reported	
Analyte	Std Area	EIS Area	ng/ml	Area Ratio	RF	ng/ml	mls	Volume mls	ng/L	ng/L	% R	%R	
PFBS	88701	221170	1001	0.401053	1.133731	354.10	10	250	15.565	14	111.18	110	MAT
PFOS	63476	145094	1001	0.437482	1.210077	361.89	10	250	15.907	15	106.05	107	MAT
PFBA	250395	630864	1001	0.396908	0.997732	398.21	10	250	17.504	16	109.40	109	MAT

Differences in the %R may be due to rounding of the true value

Calculated amount pg/ml = (Peak area ratio/RF) x DF x EIS conc ng/ml

Calculated amount ng/L = ((calculated pg/ml x 10 mls) / extracted sample volume mls) / 0.91

# Stage 3 / 4 PFAS MS/MSD

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 4

 Project:
 Fort Belvoir
 Validated by:
 PK

Method: EPA modified 537 per DoD QSM 5.3

MS/MSD Sample ID <u>FTBL-12-03-GW-092820</u> Page 2123 and 2193 SDG VJ02021

ANALYTE EtFOSAA
REPORTED MS %R 108
REPORTED MSD %R 122
REPORTED RPD 13

 Sample Concentration
 0

 MS Concentration
 14.109
 MS %R
 108.53 MATCH

 MSD Concentration
 16.117
 MSD %R
 123.98 MATCH

 MS TV
 13
 RPD
 13.29 MATCH

 MSD TV
 13
 MSD TV
 13

Differences in %R may be due to rounding of the true value

# Stage 3 / 4 PFAS Sample Concentration

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 5

 Project:
 Fort Belvoir
 Validated by:
 PK

Method: EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B1436-01-SO-092720 Lab ID: VJ02021-004 Page 197 of SDG VJ02021

Final volume = 10ml; Weight = 1.19 gm; %Solids = 88.1%

							Dry			
							Weight		Reported	
						Calculated	Value	Calculated	Value	
Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Amount pg/g	pg/g	mg/kg	mg/kg	
PFHxS	43749	171412	1001	0.255227	1.091143	1967.58	2233.348	0.00245	0.0025	MATCH
PFHpA	89627	554826	1001	0.161541	1.054926	1288.09	1462.08	0.00161	0.0016	MATCH
PFHxA	154667	658145	1001	0.235004	1.018777	1940.37	2202.461	0.00242	0.0024	MATCH

Calculated Amount pg/ml = ((Area Ratio x EIS Conc)/RF) pg/g = (pg/ml x FV ml)/ Weight g pg/g dry weight = pg/g / (%TS/100) mg/kg = (pg/g x  $10^{-6}$ )/0.91 extract volume correction factor

Field Sample: FTBL-12-03-GW-092820 Lab ID: VJ02021-017 Page 386 of SDG VJ02021

DF = 200

											_
							Extract				
							Final	Extracted			
						Calculated	Volume	Sample	Calculated	Reported	
Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Amount pg/ml	mls	Volume mls	ng/L	ng/L	
PFHxS	1545944	188946	1100	8.181936	1.091143	8248.35	10	277	59554.87	60000	MATCH
PFHxA	1881995	734768	1100	2.561346	1.018777	2765.55	10	277	19967.88	20000	MATCH
PFOS	701781	164408	1100	4.268533	1.210077	3880.24	10	277	28016.16	28000	MATCH

Calculated amount pg/ml = (Peak area ratio/RF) x EIS conc ng/ml
Calculated amount ng/L = ((calculated pg/ml x 10 mls) / extracted sample volume mls) * DF

Field Sample: FTBL-OSPFS-01-GW-092920 Lab ID: VJ02021-026 Page 503 of SDG VJ02021

							Extract				
							Final	Extracted			
						Calculated	Volume	Sample	Calculated	Reported	
Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Amount pg/ml	mls	Volume mls	ng/L	ng/L	
PFBA	5931771	1482936	1001	4.000018	1.042508	3840.76	10	266	158.67	160	MATCH
PFNA	755465	1392234	1001	0.542628	0.918801	591.17	10	266	24.42	24	MATCH

Field Sample: FTBL-MW-1R-093020 Lab ID: VJ02021-032 Page 595 of SDG VJ02021

							Extract				]
							Final	Extracted			
						Calculated	Volume	Sample	Calculated	Reported	
Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Amount pg/ml	mls	Volume mls	ng/L	ng/L	
PFBS	860159	698865	1001	1.230794	1.301024	946.97	10	273	38.12	38	MATO
PFBA	985220	910319	1001	1.08228	1.042508	1039.19	10	273	41.83	42	MATO

Calculated amount pg/ml = (Peak area ratio/RF) x EIS conc ng/ml
Calculated amount ng/L = ((calculated pg/ml x 10 mls) / extracted sample volume mls) / 0.91

# Stage 3 / 4 PFAS EIS

 SDG #:
 VJ02021
 Date:
 11/10/2020

 Lab:
 Pace (Shealy)
 Page:
 6

 Project:
 Fort Belvoir
 Validated by:
 PK

**Method:** EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B1436-01-SO-092720 Lab ID: VJ02021-004

EIS 13C8_PFOS

REPORTED EIS %R 83

%R = 100 * EIS Area

CCV 100 EIS Area

EIS Area 135460 Page 198 of SDG VJ02021
CCV 100 EIS Area 163819 Page 1146 of SDG VJ02021

%R 82.7 MATCH

Field Sample: FTBL-B1436-01-SO-092720 Lab ID: VJ02021-004

EIS 13C8_PFOA

REPORTED EIS %R 88

%R = 100 * EIS Area CCV 100 EIS Area

EIS Area 594011 Page 198 of SDG VJ02021
CCV 100 EIS Area 678243 Page 1146 of SDG VJ02021
%R 87.6 MATCH

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

# PACE ANALYTICAL SERVICES, LLC

106 Vantage Point Drive • West Columbia, SC 29172 Telephone No. 803-791-9700 Fax No. 803-791-9111 www.pacelabs.com

		Report to	Contact					PF	3<	$ \bar{n}$	alepine	ne No	/E-m	ail Artes	Cas A	5.00			Quote No.
ARCAUS		AFTON		<u>s / Ju</u>	g IIV	COF	FEY!		MIL	- 15	5. ISS I	N.CC	PEEY	CA	DIS . C. CADIS opade is	COLL			
Address		Sampler's								A	mariye.	e (Atta	ch yst.	у тогы	араан ты	Medec	,		Page 1 of 4
9954 MAYLAND DR. SUITE 24	<u>100</u>	-	(	Kar	2					Ļ	3	7						T	Lot # Bar Gode
City Line	Code 3233	Printed No	ama	()							줿	ļ				ı			FOR THE LACK ARE LICE LICE AND A
Desired Home			justi	o co	ecesi					1	Ĕ	1		إلى			i		
FORT BELYOLE   ARMY PEAS SL			1		1	_	la of Oar	nteinen		1	9			512				1	VJ02021
Project No. 3000198(2 , 305.10	P.O. No.		Sworth Composite eas	Metrix	1	by.	Preservi	live T)	ps.	_	PETS (18 CAMPRILLES	ر		3	1		ļ		HI4S —
Sample (D / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	Sec. 1	Plass Access	Shores	ASSO.	AND AND	WO.	20.000	Pilane	E	75	На	68				$\perp$	
(Containers for each sample may be extracted to the many			-	M	4		-			$\overline{}$		$\nabla$	$\vee$	X					
7(81-N975-01-50-097770)	P 2+ 20	OUS	6		12		-}-	1		K	$\Rightarrow$	$\triangle$	$\Delta$			$\neg$	_	1	
101_NPFS-02-S0-092320	09/27/200	<u> </u>	6	Χ.	1	H	-	-		4	$\langle \rangle$		-	-	$\vdash$	-		+	
ETBL-NPFS-OI-GW-OFTZ720	05/24/20	1140	(e)	V)	2			-	-	+	$\stackrel{\times}{\rightarrow}$	V	7	V			+	+	
FTBL-B1436-04-50-0927200	09/27/20	1340	(G.)	X	4	H	-	+	$\vdash$	-	$\Diamond$	$\triangle$					+	+	
FTBL-81436-02-50-092720	09/27/20	_1355	6	#	1	-	+		$\vdash$		$\ominus$			-	$\vdash$	-	-	+	
F1BL-B1436-01-GW-092720	04/21/20	1600	6/	$\mathbb{H}$	2	Н	-	+	$\vdash$	4	$\Diamond$	$\overline{}$	V	X					
<u>FTBL-LVCF-01-50-0927210</u>	09/27/20	1730	16	<del>/\</del>	4	Н		-	H	$\dashv$	$\Diamond$			4		-		+	
FIBL -LYCF-01-610-092720	@/2= 20	1822	6/	+	2		+	+	$\forall$	-	$\Diamond$		-	-		+	_	+	
101-17-10-4-4-10-10-1	व्याप्तराह	09.05	G	+	2	-	1	-	+ 1		$\Diamond$	-	-	+	-	+	_		*NS/NSD*
ETBL-DAAF-01-GU-091320	09/28/20	1335	<u>G_/</u>	<u> </u>	$\perp \downarrow Q$	7	l   shie tia		L_L Idoquiii	- Pion	$\sim$	_			ш		QC Req	wiremen	ats (Specify)
Turn Around Time Required (Prior lab approval require	d for expedited TAT	) Sample Di 3 Selum to	sposal Client 12	Disposa	i by Lab							Skin i mi	tant i	) Poiso	ո 🗆 Սո	known			
Standard - Rush (Specify)  1. Relinguished by // / / / / / / / / / / / / / / / / /		Date	~	Time		5	eceives	t by									Date	- 1	Time
1. Retinguished by Matt-Blower	<u>~)                                    </u>	~	120	17	15	2.5	loceives	d bur					-	_			Date	_	Time
2. Relinquished by		Date		Time		2.5	ore.vec	JOY						_			Ļ	_	
S. Retinquished by		Date		Tience		3. F	(aceiva:	d by									Date		Time
		Date	2-20	Time	•Z	4. L	aborak	wy red	eliveta' i	by 1	L. A	<b>1</b> A	5	100	11		Date 10 ~ a	1-10 l	Emc 1118
4. Relinguished by Folk X  Note: All samples are retain	ned for four w					LAS	BUSE (	ONLY		<del>'</del> ,	NA.	301					2.4		Temp Blank
Note: All samples are telai- uniess other arra	ngements are	e made.				Acc	seived o	n laa	(Cirde	2 6	(ás )	No	lon Pau	ak	Receipt	Temp	1.9	_'c	
										`							1	Doc	ument Number: ME003N2-01

Pace Analytical*

# PACE ANALYTICAL SERVICES, LLC

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	Report to Contact		Telephone No. / E-mail		Quote No.
Sign!	1	U CONTEY/ PENS	SEE PAGE.		
ARCADIS	AFTON HESS JUSTIN	o arrely entire	Analysis (Attach 6st If more space is needed	0	Page 7 of 4
defess					1.00
IGSU MAYLAND DR. SUITE 2400	x		(A)	<b>+</b>	Lat # Bar Code (lab use crity)
W 22222	Frinted Name		1 4		american de intellectiv
1-16-11 VICADIO	JUSTIN COPFE	į.			THE WAR WAS TO
FI BRUDIR JARMY PRAS SI PROGRAC	<u> </u>	No of Containers	PRE (18 consource) TOC PH CRAWSICE	1 1	VJ02021
Project No. 900. No.	Collection Times Of a gas	by Preservative Type	77392 (17 20C H9 688444		NMS
Sample ID / Description Catestion  Date(s)	Collection Time   OS   St. 3   a see   St. 1	HWOS IN HOS INDON	E 2 2 3 1		
(Containers for each sample may be combined on one final) Date(s)	W/				
181-DANF-01-50-092820 09/18/20	MIL				
DUP-1=091320 09/13/20	1   M   1.	<del>                                     </del>		11	*Ms Mso*
FIBL-DAMF-02-50-092826 09/28 4	TO TO TO	3			AND NOON
7BL-17-01-50-092870 09/28/20	1 VA	1		11	
TBC-12-01-6W-0923200 09/28/20		2		1	
DUP 1-092820 05 128 20		E E			*ms/mso*
<u> 1731-12-03-60)-092820 09/28/2</u>	1 17				
F181-12-02-50-092920 09/29/20	NZ    1 1	2			
FIBL-12-02-663-092920 09/29/21					
FTR H3145-01-50-092970 08/38/20	0 1135 G K	Possibja Hazard Identificat	tion	QC Requireme	nis (Spedily)
Turn Around Time Required (Prior lab approval required for expedited in Stendard © Rush (Specify)	The Reducer to Client La Disposal by La	r5 ⊡nfon-Hazard ☐ Romma	ble □ Skin tribant □ Pnison □ Unknown	Date	Time
1. Relimpuished by electric (Matt-Blower)	Date 10/1/20 17:15	1. Received by			Time
2. Retirequished by	Date Time	2. Heceived by		Dete	TETAS
	Dale Time	3. Received by		Date	Time
3. Relixplished by	Date Time	4, Laboratory required by	Valar Ct. 11	Dister 11	Time
4. Resinquished by Fed 5x	10-2-20 MV8	LAB USE ONLY	Barlon StagaM	10-2-20	Temp Biank SY DN
Note: All samples are retained for four unless other arrangements a	меєка політеськую re made.	Repaired on les (Circle)	Yes No Ica Pack Receipt Temp.	5.4 0	<u></u>
uniess other an angements a	711111111111111111111111111111111111111			1.7	cument Number: ME003N2-01

Face Analytical*

# PACE ANALYTICAL SERVICES, LLC

106 Vantage Point Drive - West Columbia, SC 29172 Telephone No. 803-791-9700 Fax No. 803-791-9111 www.pacelabs.com

	Change to Control			Telephone Mo	. / E-mail			Quote No.
Client	Pepart to Contact	- 1	FEY PRASSI	SPE				
ARCADIS Address	Sampler's Signet.		PER PRES	Analysis (Alta	ach бэг if шага эрвсг	is needed)		Page 3 of 4
9984 MAYUAND DR. SUITE ZHOD	$\dashv$ . $\frown$	h-	•	(a)		$\Gamma \uparrow \Gamma$		Lot # Bar Code
City State Zip Code VA 23233	Printed Name			SCHOOLES				(Astrice only) Source (Astrice) (Astrice)
Project Name FORT BELLICIER   ARANN PERS SI FRICKRAN	<u> </u>	) coffey	No of Containers	200 8	37.6			VJ02021
Project No. 9.0. No.	Codection Time	Matrix	by Preservative Type	Press (18	Hq Genicare			V JOZOZ.
Sample ID / Description Coffeetion (Containers for each sample may be contained on one line.) Data(a)	(Mettary)	Aguera Aguera Aguera	HAND STANKE	E F	4 3	1		
FIBC-43145-01-6W-092920 09/29/20	1225 6	2		X		1	_	
FIBL-83171-03-50-092920 09/29/20		1		$\mapsto$		1-1-1	-	
FIRL-83121-03-6W-092920 09/29/20	1445 G					+++	-	
TBL-03PFS-01-50-092920 04/29/20	1615 6	X		<del>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</del>		1-1-1	_	
TRI-05PFS-02-50-092920 09/29/20	1645 G	X	<del>                                     </del>	+>-	+++	+	-	
FTBL-05PF5-01-GU-097970 09/19/11	1755 6	X 2		$\triangleright$	+++		-	
DUP-3-0979200 09/29/29	6	X     Z		$\Theta$				
F(BL-1980PC-02-50-093010 09/30/2	2 C900 G	1				+++	_	
E181-1980PC-01-50-093070 09/30/	g 1200 G	X 4		$\otimes$	XX	-		
C101-1980PC-02-40-69202009/30/0	235 6	X       2				00	Requirement	ts (Specify)
Turn ground Tone Required (Prior is) apprecal required for expedited 7	nt.) Sample Disposal  □ Return to Glant 1	Lisennes by Lab	Possible Hezard Identifica (₱ Non-Hazard   ☐ Flamma	ibon able 🗀 Skin lin	ritant 🗆 Polson 🗆	4		
(In Standard   13 Rush (Specify)	Date	Time	1. Received by	-		Date	1	Yime
Mart Blower)	10/1/20 Date	1715_	2. Received by			Date		Time
2. Relinquisited by	Late	1000					- +	Time
3. Refinguished by	Date	Time	3. Received by	1 -		Date		1900
4. Relinquished by FedEx	Cate	Time N18	4. Laboratory received by	hail	an Steam	Date 10-	2-00	Time W18
Note: All samples are retained for four	weeks from receip		LAB USE ONLY	<u> </u>	- 0	~ (5		Temp Blank ™Y □ N
unless other arrangements a	re made.		Received on lee (Cirole)	Yes No	les Pack   fiec	sipt Temp. 5		
				_		ι.	Doc	ment Number: ME003N2-01

Pace Analytical®

# PACE ANALYTICAL SERVICES, LLC

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		aport to Contact		1,000	Telephone No. / E-mail		Quale No.
ARCADIS		ARW HE		NOTFEL PRAS	SEE_PAGE_1 Analysis (Allech list if more space is re	ovled)	
Address	1-	amoter's Signalia	ນ໌.		Analysis (Austai iist ii intire space Aria		Page 4 of 4
9954 MANLAND DR. SUITE	Code X		992_	-			Lot # Ber Code
ENV.	7 0000	rinied Name			PFAS (18:con neutling		AND SULFACE
Froject Name		JUSTA	N COAP	e.y			V302021
RAT BEWOR ARMY PRAS	BO No.	3	Matrix	No of Couleiners		1 1 1	V30202
Project No.		de d		by Preservative Type			KW.5
Sample ID / Description (Containers for each sample may be combined on one line)		ction Time	SON ANNES ANNES Litteres	HESON HESON MACH		1-1-	
PIRL-1980PC-01-00-093020	09 Bo 20 19	500 G/	1		$\frac{ \mathcal{S} }{ \mathcal{S} }$		
F(BC-MW-1R-093020	1 1	650 G)	2			+ -	
F186-H3Z32-OI-GW-0930Z0	-	820 6/	$\frac{1}{2}$				* MS/MSD*
FTBL-66-68-01-5W-290920	09/29/20 10	15 G	X 6		131 1 1		7,112,21
FTBL-40PC20-HW02-290920			X 6		X		
FTB1-M18-MW31-290920	-	612 G				+++	
FTDUP-2-290920	09/29/20 -	- 6	XI I S	<del></del>		<del>-   -   -   -   -   -   -   -   -   -  </del>	
FTBL-M26-LTM-06-300920	09/30/20 0	907 G	X   P			-   -   -	
FTBL-FATTS-LTM-NW08-300920	09/30/20 11	103 6	X	<del>`</del>			
FTBL- PSA2009-NW42-300420	2 1, 11, 12	407 6	X   6	<u> </u>		QC Requirems	rnis (Specify)
Turn Around Time Required (Print Ist approval regains	of for expedited IAT.) Sa	emple Disposal Refum to Client N	Disocsal by Lai	Possible Hazard Identifica b Iz-Kon-Hazard C Ramm	arvon nable 13 Skin Inflant 🖸 Poison 🕮 Utikis		
Standard U Rush (Specify)		Date 10/1/20	Time	1. Received by		Date	Time
1. Religgished by Luce (Most Blow	er)	Date Date	1715	2, Received by		Date	Time
2. Relinquished by		Date					Time
3. Relinquished by		Dats	Time	3. Received by		Date	
4. Reinquished by Fed	£~	Date 116-2-21	Time	4. Laboratory mosived b	"hala Stearl	Date 10-2-30	Time 1018
Note: All samples are retain				LAB USE ONLY	<b>N</b>	5.4 °c	Tomp Blank '2"Υ □ N
unless other arra	angements are mi	ede.		Received on ice (Circle)	es No Ion Pack Receipt To	7.1	
					_	, Do	gumeni Number: ME003N2-01

# Inorganic non-metals

Laboratory ID: VJ02021-001 Client: Arcadis U.S., Inc.

Description: FTBL-NPFS-01-SO-092720 Matrix: Solid

Date Sampled: 09/27/2020 0915 % Solids: 83.0 10/02/2020 2342

Date Received: 10/02/2020

**Analytical Method Dilution** Run Prep Method **Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2250 SRB 69036

CAS Analytical Method **Parameter** Number Result Q LOQ LOD DL Units Run Soil pH measured in water @ 19.3 ° C 9045D 7.1 J su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Description: FTBL-NPFS-01-SO-092720

Laboratory ID: VJ02021-001

Matrix: Solid

% Solids: 83.0 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/27/2020 0915

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2044 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	₹un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.0047		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00064	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.19		0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 / Q % Recovery	Acceptance Limits
13C2_6:2FTS	96	50-150
13C2_8:2FTS	98	50-150
13C2_PFDoA	93	50-150
13C2_PFTeDA	97	50-150
13C3_PFBS	78	50-150
13C3_PFHxS	84	50-150
13C4_PFBA	93	50-150
13C4_PFHpA	98	50-150
13C5_PFHxA	94	50-150
13C5_PFPeA	94	50-150
13C6_PFDA	101	50-150
13C7_PFUdA	99	50-150
13C8_PFOA	96	50-150
13C8_PFOS	90	50-150
13C9_PFNA	99	50-150
d5-EtFOSAA	103	50-150
d3-MeFOSAA	87	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-002

Description: FTBL-NPFS-02-SO-092720

Matrix: Solid

% Solids: 89.0 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/27/2020 0945

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2055 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0021		0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 Q % Recovery	Acceptance / Limits
13C2_6:2FTS	93	50-150
13C2_8:2FTS	99	50-150
13C2_PFDoA	95	50-150
13C2_PFTeDA	91	50-150
13C3_PFBS	75	50-150
13C3_PFHxS	79	50-150
13C4_PFBA	90	50-150
13C4_PFHpA	94	50-150
13C5_PFHxA	89	50-150
13C5_PFPeA	88	50-150
13C6_PFDA	94	50-150
13C7_PFUdA	85	50-150
13C8_PFOA	94	50-150
13C8_PFOS	85	50-150
13C9_PFNA	91	50-150
d5-EtFOSAA	96	50-150
d3-MeFOSAA	88	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-NPFS-01-GW-092720

Laboratory ID: VJ02021-003 Matrix: Aqueous

Date Sampled: 09/27/2020 1140 Date Received: 10/02/2020

Run Prep Method Analytical Method Dilution SOP SPE PFAS by ID SOP QSM B-15

**Analysis Date Analyst** 10/10/2020 0257 KMM2

**Prep Date Batch** 10/08/2020 1558 69283

CAS **Analytical** Number Method Result Q LOQ LOD DL **Parameter** Units Run PFAS by ID SOP 1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS) 3.8 39108-34-4 7.5 3.8 1.9 ng/L PFAS by ID SOP 52 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS) 27619-97-2 7.5 3.8 ng/L 1.9 N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA) PFAS by ID SOP U 7.5 2991-50-6 3.8 3.8 ng/L 1.9 N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA) 2355-31-9 PFAS by ID SOP 3.8 7.5 ng/L 1 3.8 1.9 Perfluoro-1-butanesulfonic acid (PFBS) 375-73-5 PFAS by ID SOP 21 3.8 1.9 ng/L 0.94 Perfluorohexanesulfonic acid (PFHxS) 355-46-4 PFAS by ID SOP 140 3.8 ng/L 1 1.9 0.94 Perfluoro-n-butanoic acid (PFBA) 375-22-4 PFAS by ID SOP 36 3.8 1.9 0.94 ng/L Perfluoro-n-decanoic acid (PFDA) 335-76-2 PFAS by ID SOP 19 U 3.8 0.94 ng/L 1.9 Perfluoro-n-dodecanoic acid (PFDoA) 307-55-1 PFAS by ID SOP 1.9 U 3.8 0.94 ng/L 1.9 Perfluoro-n-heptanoic acid (PFHpA) 375-85-9 PFAS by ID SOP 46 3.8 0.94 ng/L 1.9 Perfluoro-n-hexanoic acid (PFHxA) 307-24-4 PFAS by ID SOP 0.94 81 3.8 1.9 ng/L Perfluoro-n-nonanoic acid (PFNA) 375-95-1 PFAS by ID SOP 4.6 3.8 1.9 0.94 ng/L Perfluoro-n-octanoic acid (PFOA) 335-67-1 PFAS by ID SOP 44 3.8 0.94 ng/L 1.9 Perfluoro-n-pentanoic acid (PFPeA) PFAS by ID SOP 2706-90-3 100 3.8 1.9 0.94 ng/L Perfluoro-n-tetradecanoic acid (PFTeDA) 376-06-7 PEAS by ID SOP ng/L Perfluoro-n-tridecanoic acid (PFTrDA) 72629-94-8 PFAS by ID SOP 19 U 3.8 1.9 ng/L 1 0.94 Perfluoro-n-undecanoic acid (PFUdA) 2058-94-8 PFAS by ID SOP 1.9 3.8 1.9 0.94 ng/L Perfluorooctanesulfonic acid (PFOS) 1763-23-1 PFAS by ID SOP 330 3.8 1.9 0.94 ng/L

Surrogate	Q	Run 1 / % Recovery	Acceptance Limits
13C2_6:2FTS		90	50-150
13C2_8:2FTS		76	50-150
13C2_PFDoA		50	50-150
13C2_PFTeDA	N	14	50-150
13C3_PFBS		78	50-150
13C3_PFHxS		70	50-150
13C4_PFBA		85	50-150
13C4_PFHpA		85	50-150
13C5_PFHxA		90	50-150
13C5_PFPeA		84	50-150
13C6_PFDA		69	50-150
13C7_PFUdA		65	50-150
13C8_PFOA		83	50-150
13C8_PFOS		54	50-150
13C9_PFNA		73	50-150
d5-EtFOSAA		52	50-150
d3-MeFOSAA		53	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

LOD = Limit of Detection

DL = Detection Limit J = Estimated result < LOQ and ≥ DL Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

# Inorganic non-metals

Laboratory ID: VJ02021-004 Client: Arcadis U.S., Inc.

Description: FTBL-B1436-01-SO-092720 Matrix: Solid

Date Sampled: 09/27/2020 1340 % Solids: 88.1 10/02/2020 2342

Date Received: 10/02/2020

Analytical Method Dilution Run Prep Method **Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2259 SRB 69036

CAS Analytical Method **Parameter** Number Result Q LOQ LOD DL Units Run Soil pH measured in water @ 19.1 ° C 9045D 5.2 J su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-004

Description: FTBL-B1436-01-SO-092720

Matrix: Solid

% Solids: 88.1 10/02/2020 2342

Date Received: 10/02/2020

Run Prep Method

Date Sampled: 09/27/2020 1340

SOP SPE

**Analytical Method Dilution Analysis Date Analyst Prep Date Batch** PFAS by ID SOP QSM B-15 10/08/2020 2106 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units I	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.078		0.0019	0.00095	0.00048	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.0025		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00089	J	0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0016		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0024		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0031		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0032		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0045		0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00048	U	0.00095	0.00048	0.00019	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.018		0.00095	0.00048	0.00019	mg/Kg	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	87	50-150
13C2_8:2FTS	94	50-150
13C2_PFDoA	97	50-150
13C2_PFTeDA	86	50-150
13C3_PFBS	82	50-150
13C3_PFHxS	85	50-150
13C4_PFBA	90	50-150
13C4_PFHpA	88	50-150
13C5_PFHxA	90	50-150
13C5_PFPeA	89	50-150
13C6_PFDA	88	50-150
13C7_PFUdA	92	50-150
13C8_PFOA	88	50-150
13C8_PFOS	83	50-150
13C9_PFNA	90	50-150
d5-EtFOSAA	102	50-150
d3-MeFOSAA	89	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time W = Reported on wet weight basis

LOD = Limit of Detection

 $J = Estimated result < LOQ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-B1436-02-SO-092720

Laboratory ID: VJ02021-005

Matrix: Solid

% Solids: 93.4 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/27/2020 1355

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/08/2020 2116
 SES
 10/08/2020 1226
 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units I	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0010	J	0.0011	0.00055	0.00021	mg/Kg	1

Surrogate Q		Acceptance Limits
13C2_6:2FTS	87	50-150
13C2_8:2FTS	83	50-150
13C2_PFDoA	93	50-150
13C2_PFTeDA	85	50-150
13C3_PFBS	70	50-150
13C3_PFHxS	76	50-150
13C4_PFBA	84	50-150
13C4_PFHpA	86	50-150
13C5_PFHxA	85	50-150
13C5_PFPeA	84	50-150
13C6_PFDA	87	50-150
13C7_PFUdA	89	50-150
13C8_PFOA	84	50-150
13C8_PFOS	79	50-150
13C9_PFNA	89	50-150
d5-EtFOSAA	92	50-150
d3-MeFOSAA	80	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

B = Detected in the method blank
N = Recovery is out of criteria

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

DL = Detection Limit J = Estimated result < LOQ and  $\geq DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

H = Out of holding time W = Reported on wet weight basis

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

Client: Arcadis U.S., Inc.

Description: FTBL-B1436-01-GW-092720

Laboratory ID: VJ02021-006 Matrix: Aqueous

Date Sampled: 09/27/2020 1600

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/10/2020 0402 KMM2 10/08/2020 1558 69283 2 SOP SPE PFAS by ID SOP QSM B-15 10 10/12/2020 1555 SES 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units	Dun
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.0 VQ UJ	8.0	4.0	2.0	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	420	8.0	4.0	2.0 2.0	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.0 VQ UJ	8.0	4.0	2.0	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.0 UQ \/	8.0	4.0	2.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	460	4.0	2.0	1.0	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1100 DJ	40	20	10	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1200 DJ	40	20	10	ng/L	2
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.0 NQ UJ	4.0	2.0	1.0	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.0 UQ UJ	4.0	2.0	1.0	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	570	4.0	2.0	1.0	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	3000 DJ	40	20	10	ng/L	2
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.5 JQ J+	4.0	2.0	1.0	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	270 DJ	40	20	10	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5500 DJ	40	20	10	ng/L	2
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.0 UQ	4.0	2.0	1.0	ng/L	<del></del> + R
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.0 YUQ UJ	4.0	2.0	1.0	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.0 VQ UJ	4.0	2.0	1.0	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1400 DJ	40	20	10	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C2_6:2FTS		50	50-150		85	50-150
13C2_8:2FTS	Ν	33	50-150		83	50-150
13C2_PFDoA	Ν	22	50-150		86	50-150
13C2_PFTeDA	Ν	9.6	50-150		87	50-150
13C3_PFBS		50	50-150		88	50-150
13C3_PFHxS	Ν	33	50-150		85	50-150
13C4_PFBA		73	50-150		92	50-150
13C4_PFHpA		62	50-150		93	50-150
13C5_PFHxA		62	50-150		86	50-150
13C5_PFPeA		54	50-150		86	50-150
13C6_PFDA	Ν	34	50-150		85	50-150
13C7_PFUdA	Ν	26	50-150		84	50-150
13C8_PFOA		52	50-150		89	50-150
13C8_PFOS	Ν	18	50-150		90	50-150
13C9_PFNA	Ν	46	50-150		91	50-150
d5-EtFOSAA	Ν	21	50-150		94	50-150
d3-MeFOSAA	Ν	25	50-150		90	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

# Inorganic non-metals

Laboratory ID: VJ02021-007 Client: Arcadis U.S., Inc.

Description: FTBL-LVCF-01-SO-092720 Matrix: Solid

Date Sampled: 09/27/2020 1730 % Solids: 82.5 10/02/2020 2342

Date Received: 10/02/2020

Analytical Method Dilution Run Prep Method **Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2303 SRB 69036

CAS Analytical **Parameter** Number Method Result Q LOQ LOD DL Units Run Soil pH measured in water @ 19 ° C 4.5 J 9045D su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-007

Description: FTBL-LVCF-01-SO-092720

Matrix: Solid

% Solids: 82.5 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/27/2020 1730

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2127 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units I	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	93	50-150
13C2_8:2FTS	100	50-150
13C2_PFDoA	97	50-150
13C2_PFTeDA	96	50-150
13C3_PFBS	87	50-150
13C3_PFHxS	88	50-150
13C4_PFBA	95	50-150
13C4_PFHpA	102	50-150
13C5_PFHxA	95	50-150
13C5_PFPeA	93	50-150
13C6_PFDA	102	50-150
13C7_PFUdA	95	50-150
13C8_PFOA	98	50-150
13C8_PFOS	97	50-150
13C9_PFNA	97	50-150
d5-EtFOSAA	104	50-150
d3-MeFOSAA	91	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-LVCF-01-GW-092720

-LVCF-01-GW-092720

Matrix: Aqueous

Laboratory ID: VJ02021-008

Date Sampled:09/27/2020 1822
Date Received:10/02/2020

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/12/2020 1802 KMM2
 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	11		7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	12		3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	13		3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	15		3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	6.4		3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	19		3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	21		3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	53		3.6	1.8	0.91	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	16		3.6	1.8	0.91	ng/L	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	119	50-150
13C2_8:2FTS	85	50-150
13C2_PFDoA	73	50-150
13C2_PFTeDA	77	50-150
13C3_PFBS	87	50-150
13C3_PFHxS	94	50-150
13C4_PFBA	96	50-150
13C4_PFHpA	97	50-150
13C5_PFHxA	92	50-150
13C5_PFPeA	97	50-150
13C6_PFDA	91	50-150
13C7_PFUdA	90	50-150
13C8_PFOA	96	50-150
13C8_PFOS	84	50-150
13C9_PFNA	92	50-150
d5-EtFOSAA	79	50-150
d3-MeFOSAA	81	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

DL = Detection Limit $J = Estimated result < LOQ and <math>\geq DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-B707-01-GW-092820

Laboratory ID: VJ02021-009 Matrix: Aqueous

Date Sampled: 09/28/2020 0905

SOP SPE

Date Received: 10/02/2020

Run Prep Method

 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 PFAS by ID SOP QSM B-15
 1
 10/10/2020 0423 KMM2
 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.8	U	7.6	3.8	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	16		7.6	3.8	1.9	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.8	U	7.6	3.8	1.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.8	U	7.6	3.8	1.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	15		3.8	1.9	0.95	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	700		3.8	1.9	0.95	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	22		3.8	1.9	0.95	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.9	U	3.8	1.9	0.95	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9	U	3.8	1.9	0.95	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	27		3.8	1.9	0.95	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	68		3.8	1.9	0.95	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.6	J	3.8	1.9	0.95	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	67		3.8	1.9	0.95	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	62		3.8	1.9	0.95	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9	U	3.8	1.9	0.95	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9	U	3.8	1.9	0.95	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9	U	3.8	1.9	0.95	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	220		3.8	1.9	0.95	ng/L	1

Surrogate	Run 1 A Q % Recovery	ceptance Limits	
13C2_6:2FTS	89	50-150	
13C2_8:2FTS	79	50-150	
13C2_PFDoA	80	50-150	
13C2_PFTeDA	73	50-150	
13C3_PFBS	83	50-150	
13C3_PFHxS	84	50-150	
13C4_PFBA	82	50-150	
13C4_PFHpA	83	50-150	
13C5_PFHxA	91	50-150	
13C5_PFPeA	82	50-150	
13C6_PFDA	82	50-150	
13C7_PFUdA	78	50-150	
13C8_PFOA	85	50-150	
13C8_PFOS	72	50-150	
13C9_PFNA	80	50-150	
d5-EtFOSAA	73	50-150	
d3-MeFOSAA	71	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-DAAF-01-GW-092820

Laboratory ID: VJ02021-010

Matrix: Aqueous

Date Sampled: 09/28/2020 1335 Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/10/2020 0433 KMM2 10/08/2020 1558 69283 2 SOP SPE PFAS by ID SOP QSM B-15 5 10/12/2020 1544 SES 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	13 🕱 J+	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	970 DJ	36	18	9.0	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6 U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6 U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	230	3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1900 DJ	18	9.0	4.5	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	270	3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	270 <b>\$</b>	3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	790 <b>\$</b>	3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	54 S	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	330 S	3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1300 DJ	18	9.0	4.5	ng/L	2
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8 🖰 UJ	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2500 DJ	18	9.0	4.5	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		89	50-150		89	50-150	
13C2_8:2FTS		83	50-150		91	50-150	
13C2_PFDoA		73	50-150		86	50-150	
13C2_PFTeDA		64	50-150		93	50-150	
13C3_PFBS		77	50-150		92	50-150	
13C3_PFHxS		71	50-150		96	50-150	
13C4_PFBA		83	50-150		94	50-150	
13C4_PFHpA		77	50-150		93	50-150	
13C5_PFHxA		84	50-150		89	50-150	
13C5_PFPeA		76	50-150		87	50-150	
13C6_PFDA		80	50-150		94	50-150	
13C7_PFUdA		73	50-150		98	50-150	
13C8_PFOA		80	50-150		90	50-150	
13C8_PFOS		59	50-150		90	50-150	
13C9_PFNA		70	50-150		91	50-150	
d5-EtFOSAA		71	50-150		93	50-150	
d3-MeFOSAA		72	50-150		95	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

### Inorganic non-metals

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-011

Description: FTBL-DAAF-01-SO-092820

Matrix: Solid

Date Sampled:09/28/2020 1334

% Solids: **88.4 10/02/2020 2342** 

DL

Units Run

LOD

Date Received: 10/02/2020

Run Prep Method

Analytical Method Dilution (Soil pH meas) 9045D 1

Analysis Date Analyst 10/14/2020 1409 AAB Prep Date

**Batch** 69906

LOQ

CAC		
CAS	Analytical	
Parameter Number	Method	Result Q

Soil pH measured in water @ 20.3 ° C 9045D 6.2 J su 1

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-DAAF-01-SO-092820

Laboratory ID: VJ02021-011

Matrix: Solid

% Solids: 88.4 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/28/2020 1334

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2137 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	₹un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.016	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.0021		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00072	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0063		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.016		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0015		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0036		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.013		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00077	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.045		0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 / Q % Recovery	Acceptance Limits
13C2_6:2FTS	103	50-150
13C2_8:2FTS	102	50-150
13C2_PFDoA	96	50-150
13C2_PFTeDA	91	50-150
13C3_PFBS	86	50-150
13C3_PFHxS	88	50-150
13C4_PFBA	93	50-150
13C4_PFHpA	94	50-150
13C5_PFHxA	90	50-150
13C5_PFPeA	93	50-150
13C6_PFDA	101	50-150
13C7_PFUdA	100	50-150
13C8_PFOA	95	50-150
13C8_PFOS	95	50-150
13C9_PFNA	96	50-150
d5-EtFOSAA	109	50-150
d3-MeFOSAA	94	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-012

Description: DUP-1-092820

Matrix: Solid

% Solids: 86.9 10/02/2020 2342

Date Sampled: 09/28/2020 Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution** SOP SPE PFAS by ID SOP QSM B-15

**Analysis Date Analyst** 10/08/2020 2148 SES

**Prep Date Batch** 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0013	U	0.0026	0.0013	0.00066	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0013	U	0.0026	0.0013	0.00066	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0013	U	0.0026	0.0013	0.00066	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0013	U	0.0026	0.0013	0.00066	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00026	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.027	J	0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.0024		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.0010	J	0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0077		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.021		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0022		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0051		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.016		0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00026	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.0012	J	0.0013	0.00065	0.00026	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.066		0.0013	0.00065	0.00026	mg/Kg	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	98	50-150
13C2_8:2FTS	104	50-150
13C2_PFDoA	99	50-150
13C2_PFTeDA	91	50-150
13C3_PFBS	89	50-150
13C3_PFHxS	90	50-150
13C4_PFBA	99	50-150
13C4_PFHpA	102	50-150
13C5_PFHxA	97	50-150
13C5_PFPeA	96	50-150
13C6_PFDA	99	50-150
13C7_PFUdA	99	50-150
13C8_PFOA	97	50-150
13C8_PFOS	95	50-150
13C9_PFNA	98	50-150
d5-EtFOSAA	110	50-150
d3-MeFOSAA	101	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

 $J = Estimated result < LOQ and \ge DL$ 

S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-013

Description: FTBL-DAAF-02-SO-092820

Matrix: Solid

% Solids: 86.1 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/28/2020 1350

Run Prep Method Analytical Method Dilution Analysis Date Analyst **Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2159 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	re UJ	0.0023	0.0012	0.00059	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.019	·S.	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.0010	J	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00094	J	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0040	թ J-	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0060	<b>S</b>	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0023	<b>s</b> .,	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0064	şΨ	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0058		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00071	J	0.0012	0.00060	0.00023	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.12	S	0.0012	0.00060	0.00023	mg/Kg	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	94	50-150
13C2_8:2FTS	92	50-150
13C2_PFDoA	94	50-150
13C2_PFTeDA	86	50-150
13C3_PFBS	81	50-150
13C3_PFHxS	85	50-150
13C4_PFBA	91	50-150
13C4_PFHpA	87	50-150
13C5_PFHxA	89	50-150
13C5_PFPeA	89	50-150
13C6_PFDA	90	50-150
13C7_PFUdA	93	50-150
13C8_PFOA	94	50-150
13C8_PFOS	86	50-150
13C9_PFNA	90	50-150
d5-EtFOSAA	98	50-150
d3-MeFOSAA	90	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

### Inorganic non-metals

Laboratory ID: VJ02021-014 Client: Arcadis U.S., Inc.

Description: FTBL-12-01-SO-092820 Matrix: Solid

Date Sampled: 09/28/2020 1600 % Solids: 77.9 10/02/2020 2342

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2306 SRB 69036

CAS Analytical Method **Parameter** Number Result Q LOQ LOD DL Units Run Soil pH measured in water @ 18.9 ° C 9045D 5.3 J su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-014

Description: FTBL-12-01-SO-092820

Matrix: Solid

% Solids: 77.9 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/28/2020 1600

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2230 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	₹un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0013	U	0.0025	0.0013	0.00064	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0013	U	0.0025	0.0013	0.00064	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0013	U	0.0025	0.0013	0.00064	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0013	U	0.0025	0.0013	0.00064	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00080	J	0.0013	0.00065	0.00025	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.042		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.0010	J	0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0023		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0077		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0022		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.044		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0052		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00065	U	0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.0014		0.0013	0.00065	0.00025	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.0026		0.0013	0.00065	0.00025	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.10		0.0013	0.00065	0.00025	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	86	50-150
13C2_8:2FTS	92	50-150
13C2_PFDoA	87	50-150
13C2_PFTeDA	89	50-150
13C3_PFBS	76	50-150
13C3_PFHxS	82	50-150
13C4_PFBA	88	50-150
13C4_PFHpA	91	50-150
13C5_PFHxA	87	50-150
13C5_PFPeA	85	50-150
13C6_PFDA	92	50-150
13C7_PFUdA	95	50-150
13C8_PFOA	88	50-150
13C8_PFOS	83	50-150
13C9_PFNA	89	50-150
d5-EtFOSAA	102	50-150
d3-MeFOSAA	98	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-12-01-GW-092820

Laboratory ID: VJ02021-015 Matrix: Aqueous

Date Sampled:09/28/2020 1655

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/10/2020 0505 KMM2 10/08/2020 1558 69283 2 SOP SPE PFAS by ID SOP QSM B-15 50 10/13/2020 1838 SES 10/08/2020 1558 69283

	CAS	Analytical						
Parameter	Number	Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	35	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	10000 DJ	360	180	90	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6 U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6 U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	730 DJ	180	90	45	ng/L	2
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	16000	180	90	45	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	960	180	90	45	ng/L	2
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	12	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1700 DJ	180	90	45	ng/L	2
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	6400 DJ	180	90	45	ng/L	2
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	340	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	12000 DJ	180	90	45	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5800 DJ	180	90	45	ng/L	2
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8 UQ UJ	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8 U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.3 J	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	6200 DJ	180	90	45	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 / % Recovery	Acceptance Limits	
13C2_6:2FTS		77 77	50-150		93	50-150	
13C2_8:2FTS		61	50-150		107	50-150	
13C2_PFDoA		60	50-150		98	50-150	
13C2_PFTeDA	N	41	50-150		94	50-150	
13C3_PFBS		73	50-150		93	50-150	
13C3_PFHxS	N	37	50-150		96	50-150	
13C4_PFBA		70	50-150		96	50-150	
13C4_PFHpA		58	50-150		89	50-150	
13C5_PFHxA		65	50-150		93	50-150	
13C5_PFPeA		57	50-150		99	50-150	
13C6_PFDA		70	50-150		104	50-150	
13C7_PFUdA		59	50-150		93	50-150	
13C8_PFOA		54	50-150		92	50-150	
13C8_PFOS	N	45	50-150		95	50-150	
13C9_PFNA		53	50-150		93	50-150	
d5-EtFOSAA		61	50-150		108	50-150	
d3-MeFOSAA		62	50-150		97	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

DL = Detection Limit J = Estimated result < LOQ and  $\geq DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: <del>DUP-1-092820</del> DUP-1-GW-092820

Laboratory ID: VJ02021-016

Matrix: Aqueous

Date Sampled: **09/28/2020**Date Received: **10/02/2020** 

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/10/2020 0516 KMM2
 10/08/2020 1558 69283

 2
 SOP SPE
 PFAS by ID SOP QSM B-15
 50
 10/13/2020 1848 SES
 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	29	7.5	3.8	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	10000 DJ	380	190	94	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	740 DJ	190	95	47	ng/L	2
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	16000	190	95	47	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	940 🗸	190	95	47	ng/L	2
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	11	3.8	1.9	0.94	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1700 DJ	190	95	47	ng/L	2
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	6400 DJ	190	95	47	ng/L	2
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	340	3.8	1.9	0.94	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ل ال 12000	190	95	47	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5700 DJ	190	95	47	ng/L	2
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9 VC UJ	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.2 J	3.8	1.9	0.94	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	5900 DJ	190	95	47	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		80	50-150		93	50-150	
13C2_8:2FTS		58	50-150		106	50-150	
13C2_PFDoA		51	50-150		93	50-150	
13C2_PFTeDA	N	39	50-150		96	50-150	
13C3_PFBS		71	50-150		93	50-150	
13C3_PFHxS	N	38	50-150		99	50-150	
13C4_PFBA		71	50-150		97	50-150	
13C4_PFHpA		57	50-150		94	50-150	
13C5_PFHxA		66	50-150		92	50-150	
13C5_PFPeA		60	50-150		99	50-150	
13C6_PFDA		70	50-150		103	50-150	
13C7_PFUdA		55	50-150		94	50-150	
13C8_PFOA		55	50-150		94	50-150	
13C8_PFOS	N	45	50-150		93	50-150	
13C9_PFNA		53	50-150		97	50-150	
d5-EtFOSAA		56	50-150		106	50-150	
d3-MeFOSAA		58	50-150		107	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-12-03-GW-092820

Laboratory ID: **VJ02021-017** Matrix: **Aqueous** 

Date Sampled:09/28/2020 1850
Date Received:10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 20 10/12/2020 1648 KMM2 10/08/2020 1558 69283 2 SOP SPE PFAS by ID SOP QSM B-15 200 10/12/2020 1637 SES 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result <b>Q</b>	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	270 S DJ	140	70	36	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	15000 DJ	1400	700	360	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	70 \usuJ-	140	70	36	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	70 🔰 UJ-	140	70	36	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3100 😮 DJ	72	36	18	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	60000	720	360	180	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2600 S	72	36	18	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	44 Js V	72	36	18	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	36 U <mark>S UJ-</mark>	72	36	18	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	4700 S DJ	72	36	18	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	20000	720	360	180	ng/L	2
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2700 S	72	36	18	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	52000	720	360	180	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	12000 🧏 🗸	72	36	18	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	36 US UJ-	72	36	18	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	36 <b>\</b> JS <b>UJ</b> -	72	36	18	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	46 Js DJ	72	36	18	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	28000 DJ	720	360	180	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		73	50-150		96	50-150	
13C2_8:2FTS		87	50-150		100	50-150	
13C2_PFDoA		89	50-150		94	50-150	
13C2_PFTeDA		93	50-150		104	50-150	
13C3_PFBS		92	50-150		96	50-150	
13C3_PFHxS		77	50-150		101	50-150	
13C4_PFBA		94	50-150		97	50-150	
13C4_PFHpA		77	50-150		95	50-150	
13C5_PFHxA		84	50-150		96	50-150	
13C5_PFPeA		86	50-150		95	50-150	
13C6_PFDA		95	50-150		98	50-150	
13C7_PFUdA		96	50-150		102	50-150	
13C8_PFOA		77	50-150		91	50-150	
13C8_PFOS		95	50-150		105	50-150	
13C9_PFNA		83	50-150		97	50-150	
d5-EtFOSAA		92	50-150		102	50-150	
d3-MeFOSAA		94	50-150		108	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-12-02-SO-092920

Laboratory ID: VJ02021-018 Matrix: Solid

% Solids: 83.4 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/29/2020 0900

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2241 SES 10/08/2020 1226 69209 2 SOP SPE PFAS by ID SOP QSM B-15 10 10/09/2020 1858 KMM2 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.043	0.0024	0.0012	0.00060	mg/Kg 1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.082	0.0024	0.0012	0.00060	mg/Kg 1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012 U	0.0024	0.0012	0.00060	mg/Kg 1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012 U	0.0024	0.0012	0.00060	mg/Kg 1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.028	0.0012	0.00060	0.00024	mg/Kg 1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.44 DJ	0.012	0.0060	0.0024	mg/Kg 2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.012	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.0016	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060 U	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.017	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.14	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.013	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.19	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.050	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060 U	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00098 J	0.0012	0.00060	0.00024	mg/Kg 1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.0023	0.0012	0.00060	0.00024	mg/Kg 1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.2 DJ	0.012	0.0060	0.0024	mg/Kg 2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		77	50-150		105	50-150	
13C2_8:2FTS		95	50-150		94	50-150	
13C2_PFDoA		94	50-150		99	50-150	
13C2_PFTeDA		89	50-150		94	50-150	
13C3_PFBS		81	50-150		98	50-150	
13C3_PFHxS		73	50-150		94	50-150	
13C4_PFBA		88	50-150		97	50-150	
13C4_PFHpA		85	50-150		90	50-150	
13C5_PFHxA		87	50-150		96	50-150	
13C5_PFPeA		89	50-150		92	50-150	
13C6_PFDA		94	50-150		95	50-150	
13C7_PFUdA		96	50-150		97	50-150	
13C8_PFOA		83	50-150		89	50-150	
13C8_PFOS		84	50-150		97	50-150	
13C9_PFNA		75	50-150		89	50-150	
d5-EtFOSAA		101	50-150		100	50-150	
d3-MeFOSAA		98	50-150		90	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc. Laborato

Description: FTBL-12-02-GW-092920

Date Sampled:09/29/2020 0945

Date Received:10/02/2020

Laboratory ID: VJ02021-019

Matrix: Aqueous

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 50 10/12/2020 1824 KMM2 10/08/2020 1558 69283 2 SOP SPE PFAS by ID SOP QSM B-15 5 10/12/2020 1834 SES 10/08/2020 1558 69283

	CAS	Analytical						
Parameter	Number	Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	44 DJ	35	18	8.8	ng/L	2
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	8500 DJ	350	180	88	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	18 U	35	18	8.8	ng/L	2
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	18 U	35	18	8.8	ng/L	2
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1600 DJ	18	9.0	4.4	ng/L	2
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	14000	180	90	44	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1400	18	9.0	4.4	ng/L	2
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	9.8 🔍 🗸	18	9.0	4.4	ng/L	2
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	9.0 U	18	9.0	4.4	ng/L	2
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2000 DJ	18	9.0	4.4	ng/L	2
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	9500	180	90	44	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	290	18	9.0	4.4	ng/L	2
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	9200	180	90	44	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	7500 🗸	180	90	44	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	9.0 U	18	9.0	4.4	ng/L	2
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	9.0 U	18	9.0	4.4	ng/L	2
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	9.0 U	18	9.0	4.4	ng/L	2
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	4300 DJ	180	90	44	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 / % Recovery	Acceptance Limits	
13C2_6:2FTS	i	87	50-150		72	50-150	
13C2_8:2FTS		102	50-150		84	50-150	
13C2_PFDoA		87	50-150		85	50-150	
13C2_PFTeDA		99	50-150		86	50-150	
13C3_PFBS		92	50-150		86	50-150	
13C3_PFHxS		91	50-150		73	50-150	
13C4_PFBA		93	50-150		96	50-150	
13C4_PFHpA		93	50-150		81	50-150	
13C5_PFHxA		91	50-150		80	50-150	
13C5_PFPeA		88	50-150		81	50-150	
13C6_PFDA		96	50-150		89	50-150	
13C7_PFUdA		97	50-150		92	50-150	
13C8_PFOA		91	50-150		76	50-150	
13C8_PFOS		100	50-150		86	50-150	
13C9_PFNA		93	50-150		83	50-150	
d5-EtFOSAA		95	50-150		90	50-150	
d3-MeFOSAA		95	50-150		90	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

### Inorganic non-metals

Client: Arcadis U.S., Inc. Laboratory ID: VJ02021-020

Description: FTBL-H3145-01-SO-092920 Matrix: Solid

Date Sampled: 09/29/2020 1135 % Solids: 85.0 10/02/2020 2342

Date Received: 10/02/2020

Analytical Method Dilution Run Prep Method **Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2308 SRB 69036

CAS Analytical **Parameter** Number Method Result Q LOQ LOD DL Units Run 8.2 Soil pH measured in water @ 18.9 ° C 9045D su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-020

Description: FTBL-H3145-01-SO-092920

Matrix: Solid

% Solids: 85.0 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/29/2020 1135

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2303 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00051	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00051	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00051	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00051	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00020	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	83	50-150
13C2_8:2FTS	94	50-150
13C2_PFDoA	88	50-150
13C2_PFTeDA	83	50-150
13C3_PFBS	67	50-150
13C3_PFHxS	76	50-150
13C4_PFBA	85	50-150
13C4_PFHpA	85	50-150
13C5_PFHxA	84	50-150
13C5_PFPeA	86	50-150
13C6_PFDA	93	50-150
13C7_PFUdA	86	50-150
13C8_PFOA	87	50-150
13C8_PFOS	78	50-150
13C9_PFNA	94	50-150
d5-EtFOSAA	96	50-150
d3-MeFOSAA	87	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-H3145-01-GW-092920

Laboratory ID: VJ02021-021 Matrix: Aqueous

Date Sampled: 09/29/2020 1225 Date Received: 10/02/2020

Run Prep Method SOP SPE

**Analytical Method Dilution** PFAS by ID SOP QSM B-15

Analysis Date Analyst 10/12/2020 1813 KMM2 10/08/2020 1558 69283

**Prep Date** 

**Batch** 

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.5	J	7.0	3.5	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.8		3.5	1.8	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	14		3.5	1.8	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11		3.5	1.8	0.87	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.4	J	3.5	1.8	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	13		3.5	1.8	0.87	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	8.6		3.5	1.8	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	18		3.5	1.8	0.87	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	28		3.5	1.8	0.87	ng/L	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	98	50-150
13C2_8:2FTS	81	50-150
13C2_PFDoA	61	50-150
13C2_PFTeDA	55	50-150
13C3_PFBS	74	50-150
13C3_PFHxS	69	50-150
13C4_PFBA	91	50-150
13C4_PFHpA	92	50-150
13C5_PFHxA	92	50-150
13C5_PFPeA	92	50-150
13C6_PFDA	83	50-150
13C7_PFUdA	72	50-150
13C8_PFOA	85	50-150
13C8_PFOS	57	50-150
13C9_PFNA	87	50-150
d5-EtFOSAA	74	50-150
d3-MeFOSAA	77	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

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Laboratory ID: VJ02021-022

Description: FTBL-B3121-03-SO-092920

Matrix: Solid

% Solids: 81.0 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/29/2020 1330

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/08/2020 2313
 SES
 10/08/2020 1226
 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units I	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00053	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00021	mg/Kg	1

Surrogate	Run 1 / Q % Recovery	Acceptance Limits
13C2_6:2FTS	87	50-150
13C2_8:2FTS	86	50-150
13C2_PFDoA	93	50-150
13C2_PFTeDA	85	50-150
13C3_PFBS	74	50-150
13C3_PFHxS	78	50-150
13C4_PFBA	87	50-150
13C4_PFHpA	86	50-150
13C5_PFHxA	87	50-150
13C5_PFPeA	88	50-150
13C6_PFDA	87	50-150
13C7_PFUdA	91	50-150
13C8_PFOA	94	50-150
13C8_PFOS	85	50-150
13C9_PFNA	88	50-150
d5-EtFOSAA	104	50-150
d3-MeFOSAA	87	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

B = Detected in the method blank
N = Recovery is out of criteria

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\%$ 

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time W = Reported on wet weight basis LO

LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \geq DL$ 

S = MS/MSD failure

Client: Arcadis U.S., Inc.

Description: **FTBL-B3121-03-GW-092920** 

Laboratory ID: VJ02021-023

Matrix: Aqueous

Date Sampled:09/29/2020 1445

Date Received:10/02/2020

SOP SPE

Run Prep Method

Analytical Method Dilution Analysis Date Analyst Prep Date Batch
PFAS by ID SOP QSM B-15 1 10/10/2020 0620 KMM2 10/08/2020 1558 69283

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	4.3		3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	21		3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.8	J	3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	3.0	J	3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.7	J	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	10		3.6	1.8	0.91	ng/L	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	93	50-150
13C2_8:2FTS	80	50-150
13C2_PFDoA	86	50-150
13C2_PFTeDA	82	50-150
13C3_PFBS	82	50-150
13C3_PFHxS	81	50-150
13C4_PFBA	90	50-150
13C4_PFHpA	85	50-150
13C5_PFHxA	91	50-150
13C5_PFPeA	88	50-150
13C6_PFDA	91	50-150
13C7_PFUdA	80	50-150
13C8_PFOA	92	50-150
13C8_PFOS	82	50-150
13C9_PFNA	88	50-150
d5-EtFOSAA	83	50-150
d3-MeFOSAA	83	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

DL = Detection Limit $J = Estimated result < LOQ and <math>\geq DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

### Inorganic non-metals

Client: Arcadis U.S., Inc. Laboratory ID: VJ02021-024

Description: FTBL-OSPFS-01-SO-092920 Matrix: Solid

% Solids: **88.0 10/02/2020 2342** 

Date Received: 10/02/2020

Date Sampled: 09/29/2020 1615

RunPrep MethodAnalytical MethodDilutionAnalysis DateAnalystPrep DateBatch1(Soil pH meas) 9045D110/06/2020 2312SRB69036

Parameter CAS Number Method Result Q LOQ LOD DL Units Run
Soil pH measured in water @ 18.7 ° C 9045D 6.9 J su 1

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LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:energy} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds } 40\% \\ \mbox{LOD} = \mbox{Limit of Detection}$ 

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

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Laboratory ID: VJ02021-024

Description: FTBL-OSPFS-01-SO-092920

Matrix: Solid

% Solids: 88.0 10/02/2020 2342

Date Received: 10/02/2020

Date Sampled: 09/29/2020 1615

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/08/2020 2324
 SES
 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0022		0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits	
13C2_6:2FTS	89	50-150	
13C2_8:2FTS	87	50-150	
13C2_PFDoA	91	50-150	
13C2_PFTeDA	86	50-150	
13C3_PFBS	71	50-150	
13C3_PFHxS	81	50-150	
13C4_PFBA	86	50-150	
13C4_PFHpA	88	50-150	
13C5_PFHxA	89	50-150	
13C5_PFPeA	83	50-150	
13C6_PFDA	92	50-150	
13C7_PFUdA	91	50-150	
13C8_PFOA	87	50-150	
13C8_PFOS	82	50-150	
13C9_PFNA	89	50-150	
d5-EtFOSAA	100	50-150	
d3-MeFOSAA	93	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

DL = Detection Limit $J = Estimated result < LOQ and <math>\geq DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-025

Description: FTBL-OSPFS-02-SO-092920

Matrix: Solid

Date Sampled: 09/29/2020 1645

% Solids: 87.1 10/02/2020 2342

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2334 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	₹un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00077	J	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00065	J	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00079	J	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00061	J	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0019		0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.010		0.0010	0.00050	0.00021	mg/Kg	1

Surrogate	Run 1 / Q % Recovery	Acceptance Limits	
13C2_6:2FTS	87	50-150	
13C2_8:2FTS	98	50-150	
13C2_PFDoA	93	50-150	
13C2_PFTeDA	89	50-150	
13C3_PFBS	72	50-150	
13C3_PFHxS	79	50-150	
13C4_PFBA	89	50-150	
13C4_PFHpA	91	50-150	
13C5_PFHxA	91	50-150	
13C5_PFPeA	90	50-150	
13C6_PFDA	94	50-150	
13C7_PFUdA	96	50-150	
13C8_PFOA	92	50-150	
13C8_PFOS	88	50-150	
13C9_PFNA	92	50-150	
d5-EtFOSAA	99	50-150	
d3-MeFOSAA	96	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis LOD = Limit of Detection

 $J = Estimated result < LOQ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-OSPFS-01-GW-092920

Laboratory ID: VJ02021-026 Matrix: Aqueous

Date Sampled: 09/29/2020 1755 Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/12/2020 0055 MMM 10/09/2020 1637 69425 2 SOP SPE PFAS by ID SOP QSM B-15 5 10/12/2020 1420 MMM 10/09/2020 1637 69425

	CAS	Analytical						
Parameter	Number	Method	Result Q	LOQ	LOD	DL	Units R	un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	59	7.5	3.8	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	980 DJ	38	19	9.4	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	91	3.8	1.9	0.94	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	680 DJ	19	9.5	4.7	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	160	3.8	1.9	0.94	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	140	3.8	1.9	0.94	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	450	3.8	1.9	0.94	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	24	3.8	1.9	0.94	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	160	3.8	1.9	0.94	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	550	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9 📆 UJ	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1100 DJ	19	9.5	4.7	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		128	50-150		96	50-150	
13C2_8:2FTS		96	50-150		109	50-150	
13C2_PFDoA		83	50-150		98	50-150	
13C2_PFTeDA	N	41	50-150		90	50-150	
13C3_PFBS		112	50-150		111	50-150	
13C3_PFHxS		101	50-150		105	50-150	
13C4_PFBA		107	50-150		101	50-150	
13C4_PFHpA		115	50-150		103	50-150	
13C5_PFHxA		111	50-150		101	50-150	
13C5_PFPeA		114	50-150		97	50-150	
13C6_PFDA		101	50-150		91	50-150	
13C7_PFUdA		95	50-150		101	50-150	
13C8_PFOA		118	50-150		104	50-150	
13C8_PFOS		81	50-150		88	50-150	
13C9_PFNA		110	50-150		102	50-150	
d5-EtFOSAA		80	50-150		95	50-150	
d3-MeFOSAA		89	50-150		93	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-027

Description: DUP-3-092920 Date Sampled: 09/29/2020

Matrix: Aqueous

Date Received: 10/02/2020

1

2

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/12/2020 0106 MMM 10/09/2020 1637 69425 SOP SPE PFAS by ID SOP QSM B-15 5 10/12/2020 1430 MMM 10/09/2020 1637 69425

	CAS	Analytical						
Parameter	Number	Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	60	7.4	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	1000 DJ	37	19	9.2	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7 U	7.4	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7 U	7.4	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	94	3.7	1.9	0.92	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	600 DJ	18	9.0	4.6	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	150	3.7	1.9	0.92	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.9 U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9 U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	130	3.7	1.9	0.92	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	410	3.7	1.9	0.92	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	26	3.7	1.9	0.92	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	150	3.7	1.9	0.92	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	560	3.7	1.9	0.92	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9 VQ UJ	3.7	1.9	0.92	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9 U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9 U	3.7	1.9	0.92	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	840 DJ	18	9.0	4.6	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS		113	50-150		89	50-150	
13C2_8:2FTS		85	50-150		92	50-150	
13C2_PFDoA		67	50-150		89	50-150	
13C2_PFTeDA	N	33	50-150		83	50-150	
13C3_PFBS		100	50-150		103	50-150	
13C3_PFHxS		80	50-150		95	50-150	
13C4_PFBA		110	50-150		98	50-150	
13C4_PFHpA		108	50-150		89	50-150	
13C5_PFHxA		111	50-150		99	50-150	
13C5_PFPeA		110	50-150		89	50-150	
13C6_PFDA		91	50-150		85	50-150	
13C7_PFUdA		82	50-150		91	50-150	
13C8_PFOA		113	50-150		93	50-150	
13C8_PFOS		64	50-150		85	50-150	
13C9_PFNA		94	50-150		93	50-150	
d5-EtFOSAA		69	50-150		85	50-150	
d3-MeFOSAA		68	50-150		86	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-028

Description: FTBL-1980PC-02-SO-093020

Matrix: Solid

Date Sampled: 09/30/2020 0900

% Solids: 85.1 10/02/2020 2342

Date Received: 10/02/2020

RunPrep MethodAnalytical MethodDilutionAnalysis DateAnalystPrep DateBatch1SOP SPEPFAS by ID SOP QSM B-15110/08/2020 2345SES10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP		U	0.0024	0.0012	0.00061	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	86	50-150
13C2_8:2FTS	92	50-150
13C2_PFDoA	95	50-150
13C2_PFTeDA	88	50-150
13C3_PFBS	70	50-150
13C3_PFHxS	79	50-150
13C4_PFBA	92	50-150
13C4_PFHpA	90	50-150
13C5_PFHxA	90	50-150
13C5_PFPeA	87	50-150
13C6_PFDA	93	50-150
13C7_PFUdA	96	50-150
13C8_PFOA	94	50-150
13C8_PFOS	81	50-150
13C9_PFNA	93	50-150
d5-EtFOSAA	106	50-150
d3-MeFOSAA	101	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

DL = Detection Limit J = Estimated result < LOQ and  $\geq DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

### Inorganic non-metals

Laboratory ID: VJ02021-029 Client: Arcadis U.S., Inc.

Description: FTBL-1980PC-01-SO-093020 Matrix: Solid

Date Sampled: 09/30/2020 1200 % Solids: 81.7 10/02/2020 2342

Date Received: 10/02/2020

Analytical Method Dilution Run Prep Method **Analysis Date Analyst Prep Date Batch** (Soil pH meas) 9045D 10/06/2020 2315 SRB 69036

CAS Analytical **Parameter** Number Method Result Q LOQ LOD DL Units Run Soil pH measured in water @ 18.6 ° C 9045D 4.4 J su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Client: Arcadis U.S., Inc.

Laboratory ID: VJ02021-029 Description: FTBL-1980PC-01-SO-093020

Matrix: Solid

Date Sampled: 09/30/2020 1200 % Solids: 81.7 10/02/2020 2342

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/08/2020 2356 SES 10/08/2020 1226 69209

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	₹un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0014	U	0.0028	0.0014	0.00071	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0014	U	0.0028	0.0014	0.00071	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0014	U	0.0028	0.0014	0.00071	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0014	U	0.0028	0.0014	0.00071	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00070	U	0.0014	0.00070	0.00028	mg/Kg	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	82	50-150
13C2_8:2FTS	90	50-150
13C2_PFDoA	91	50-150
13C2_PFTeDA	84	50-150
13C3_PFBS	67	50-150
13C3_PFHxS	74	50-150
13C4_PFBA	83	50-150
13C4_PFHpA	85	50-150
13C5_PFHxA	80	50-150
13C5_PFPeA	79	50-150
13C6_PFDA	89	50-150
13C7_PFUdA	91	50-150
13C8_PFOA	90	50-150
13C8_PFOS	82	50-150
13C9_PFNA	88	50-150
d5-EtFOSAA	95	50-150
d3-MeFOSAA	86	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-1980PC-02-GW-093020

Laboratory ID: VJ02021-030 Matrix: Aqueous

Date Sampled:09/30/2020 1235 Date Received:10/02/2020

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/12/2020 1441
 MMM
 10/09/2020 1637
 69425

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	6.5	ΨQ UJ_	13	6.5	3.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	6.5	UQ	13	6.5	3.4	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	6.5	UQ	13	6.5	3.4	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	6.5	ua 🗸	13	6.5	3.4	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.4	ψ UJ- '	6.7	3.4	1.7	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	14	<b>d</b> J+	6.7	3.4	1.7	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	6.3	J J_	6.7	3.4	1.7	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	3.4	Na UJ-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	3.4	ud UJ-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.4	4 UJ-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	4.6	J_	6.7	3.4	1.7	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	3.4	UJ-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	11		6.7	3.4	1.7	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP		<b>3</b> ∙J-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	3.4	hơ M-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	3.4	JQ	6.7	3.4	1.7	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	3.4	ψα 🗸	6.7	3.4	1.7	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	13	g 1+	6.7	3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	47	50-150
13C2_8:2FTS	N	45	50-150
13C2_PFDoA	N	28	50-150
13C2_PFTeDA	N	22	50-150
13C3_PFBS		50	50-150
13C3_PFHxS	N	39	50-150
13C4_PFBA		55	50-150
13C4_PFHpA		52	50-150
13C5_PFHxA		55	50-150
13C5_PFPeA		52	50-150
13C6_PFDA	N	41	50-150
13C7_PFUdA	N	40	50-150
13C8_PFOA		55	50-150
13C8_PFOS	N	31	50-150
13C9_PFNA		50	50-150
d5-EtFOSAA	N	28	50-150
d3-MeFOSAA	N	32	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-1980PC-01-GW-093020

Laboratory ID: VJ02021-031 Matrix: Aqueous

Date Sampled: 09/30/2020 1500 Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution** Analysis Date Analyst **Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/12/2020 0127 MMM 10/09/2020 1637 69425

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.3 V UJ	- 8.5	4.3	2.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.3 ₩₩	8.5	4.3	2.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.3 VQ L	J <b>_</b> 8.5	4.3	2.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.3 UQ	/ 8.5	4.3	2.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.2 🗓 J-	4.2	2.1	1.1	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	15 J-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	3.4 J_	4.2	2.1	1.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.1 <b>ψ UJ</b>	4.2	2.1	1.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.1 VQ (	<b>JJ-</b> 4.2	2.1	1.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.1 Ų ⋃ͺ	<b>J-</b> 4.2	2.1	1.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	-ل ل 3.3	4.2	2.1	1.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1 V UJ	4.2	2.1	1.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1 UJ	4.2	2.1	1.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ـل 🌡 2.3	4.2	2.1	1.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.1 UQ (	<b>JJ-</b> 4.2	2.1	1.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.1 ŲQ <b>√</b>	4.2	2.1	1.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.1 ௰⋃Ϳ	4.2	2.1	1.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	11 d J+	4.2	2.1	1.1	ng/L	1

Surrogate	Q %	Run 1 6 Recovery	Acceptance Limits
13C2_6:2FTS		99	50-150
13C2_8:2FTS		64	50-150
13C2_PFDoA	N	46	50-150
13C2_PFTeDA	N	29	50-150
13C3_PFBS		73	50-150
13C3_PFHxS		60	50-150
13C4_PFBA		82	50-150
13C4_PFHpA		81	50-150
13C5_PFHxA		86	50-150
13C5_PFPeA		86	50-150
13C6_PFDA		71	50-150
13C7_PFUdA		63	50-150
13C8_PFOA		85	50-150
13C8_PFOS	N	48	50-150
13C9_PFNA		75	50-150
d5-EtFOSAA	N	46	50-150
d3-MeFOSAA	N	48	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-MW-1R-093020

Date Sampled:09/30/2020 1650
Date Received:10/02/2020

Laboratory ID: VJ02021-032 Matrix: Aqueous

Run Prep Method **Analytical Method Dilution Analysis Date Analyst Prep Date Batch** 1 SOP SPE PFAS by ID SOP QSM B-15 10/12/2020 0138 MMM 10/09/2020 1637 69425 2 SOP SPE PFAS by ID SOP QSM B-15 5 10/12/2020 1452 MMM 10/09/2020 1637 69425

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	5.3	/ld J-	7.3	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	17	٦ ل	7.3	3.7	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	38	<i>Ø</i> 1⁻	3.7	1.9	0.92	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	800	DJ	18	9.0	4.6	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	42		3.7	1.9	0.92	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	3.2	J	3.7	1.9	0.92	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9	U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	56		3.7	1.9	0.92	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	170		3.7	1.9	0.92	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	9.3		3.7	1.9	0.92	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	110		3.7	1.9	0.92	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	120		3.7	1.9	0.92	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9	U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9	U	3.7	1.9	0.92	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9	U	3.7	1.9	0.92	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1400	DJ	18	9.0	4.6	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	
13C2_6:2FTS	N	338	50-150		122	50-150	
13C2_8:2FTS	N	207	50-150		123	50-150	
13C2_PFDoA		102	50-150		94	50-150	
13C2_PFTeDA		82	50-150		91	50-150	
13C3_PFBS	N	163	50-150		108	50-150	
13C3_PFHxS		102	50-150		97	50-150	
13C4_PFBA		66	50-150		86	50-150	
13C4_PFHpA		114	50-150		95	50-150	
13C5_PFHxA		115	50-150		100	50-150	
13C5_PFPeA		94	50-150		92	50-150	
13C6_PFDA		127	50-150		97	50-150	
13C7_PFUdA		127	50-150		101	50-150	
13C8_PFOA		134	50-150		105	50-150	
13C8_PFOS		92	50-150		91	50-150	
13C9_PFNA		121	50-150		102	50-150	
d5-EtFOSAA		132	50-150		96	50-150	
d3-MeFOSAA		129	50-150		92	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $\label{eq:power_power} E = \mbox{Quantitation of compound exceeded the calibration range} \\ P = \mbox{The RPD between two GC columns exceeds 40\%}$ 

LOD = Limit of Detection

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-H3232-01-GW-093020

Laboratory ID: VJ02021-033 Matrix: Aqueous

Date Sampled: 09/30/2020 1820

Date Received: 10/02/2020

SOP SPE

Run Prep Method

**Analytical Method Dilution** Analysis Date Analyst **Prep Date Batch** PFAS by ID SOP QSM B-15 10/12/2020 1502 MMM 10/09/2020 1637 69425

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	18		3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	230		3.6	1.8	0.90	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	15		3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	12		3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	38		3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1	J	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	59		3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	24		3.6	1.8	0.90	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	AG NI	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	130		3.6	1.8	0.90	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	
13C2_6:2FTS		88	50-150	
13C2_8:2FTS		80	50-150	
13C2_PFDoA		59	50-150	
13C2_PFTeDA	N	32	50-150	
13C3_PFBS		77	50-150	
13C3_PFHxS		69	50-150	
13C4_PFBA		91	50-150	
13C4_PFHpA		82	50-150	
13C5_PFHxA		96	50-150	
13C5_PFPeA		92	50-150	
13C6_PFDA		71	50-150	
13C7_PFUdA		69	50-150	
13C8_PFOA		94	50-150	
13C8_PFOS		53	50-150	
13C9_PFNA		89	50-150	
d5-EtFOSAA		60	50-150	
d3-MeFOSAA		60	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-66-68-01-SW-092920

Laboratory ID: VJ02021-034 Matrix: Aqueous

Date Sampled: 09/29/2020 1015

SOP SPE

Date Received: 10/02/2020

Run Prep Method

Analytical Method Dilution Analysis Date Analyst Prep Date Batch
PFAS by ID SOP QSM B-15 1 10/12/2020 0200 MMM 10/09/2020 1637 69425

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	5.7		3.5	1.8	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	8.1		3.5	1.8	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11		3.5	1.8	0.87	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	6.9		3.5	1.8	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	12		3.5	1.8	0.87	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.9	J	3.5	1.8	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	11		3.5	1.8	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	14	<b>∕€</b> J+	3.5	1.8	0.87	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	8.3		3.5	1.8	0.87	ng/L	1

Surrogate	Run 1 / Q % Recovery	Acceptance Limits
13C2_6:2FTS	147	50-150
13C2_8:2FTS	94	50-150
13C2_PFDoA	80	50-150
13C2_PFTeDA	68	50-150
13C3_PFBS	90	50-150
13C3_PFHxS	88	50-150
13C4_PFBA	87	50-150
13C4_PFHpA	107	50-150
13C5_PFHxA	112	50-150
13C5_PFPeA	106	50-150
13C6_PFDA	96	50-150
13C7_PFUdA	99	50-150
13C8_PFOA	114	50-150
13C8_PFOS	70	50-150
13C9_PFNA	102	50-150
d5-EtFOSAA	87	50-150
d3-MeFOSAA	95	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

B = Detected in the method blank
N = Recovery is out of criteria

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

H = Out of holding time W = Reported on wet weight basis LOD = Lim

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-AOPC20-MW02-092920

Laboratory ID: VJ02021-035 Matrix: Aqueous

Date Sampled:09/29/2020 1402
Date Received: 10/02/2020

 Run
 Prep Method
 Analytical Method
 Dilution
 Analysis Date
 Analyst
 Prep Date
 Batch

 1
 SOP SPE
 PFAS by ID SOP QSM B-15
 1
 10/12/2020 0232
 MMM
 10/09/2020 1637
 69425

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.8 VQ U	7.5	3.8	1.9	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.8 U	7.5	3.8	1.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	5.1	3.8	1.9	0.94	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	10	3.8	1.9	0.94	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11	3.8	1.9	0.94	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	5.2	3.8	1.9	0.94	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	10	3.8	1.9	0.94	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.7 J	3.8	1.9	0.94	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	10	3.8	1.9	0.94	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	13	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9 U	3.8	1.9	0.94	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	3.8	3.8	1.9	0.94	ng/L	1

Surrogate	Run 1 Q % Recove	
13C2_6:2FTS	N 152	50-150
13C2_8:2FTS	89	50-150
13C2_PFDoA	73	50-150
13C2_PFTeDA	62	50-150
13C3_PFBS	95	50-150
13C3_PFHxS	91	50-150
13C4_PFBA	102	50-150
13C4_PFHpA	115	50-150
13C5_PFHxA	119	50-150
13C5_PFPeA	113	50-150
13C6_PFDA	94	50-150
13C7_PFUdA	83	50-150
13C8_PFOA	122	50-150
13C8_PFOS	68	50-150
13C9_PFNA	105	50-150
d5-EtFOSAA	73	50-150
d3-MeFOSAA	75	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-M18-MW31-092920

Laboratory ID: VJ02021-036 Matrix: Aqueous

Date Sampled: 09/29/2020 1612 Date Received: 10/02/2020

Run Prep Method Analytical Method Dilution Analysis Date Analyst SOP SPE PFAS by ID SOP QSM B-15

10/12/2020 1535 MMM

**Prep Date Batch** 10/11/2020 1510 69532

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.7	J	3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	12		3.6	1.8	0.90	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	8.4		3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	4.8		3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	8.9		3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	8.4		3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	8.7		3.6	1.8	0.90	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	7.0		3.6	1.8	0.90	ng/L	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	100	50-150
13C2_8:2FTS	102	50-150
13C2_PFDoA	85	50-150
13C2_PFTeDA	78	50-150
13C3_PFBS	91	50-150
13C3_PFHxS	86	50-150
13C4_PFBA	91	50-150
13C4_PFHpA	98	50-150
13C5_PFHxA	101	50-150
13C5_PFPeA	94	50-150
13C6_PFDA	86	50-150
13C7_PFUdA	93	50-150
13C8_PFOA	106	50-150
13C8_PFOS	73	50-150
13C9_PFNA	98	50-150
d5-EtFOSAA	77	50-150
d3-MeFOSAA	79	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: **DUP-2-093020 DUP-2-092920** 

Laboratory ID: VJ02021-037 Matrix: Aqueous

Date Sampled: 09/29/2020 Date Received: 10/02/2020

SOP SPE

Run Prep Method

**Analytical Method Dilution** Analysis Date Analyst **Prep Date Batch** PFAS by ID SOP QSM B-15 10/12/2020 1545 MMM 10/11/2020 1510 69532

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	4.5		3.5	1.8	0.88	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	8.0		3.5	1.8	0.88	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	9.5		3.5	1.8	0.88	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	5.5		3.5	1.8	0.88	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	9.3		3.5	1.8	0.88	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.3	J	3.5	1.8	0.88	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	9.2		3.5	1.8	0.88	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	14		3.5	1.8	0.88	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	7.2		3.5	1.8	0.88	ng/L	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	107	50-150
13C2_8:2FTS	102	50-150
13C2_PFDoA	79	50-150
13C2_PFTeDA	70	50-150
13C3_PFBS	90	50-150
13C3_PFHxS	75	50-150
13C4_PFBA	81	50-150
13C4_PFHpA	99	50-150
13C5_PFHxA	113	50-150
13C5_PFPeA	91	50-150
13C6_PFDA	89	50-150
13C7_PFUdA	80	50-150
13C8_PFOA	104	50-150
13C8_PFOS	61	50-150
13C9_PFNA	105	50-150
d5-EtFOSAA	79	50-150
d3-MeFOSAA	81	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-M26-LTM-06-093020

Laboratory ID: VJ02021-038 Matrix: Aqueous

Date Sampled: 09/30/2020 0907

Date Received: 10/02/2020

Run Prep Method **Analytical Method Dilution** Analysis Date Analyst **Prep Date Batch** SOP SPE PFAS by ID SOP QSM B-15 10/12/2020 1556 MMM 10/11/2020 1510 69532

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	4.9		3.6	1.8	0.89	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	6.9		3.6	1.8	0.89	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	3.4	J	3.6	1.8	0.89	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	4.5		3.6	1.8	0.89	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	3.6		3.6	1.8	0.89	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.9	J	3.6	1.8	0.89	ng/L	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits
13C2_6:2FTS	94	50-150
13C2_8:2FTS	95	50-150
13C2_PFDoA	85	50-150
13C2_PFTeDA	77	50-150
13C3_PFBS	81	50-150
13C3_PFHxS	78	50-150
13C4_PFBA	90	50-150
13C4_PFHpA	90	50-150
13C5_PFHxA	101	50-150
13C5_PFPeA	100	50-150
13C6_PFDA	89	50-150
13C7_PFUdA	90	50-150
13C8_PFOA	99	50-150
13C8_PFOS	62	50-150
13C9_PFNA	92	50-150
d5-EtFOSAA	80	50-150
d3-MeFOSAA	80	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-FATTS-LTM-MW08-093020

Laboratory ID: VJ02021-039 Matrix: Aqueous

Date Sampled: 09/30/2020 1103 Date Received: 10/02/2020

Run Prep Method SOP SPE

Analytical Method Dilution Analysis Date Analyst **Prep Date Batch** PFAS by ID SOP QSM B-15 10/12/2020 1607 MMM 10/11/2020 1510 69532

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	5.3		3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.3		3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.2	J	3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.9	J	3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.9	J	3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	4.1		3.6	1.8	0.90	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1

Surrogate	Run 1 A Q % Recovery	Acceptance Limits
13C2_6:2FTS	105	50-150
13C2_8:2FTS	117	50-150
13C2_PFDoA	98	50-150
13C2_PFTeDA	89	50-150
13C3_PFBS	107	50-150
13C3_PFHxS	105	50-150
13C4_PFBA	105	50-150
13C4_PFHpA	107	50-150
13C5_PFHxA	112	50-150
13C5_PFPeA	109	50-150
13C6_PFDA	95	50-150
13C7_PFUdA	101	50-150
13C8_PFOA	115	50-150
13C8_PFOS	87	50-150
13C9_PFNA	111	50-150
d5-EtFOSAA	90	50-150
d3-MeFOSAA	94	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P =The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated result < LOQ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-PSA2009-MW42-093020

Laboratory ID: VJ02021-040

Matrix: Aqueous

Date Sampled:09/30/2020 1407 Date Received:10/02/2020

RunPrep MethodAnalytical MethodDilutionAnalysis DateAnalystPrep DateBatch1SOP SPEPFAS by ID SOP QSM B-15110/12/2020 1618MMM10/11/2020 1510 69532

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.2	J	3.5	1.8	0.88	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.4	J	3.5	1.8	0.88	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1	J	3.5	1.8	0.88	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	3.3	J	3.5	1.8	0.88	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.88	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.2	J	3.5	1.8	0.88	ng/L	1

Surrogate	Run 1 Q % Recovery	Acceptance Limits	
13C2_6:2FTS	115	50-150	
13C2_8:2FTS	118	50-150	
13C2_PFDoA	97	50-150	
13C2_PFTeDA	100	50-150	
13C3_PFBS	106	50-150	
13C3_PFHxS	111	50-150	
13C4_PFBA	99	50-150	
13C4_PFHpA	109	50-150	
13C5_PFHxA	109	50-150	
13C5_PFPeA	111	50-150	
13C6_PFDA	102	50-150	
13C7_PFUdA	109	50-150	
13C8_PFOA	121	50-150	
13C8_PFOS	96	50-150	
13C9_PFNA	111	50-150	
d5-EtFOSAA	99	50-150	
d3-MeFOSAA	100	50-150	

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

$$\label{eq:energy} \begin{split} E &= \text{Quantitation of compound exceeded the calibration range} \\ P &= \text{The RPD between two GC columns exceeds } 40\% \\ \text{LOD} &= \text{Limit of Detection} \end{split}$$

 $\begin{aligned} &DL = Detection \ Limit \\ &J = Estimated \ result < LOQ \ and \ge DL \end{aligned}$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client ID: 4367 - Pace Analytical Services

SDG: 220101411

PM: DLH



Chain of Custody

Taut Hilalyuval

	Workorder: VJ02021	W	orkorder Na	me:	Fort Belv	oir Army	PFAS SI I OV	vner Recei	ved Date:		Results Requested By:				
Repo	ort To:		Subo	ontra	ct To:		Requested Analysis				1				
Nisre	een Saikaly		Proje	ect#3	30001992	.3DL10						TI			
Pace	Analytical									111		11	11		
106	Vantage Point Drive		Pace	Golf	Coast							11			
Colu	bmia SC, 29223		7979	Inno	vation Pa	rk Drive,									
803-	227-2704		Bato	n Ro	uge, LA 70	0820								111	
nsail	kaly@shealylab.com							Preserved	Containers						
Item	Sample ID	Sample Type	Collect Date/Time	9	Lab ID		Matrix	z		U					
1								NON		70					LAB USE ONL
2	FTBL-NPFS-01-SO-092720		09/27/2020	09:15	VJ02021	-001	Solid	х		x					1
3	FTBL-B1436-01-SO-092720	) (	9/27/2020	13:40	VJ02021	-004	Solid	х		X					9
4	FTBL-LVCF-01-SO-092720	(	9/27/2020	17:30	VJ02021	-007	Solid	x		x			116		3
5	FTBL-DAAF-01-SO-092820		09/28/2020	13:34	VJ02021	-011	Solid	х		х					4
6	FTBL-12-01-SO-092820	(	09/28/2020	16:00	VJ02021	-014	Solid	x		x					5
7	FTBL-H3145-01-SO-092920	) (	9/29/2020	11:35	VJ02021	-020	Solid	х	BER	x					4
8	FTBL-OSPFS-01-SO-092920		9/29/2020	16:15	VJ02021	-024	Solid	х		х					7
9	FTBL-1980PC-01-SO-09302	0 0	9/30/2020	12:00	VJ02021	-029	Solid	х		х					8
10							Solid	х		х					
Tran	sfers Released By				/Time	Reveive	ed By		Date	/Time			Com	ments	
2	98 F	edex	14:10		3/20	Rad	ul alau	yadhi	1013	3/20	14:10	10	163-3	3464	-5818
3								10							

Cooler Temperature on Receipt	0.1 EDIO °C	Custody Seal Y or N	Received on Ice Y or N	Sample Intact Y or N
				1

^{***}In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC This chain of custody is considered complete as is since this information is available in the owner laboratory.

Friday, June 17, 2016 11:01:34 AM

FMT-ALL-C-002rev.00 24March2009

Page 1 of 1



**Report#:** 220101411

Project ID: VJ02021-Fort Belvoir Army PFAS Report Date: 10/20/2020

### Summary of Compounds Detected

FTBL-NPFS-01-SO- Collect Date 09/27/2020 09:15 LAB ID 22010141101

092720 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 4620 153 200 250 mg/kg

FTBL-B1436-01-SO- Collect Date 09/27/2020 13:40 LAB ID 22010141102

092720 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 1060 153 200 250 mg/kg

 FTBL-LVCF-01-SO Collect Date
 09/27/2020 17:30
 LAB ID
 22010141103

 092720
 Receive Date
 10/13/2020 14:10
 Matrix
 Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 568 153 200 250 mg/kg

FTBL-DAAF-01-SO- Collect Date 09/28/2020 13:34 LAB ID 22010141104

092820 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 8280 153 200 250 mg/kg



**Report#:** 220101411

Project ID: VJ02021-Fort Belvoir Army PFAS Report Date: 10/20/2020

## **Summary of Compounds Detected**

FTBL-12-01-SO-092820 Collect Date 09/28/2020 16:00 LAB ID 22010141105

Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 1880 153 200 250 mg/kg

FTBL-H3145-01-SO- Collect Date 09/29/2020 11:35 LAB ID 22010141106

092920 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 2120 153 200 250 mg/kg

FTBL-OSPFS-01-SO- Collect Date 09/29/2020 16:15 LAB ID 22010141107

092920 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 4760 153 200 250 mg/kg

FTBL-1980PC-01-SO- Collect Date 09/30/2020 12:00 LAB ID 22010141108

093020 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

CAS# Parameter Result DL LOD LOQ Units
C-012 Total Organic Carbon 204J 153 200 250 mg/kg



## Fort Belvoir PFAS PA/SI

## **DATA REVIEW**

## Fort Belvoir, Virginia

Perfluoroalkyl Substances (PFAS), Total Organic Carbon, and Soil pH Analyses

SDGs # VJ05046 and 220101408

Analyses Performed By: Pace South Carolina formerly Shealy Environmental Services West Columbia, South Carolina

Report #39091R

Review Level: Stage 3/4 Project: 30001992.3DL10

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # VJ05046 and 220101408 for samples collected in association with the Fort Belvoir Site. The review was conducted as a Stage 3/4 evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

				Sample		А	nalysis	
SDGs	Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	PFAS	тос	рН
	FTBL-FB-01-100120	VJ05046-001	Water	10/1/2020		Х		
	FTBL-SB-01-100120	VJ05046-002	Water	10/1/2020		Х		
	FTBL-MO7-MW02-100120	VJ05046-003	Water	10/1/2020		Х		
	FTBL-H3151-01-SO-100120	VJ05046-004	Soil	10/1/2020		X		Х
	FTBL-H3151-01-GW-100120	VJ05046-005	Water	10/1/2020		X		
	FTBL-B3121-02-SO-100120	VJ05046-006	Soil	10/1/2020		X		
	FTBL-B3121-02-GW-100120	VJ05046-007	Water	10/1/2020		X		
	FTBL-B3121-01-SO-100120	VJ05046-008	Soil	10/1/2020		X		Х
	FTBL-B3121-01-GW-100120	VJ05046-009	Water	10/1/2020		X		
V 105046	FTBL-EB-01-100120	VJ05046-010	Water	10/1/2020		X		
VJ05046	FTBL-EB-02-100120	VJ05046-011	Water	10/1/2020		X		
	FTBL-EB-03-100120	VJ05046-012	Water	10/1/2020		X		
	FTBL-EB-04-100120	VJ05046-013	Water	10/1/2020		X		
	FTBL-EB-05-100120	VJ05046-014	Water	10/1/2020		X		
	FTBL-FB-02-100120	VJ05046-015	Water	10/1/2020		X		
	FTBL-FBNAFS-02-SO-100120	VJ05046-016	Soil	10/1/2020		Х		
	FTBL-FBNAFS-02-GW-100120	VJ05046-017	Water	10/1/2020		X		
	FTBL-FBNAFS-01-SO-100120	VJ05046-018	Soil	10/1/2020		Х		X
	FTBL-FBNAFS-01-GW-100120	VJ05046-019	Water	10/1/2020		X		
	FTBL-FBNAFS-03-SO-100120	VJ05046-020	Soil	10/1/2020		X		
	FTBL-H3151-01-SO-100120	22010140801	Soil	10/1/2020			Х	
220101408	FTBL-B3121-01-SO-100120	22010140802	Soil	10/1/2020			Х	
	FTBL-FBNAFS-01-SO-100120	22010140803	Soil	10/1/2020			Х	

#### Notes:

1. Stage 4 validation was performed on samples FTBL-H3151-01-GW-100120 and FTBL-B3121-01-GW-100120.

2. Matrix spike (MS) and laboratory duplicate analysis were performed on a field QC sample, FTBL-EB-03-100120. A field sample was not submitted for MS/MSD analysis.

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	orted	Performance Acceptable		Not	
Items Reviewed	No	Yes	No	Yes	Required	
Sample receipt condition		Х		X		
2. Requested analyses and sample results		Х		X		
Master tracking list		Х		X		
4. Methods of analysis		Х		Х		
5. Reporting limits		Х		Х		
6. Sample collection date		Х		Х		
7. Laboratory sample received date		Х		Х		
8. Sample preservation verification (as applicable)		Х		Х		
Sample preparation/extraction/analysis dates		Х		Х		
10. Fully executed Chain-of-Custody (COC) form		Х		Х		
11. Narrative summary of QA or sample problems provided		Х		Х		
12. Data Package Completeness and Compliance		Х		Х		

Note:

QA - Quality Assurance

The sample collection time for below listed samples were not stated on chain of custody whereas marked in sample container.

Lab Sample ID	Field Sample ID	Collection Time
VJ05046-016	FTBL-FBNAFS-02-SO-100120	15:45
VJ05046-017	FTBL-FBNAFS-02-GW-100120	16:40
VJ05046-018	FTBL-FBNAFS-01-SO-100120	17:25
VJ05046-019	FTBL-FBNAFS-01-GW-100120	18:10
VJ05046-020	FTBL-FBNAFS-03-SO-100120	17:45

#### **ORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with USEPA Method 537, Pace (Shealy) Laboratories SOP ME00213-12 Determination of Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS (Isotope Dilution) QSM 5.3 Table B-15, Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, DoD Final Data Validation Guidelines Module 3: PFAS, May 2020, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified, and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes:

- Concentration (C) Qualifiers
  - U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The reported result was an estimated value with an unknown bias.
  - J+ The result was an estimated quantity, but the result may be biased high.
  - J- The result was an estimated quantity, but the result may be biased low.
  - UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

#### PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA modified	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
537 DoD QSM 5.3	Water	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

The holding time has been changed from the original holding time documented in EPA 537 of 14 days to extraction hold time that has now been changed to 28 days. This was documented in EPA Technical Brief EPA/600/F-17/022h Updated January 2020. Utilizing the new guidance of 28 days all samples were analyzed within the specified holding time criteria.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Calibration

Mass calibration and system performance were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration,  $r^2 \ge 0.99$ . Analytes must be within 70-130% of their true value for each calibration standard.

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with the initial and continuing calibrations were within the specified control limits.

#### 4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 70 to 130%.

All compounds associated with ISC recoveries were within control limits.

#### 4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.3 Table B-15.

The ion transitions were as specified in DoD QSM 5.3.

#### 5. Isotopically labeled Standards

#### 5.1 Extracted Internal Standards (EIS)

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within DoD QSM 5.3 specified limits of 50% to 150%.

Samples associated with EIS exhibiting recoveries outside of the control limits are presented in the following table.

Sample ID	EIS	Associated Compounds	%R
FTBL-H3151-01-GW-100120	13C2_PFTeDA	Perfluoro-n-tetradecanoic acid (PFTeDA)	< 50% but > 20%
	13C2_PFTeDA	Perfluoro-n-tetradecanoic acid (PFTeDA)	< 50% but > 20%
FTBL-B3121-02-GW-100120	13C8_PFOS	Perfluorooctanesulfonic acid (PFOS)	< 50% but > 20%
FTBL-EB-01-100120	13C2_6:2FTS	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	> 150%
FTBL-EB-02-100120	13C2_6:2FTS	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	> 150%
FTBL-EB-03-100120	13C2_6:2FTS	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	> 150%

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
4500	Non-detect	No Action
> 150%	Detect	J-
< 50% but > 20%	Non-detect	UJ

Control Limit	Sample Result	Qualification
	Detect	J+
.000/	Non-detect	X
< 20%	Detect	X

#### 6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be ≤ 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS analysis performed on field QC sample FTBL-EB-03-100120 exhibited acceptable recoveries. A field sample was not submitted for MS/MSD analysis.

#### 7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

#### 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 50% for soils is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

A field duplicate sample was not collected with this SDG.

#### 9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compounds		Reported Analysis
FTBL-FBNAFS-01-GW-100120	Perfluoro-n-pentanoic acid (PFPeA)	 1000	1000 DJ

Note: the lab didn't report the original analysis; only the diluted results were reported.

The overall analysis is performed utilizing the isotope dilution procedure. A dilution was needed to bring the compounds presented in the table above within the instrument calibration range. The dilution required the laboratory to refortify the extractable internal standard. This refortification negated the EIS isotope dilution, affecting the results in the diluted analysis. The diluted results are not representative of the original analysis performed as an isotope dilution; therefore, the diluted results have been qualified as estimated (J).

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range. The isotope dilution was negated due to dilution and refortification.	DJ

#### 10. System Performance and Overall Assessment

The case narrative notes that samples FTBL-H3151-01-GW-100120, FTBL-B3121-02-GW-100120, FTBL-B3121-01-GW-100120, FTBL-FBNAFS-01-GW-100120 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; sample was spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <10mL and reconstituted to 10mL using MeOH by transfer pipet. Hence, the target compounds were not qualified for these samples.

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

#### **DATA VALIDATION CHECKLIST FOR PFAS**

PFAS: 537M/DoD QSM 5.3	Rep	orted		rmance eptable	Not	
	No	Yes	No	Yes	Required	
LIQUID CHROMATOGRAPHY/MASS SPECTROME	TRY (LC	/MS/MS)				
Stage 2 Validation						
Holding times		X		Х		
Reporting limits (units)		Х		Х		
Blanks						
A. Method blanks		X		Х		
B. Equipment blanks		Х		Х		
C. Field blanks		Х		Х		
Laboratory Control Sample (LCS) %R		X		Х		
Laboratory Control Sample Duplicate (LCSD) %R	Х				Х	
LCS/LCSD Precision (RPD)	Х				Х	
Matrix Spike (MS) %R		Х		Х		
Matrix Spike Duplicate (MSD) %R	Х				Х	
MS/MSD Precision (RPD)	Х				Х	
Lab Duplicate (RPD)		Х		Х		
Field Duplicate (RPD)	Х				Х	
Extracted Internal Standard %R		Х	Х			
Dilution Factor		Х		Х		
Moisture Content		Х		Х		
Stage 3/4 Validation						
Instrument tune and performance check		Х		Х		
Initial calibration %RSDs		Х		Х		
Continuing calibration %Ds		Х		Х		
Instrument sensitivity check		Х		Х		
lon transitions used		Х		Х		
Compound identification and quantitation	1	1		1	1	
A. Reconstructed ion chromatograms		Х		Х		
B. Quantitation Reports		Х		Х		
C. RT of sample compounds within the established RT windows		Х		х		

PFAS: 537M/DoD QSM 5.3		orted	Performance Acceptable		Not		
		Yes	No	Yes	Required		
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)							
D. Ion Ratio %D		X		Х			
E. Transcription/calculations acceptable		Х		Х			
F. Reporting limits adjusted to reflect sample dilutions		х		Х			

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

#### **INORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 9045D and 9060A. Data were reviewed in accordance with Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes:

#### Concentration (C) Qualifiers

- U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.
- J The reported value was obtained from a reading less than the limit of detection (LOQ), but greater than or equal to the detection limit (DL).

#### Quantitation (Q) Qualifiers

E The compound was quantitated above the calibration range.

#### Validation Qualifiers

- J The reported result was an estimated value with an unknown bias.
- J+ The result was an estimated quantity, but the result may be biased high.
- J- The result was an estimated quantity, but the result may be biased low.
- UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
- UB Analyte considered non-detect at the listed value due to associated blank contamination.
- X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

#### **GENERAL CHEMISTRY ANALYSES**

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total Organic Carbon (TOC) by SW846 9060A	Soil	28 days from collection to analysis	Cool to <6 °C.
pH by SW846 9045D	Soil	Within 24 hours of receipt at laboratory	Cool to <6 °C.

The analyses that exceeded the holding time are presented in the following table.

Sample ID	Holding Time	Criteria		
FTBL-H3151-01-SO-100120				
FTBL-B3121-01-SO-100120	15 days from collection; 11 days from receipt	Within 24 hours of receipt at laboratory		
FTBL-FBNAFS-01-SO-100120	Tr days nom resorpt			

Sample results associated with sample locations analyzed by analytical method SW-846 9045D were qualified, as specified in the table below. All other holding times were met.

Criteria	Qualification  Detected  Analytes
Analysis completed past the holding time	J

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

TOC was not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

pH: The initial and continuing calibration criteria were within the acceptance criteria of  $\pm$  0.05 SU of the true value.

#### 4. Matrix Spike (MS)/Laboratory Duplicate Analysis

MS and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

#### 4.1 MS Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS recovery control limits do not apply for MS performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS concentration by a factor of four or greater.

A MS analysis was not performed for TOC.

#### 4.2 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the LOQ. A control limit of 20% for water matrices and 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of one time the LOQ is applied for water matrices and two times the LOQ for soil matrices.

The difference between the sample result and the laboratory duplicate result must be within QAPP specified control limit of less than or equal to 0.1 su. for pH.

A laboratory duplicate analysis was not performed for TOC and pH.

#### 5. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of three times the LOQ is applied for soil matrices.

A field duplicate was not collected for TOC and pH analysis.

#### 6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits.

#### 7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

#### DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW846 9045D/9060A	Rep	orted		mance ptable	Not
	No	Yes	No	Yes	Required
Miscellaneous Instrumentation					
Stage 2 Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				Х
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R	X				X
Matrix Spike Duplicate (MSD) %R	X				X
MS/MSD Precision (RPD)	X				X
Lab Duplicate (RPD)	Х				Х
Field Duplicate (RPD)	Х				Х
Dilution Factor		X		Х	
Moisture Content		Х		Х	
Stage 3/4 Validation pH Only					
Initial calibration		Х		Х	
Continuing calibration %R		Х		Х	
Raw Data		Х		Х	
Transcription/calculations acceptable		Х		Х	
Reporting limits adjusted to reflect sample dilutions		Х		Х	

#### Notes:

%R - percent recovery

RPD - relative percent difference

VALIDATION PERFORMED BY: Suresh PR, Arcadis

SIGNATURE:

DATE: November 18, 2020

PEER REVIEW: Lyndi Mott, Arcadis

DATE: November 18, 2020

## Stage 3 / 4 PFAS Calibration Standards

 SDG #:
 VJ05046
 Date:
 11/18/2020

 Lab:
 Pace (Shealy)
 Page:
 1

 Project:
 Fort Belvoir
 Validated by:
 SPR

Method: EPA modified 537 per DoD QSM 5.3

Instrument : LCMSMS02

PFOS 10/6/2020 Calibration Page 282-292 of SDG VJ05046

	, ==== ================================					-5- 5. 5- 5				
						Calc		%R Calc		
						Amount		Amount/	Reported	
Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	RF	ng/L	Tvalue ng/L	Tvalue	%R	
50	10874	164816	1000	0.065977	1.210077	54.52	46.4	117.51	118	MATC
100	19554	177371	1000	0.110244	1.210077	91.10	92.8	98.17	98	MATC
200	38822	173400	1000	0.223887	1.210077	185.02	185.6	99.69	99.7	MATC
500	87706	161518	1000	0.543011	1.210077	448.74	464	96.71	96.7	MATC
1000	192678	174937	1000	1.101414	1.210077	910.20	928	98.08	98.1	MATC
2000	407305	182412	1000	2.232885	1.210077	1845.24	1856	99.42	99.4	MATC
5000	912750	173176	1000	5.27065	1.210077	4355.63	4640	93.87	93.9	MATC
10000	1971001	182452	1000	10.80285	1.210077	8927.40	9280	96.20	96.2	MATC
15000	3079785	178224	1000	17.28042	1.210077	14280.43	13920	102.59	103	MATC
20000	4032776	183677	1000	21.9558	1.210077	18144.14	18560	97.76	97.8	MATC

Calculated Amount pg/ml = ((Area Ratio x EIS Conc)/RF)

## Stage 3 / 4 PFAS ICV CCV Standards %R

 SDG #:
 VJ05046
 Date:
 11/18/2020

 Lab:
 Pace (Shealy)
 Page:
 2

 Project:
 Fort Belvoir
 Validated by:
 SPR

**Method:** EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02 File ID: 100620017

ICV 500_SVLC-1109 10/6/2020 13:41:31 Page 466 - 467 of SDG VJ05046

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFBA	493.82	500	98.76	98.8	MATCH
PFBS	471.33	442.5	106.52	107	MATCH
PFOA	513.7	500	102.74	103	MATCH
PFOS	432.79	462.75	93.53	93.5	MATCH
PFNA	511.35	500	102.27	102	MATCH

Instrument: LCMSMS02 File ID: 101320051

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFBA	1015.48	1000	101.55	102	MATCH
PFBS	924.35	884	104.56	105	MATCH
PFOA	1025.82	1000	102.58	103	MATCH
PFOS	948.99	928	102.26	102	MATCH
PFNA	1047.59	1000	104.76	105	MATCH

Stage 3 / 4 PFAS LCS

SDG #: VJ05046

Pace (Shealy)

Project: Fort Belvoir

Lab:

Date: 11/18/2020

Page: 3

Validated by: SPR

Method: EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02

File ID: 101320036

LCS VQ69662-002

Page 1289 - 1293 of SDG VJ05046

							Extract						
						Calculated	Final	Extracted					
			EIS Conc			Amount	Volume	Sample	Calculated		Calculated	Reported	
Analyte	Std Area	EIS Area	ng/L	Area Ratio	RF	ng/L	mls	Volume mls	ng/L	Tvalue ng/L	% R	%R	
PFBA	224038	656756	1001	0.341128	0.997732	342.25	10	250	15.0	16	94.02	94	MATCH
PFBS	78891	236437	1001	0.333666	1.133731	294.60	10	250	12.9	14	92.50	92	MATCH
PFOA	231662	684511	1001	0.338434	1.031895	328.30	10	250	14.4	16	90.19	90	MATCH
PFOS	59037	145192	1001	0.406613	1.21007	336.36	10	250	14.8	15	98.57	100	MATCH
PFNA	267783	792830	1001	0.337756	0.98909	341.82	10	250	15.0	16	93.91	94	MATCH

Differences in %R may be due to rounding of the true value

Calculated amount ng/L = (Peak area ratio/Avg RF) x EIS conc ng/L

Calculated amount ng/L = ((calculated pg/ml x 10 mls) / extracted sample volume mls) / 0.91

#### Stage 3 / 4 PFAS MS/MSD

SDG #:	VJ05046	Date	e: 11/18/2020
Lab:	Pace (Shealy)	Pag	e: 4
Project:	Fort Belvoir	Validated b	y: SPR
Method:	EPA modified 537 per DoD QSM 5.3		
MS/MSE	Sample ID <u>FTBL-EB-03-100120</u> ANALYTE PFHpA	Page 1343 of SDG VJ05	046
REPOR	TED MS %R 108		
	$%R = \frac{100 * (MS Conc - Sample Conc)}{MS TV}$		
	Sample Concentration 0 MS Concentration 14 MS TV 13	MS %R107	.7 MATCH

Differences in %R may be due to rounding of the true value

## Stage 3 / 4 PFAS Sample Concentration

 SDG #:
 VJ05046
 Date:
 11/18/2020

 Lab:
 Pace (Shealy)
 Page:
 5

 Project:
 Fort Belvoir
 Validated by:
 SPR

Method: EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-H3151-01-GW-100120 Lab ID: VJ05046-005 Page 122-124 of SDG VJ05046

							Extract				1
							Final	Extracted			
			EIS Conc			Calculated	Volume	Sample	Calculated	Reported	
Analyte	Std Area	EIS Area	ng/L	Area Ratio	Avg RF	Amount ng/L	mls	Volume mls	ng/L	ng/L	
PFBA	461926	604013	1001	0.764762	0.997732	767.27	10	269	31.3	31	MATCH
PFBS	39960	227018	1001	0.176021	1.133731	155.41	10	269	6.3	6.3	MATCH
PFOA	600172	627552	1001	0.95637	1.031895	927.74	10	269	37.9	38	MATCH
PFOS	296188	91241	1001	3.246216	1.21007	2685.35	10	269	109.7	110	MATCH
PFNA	56480	717805	1001	0.078684	0.98909	79.63	10	269	3.3	3.3 J	MATCH

Field Sample: FTBL-B3121-01-GW-100120 Lab ID: VJ05046-009 Page 160-162 of SDG VJ05046

							Extract				]
							Final	Extracted			
			EIS Conc			Calculated	Volume	Sample	Calculated	Reported	
Analyte	Std Area	EIS Area	ng/L	Area Ratio	Avg RF	Amount ng/L	mls	Volume mls	ng/L	ng/L	
PFBA	1144107	688090	1001	1.662729	0.997732	1668.17	10	286	64.1	64	MATCH
PFBS	50590	229077	1001	0.220843	1.133731	194.99	10	286	7.5	7.5	MATCH
PFOA	860984	676448	1001	1.272801	1.031895	1234.69	10	286	47.4	47	MATCH
PFOS	110819	135626	1001	0.817093	1.21007	675.92	10	286	26.0	26	MATCH
PFNA	175330	814843	1001	0.21517	0.98909	217.76	10	286	8.4	8.4	MATCH

Calculated amount  $ng/L = (Peak area \ ratio/Avg\ RF) \ x \ EIS \ conc \ ng/L$ Calculated  $ng/L = ((calculated \ pg/ml \ x \ 10 \ mls) \ / \ extracted \ sample \ volume \ mls) \ / \ 0.91$ 

#### Stage 3 / 4 PFAS EIS

 SDG #:
 VJ05046
 Date:
 11/18/2020

 Lab:
 Pace (Shealy)
 Page:
 6

 Project:
 Fort Belvoir
 Validated by:
 SPR

Method: EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B3121-01-GW-100120 Lab ID: VJ05046-009

EIS 13C8_PFOS

REPORTED EIS %R 80

%R = 100 * EIS Area CCV 100 EIS Area

EIS Area 135626 Page 160 of SDG VJ05046 CCV 100 EIS Area 168585 Page 718 of SDG VJ05046 %R 80.4 MATCH

## CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

PACE ANALYTICAL SERVICES, LLC 108 Vantage Point Drive · West Columbia, SC 29172 Telephone No. 809-791-9700 Fax No. 809-791-9111 www.pace/abs.com

Number 111745

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Additions	-	Analysis (Altech fist if more space is needed)	
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F185861-100120 10/120	D900 6 M 2 X		
CTOL-MOS-MUDZ	1102 6 X 2 2011		
F18/-H3/51-01-50-100120 10/1/20	XXX	X	
FT81-43151-01-64-100/20 10/1/20	X   2   X   0   0   0   0   0   0   0   0   0		
EIBL- 63/21-02-50-100/20 10/1/20	X 11 X 9 5001		
E184- 63121-02-60-100120 10/1/20	1100 GX 2		
F182-63121-01-80-100120 10/1/20	XXX	×	
FIBL- 63121 - 01 - 633-100120 10/1/20	1255 6X 2		
518L-88-02-100120 10/1/20	X 2 X9 OEH		
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2. Rethrepiehed by	Date Thue 2. Received by	Date	Тав
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DISTRIBUTION: WHITE & YELLOW Return to laboratory with Sample(s); PINK-Field/Cliens Cupy

Document Number: ME003N2-01

# 111747 Number 106 Vantage Point Drive · West Columbia, SC 29172 PACE ANALYTICAL SERVICES, LLC Pace Analytical"

Telephone No. 803-791-9700 Fax No. 803-791-9111

www.pacelabs.com

ARMOR

7.19 E. VJ05046 Lot # Ber Code (Rebuspion(y) Page 2. 01. 2. 27-60 mm 228 CO Requirements (Specify) Time Ting 7,770 Bilda Dafa Oafe Parts Anglysis (Attach list I more space is recorded) ... Skin-Irritant -- El Potson -- El-Unknown-31115 CHASO Telephone No. / E-mail SEP PAGE HO 207 ALL (18 CONCOUR Setting to them & Disposal by Lab. 18 Monthson . L. Ramanatia Posnitje hizzard (dentification pinaja. PPM or serv No of Contathors by Preservative Type 4. Laboratory receive LAB USE ONLY 2. Received by Received by 3. Received by SW. EQNH! 2095H さらなりこの存む人 N revers N 4 14 N 2 Ç **2**を2 5 pjog Tome きに SEE PAGE Sampler's Stansture STOREGE Report to Cardact 02/2/01 \$ 5 kg 4(4)(1) 4(4)(1) ৩ All samples are retained for four weeks from receipt و ů ڡ Sample Disposal Collection Time (Mikazy) 446 1435 1450 1445 1500 Date Sate a liot Turn Around Turn Required (Prior lat approval required for expedited 12(1.) 10/1/20 02/10 921101 02/1/01 32/1/01 0/1 2th FI BEWOIR, ARMY PERS PRISERM 10/1/20 92/1/01 02/ 1/al Zio Codo 7,37233 Collection Dale(s) P.O. Ro. SWIF 24BD F10C-FBLAES-001-30-100120 F181.-FBNAF5-01-GD-100120 F101- FBUNES - 02-60-100120 CTBL-FBURES-03-50-100120 State V.D. FIBI-FRUNES-02-100120 Curlaisses for each sample mey be contained on one doe.) F101-EB-05-100120 F161-EB-03-100120 FIBL-EB-02-1000ZC P(GL-EB-04-100120 FIBL-FB-02-100170 gast may up De Sumple 10 / Description 30001992.3DLID Rush (Specify) RICHMOND Note: -> Reinquished by 4. Relinquished by 2. Reinguehed by 1. Helinquished by Project Name Standard Š

unless other arrangements are made.

Document Number: ME000Ni2-01

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Temp Blank

Ascept Temp. 12.

Apple Pack

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Received on the (Chale) Yes

Client: Arcadis U.S., Inc.

Description: FTBL-FB-01-100120

Laboratory ID: VJ05046-001 Matrix: Aqueous

Date Sampled:10/01/2020 0855 Date Received: 10/05/2020

Run Prep Method SOP SPE

Analytical Method Dilution PFAS by ID SOP QSM B-15

Analysis Date Analyst 10/13/2020 1942 SES

Prep Date Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.2	U	8.3	4.2	2.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.2	U	8.3	4.2	2.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.2	U	8.3	4.2	2.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.2	U	8.3	4.2	2.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.0	ng/L	1

Acceptance

Run 1

Surrogate	Q	% Recovery	Limits
13C2_6:2FTS		134	50-150
13C2_8:2FTS		116	50-150
13C2_PFDoA		102	50-150
13C2_PFTeDA		101	50-150
13C3_PFBS		95	50-150
13C3_PFHxS		105	50-150
13C4_PFBA		112	50-150
13C4_PFHpA		106	50-150
13C5_PFHxA		112	50-150
13C5_PFPeA		114	50-150
13C6_PFDA		112	50-150
13C7_PFUdA		104	50-150
13C8_PFOA		121	50-150
13C8_PFOS		97	50-150
13C9_PFNA		115	50-150
d5-EtFOSAA		115	50-150
d3-MeFOSAA		109	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-SB-01-100120

Laboratory ID: VJ05046-002

Date Sampled:10/01/2020 0900

Matrix: Aqueous

Date Received: 10/05/2020

Run Prep Method SOP SPE

PFAS by ID SOP QSM B-15

Analytical Method Dilution Analysis Date Analyst 10/13/2020 1952 SES

Prep Date

Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1

13C2_6:2FTS 106 50-150
13C2_8:2FTS 111 50-150
13C2_PFDoA 91 50-150
13C2_PFTeDA 86 50-150
13C3_PFBS 84 50-150
13C3_PFHxS 85 50-150
13C4_PFBA 106 50-150
13C4_PFHpA 101 50-150
13C5_PFHxA 101 50-150
13C5_PFPeA 101 50-150
13C6_PFDA 102 50-150
13C7_PFUdA 95 50-150
13C8_PFOA 100 50-150
13C8_PFOS 73 50-150
13C9_PFNA 98 50-150
d5-EtFOSAA 100 50-150
d3-MeFOSAA 95 50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

W = Reported on wet weight basis

LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-MO7-MW02-100120

Laboratory ID: VJ05046-003 Matrix: Aqueous

Date Sampled:10/01/2020 1102 Date Received: 10/05/2020

Run Prep Method SOP SPE

Analytical Method Dilution Analysis Date Analyst PFAS by ID SOP QSM B-15

10/13/2020 2211 SES

Prep Date 10/13/2020 1008 69662

Batch

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.8	J	3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	4.5		3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	9.1		3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	4.4		3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	7.1		3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	11		3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	6.1		3.6	1.8	0.91	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.5	J	3.6	1.8	0.91	ng/L	1

	Acceptance
Q % Recovery	Limits
119	50-150
109	50-150
100	50-150
98	50-150
104	50-150
110	50-150
110	50-150
113	50-150
111	50-150
115	50-150
113	50-150
103	50-150
118	50-150
93	50-150
108	50-150
109	50-150
106	50-150
	Q % Recovery  119 109 100 98 104 110 110 111 115 113 103 118 93 108 109

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

W = Reported on wet weight basis H = Out of holding time

LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

#### Inorganic non-metals

Client: Arcadis U.S., Inc.

Laboratory ID: VJ05046-004

Description: FTBL-H3151-01-SO-100120

Matrix: Solid

% Solids: 86.2 10/06/2020 2331

Date Received: 10/05/2020

Date Sampled:10/01/2020 0900

Run Prep Method

Analytical Method Dilution (Soil pH meas) 9045D

Analysis Date Analyst 10/16/2020 1733 AAB

Prep Date

Batch 70227

CAS Analytical Parameter Number Result Q LOQ LOD Method

Soil pH measured in water @ 20.7 ° C

9045D

5.4

DL

su

Units Run

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure U = Not detected at or above the LOQ N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40%  $J = Estimated \ result < LOQ \ and \ge DL$ L = LCS/LCSD failure S = MS/MSD failure W = Reported on wet weight basis H = Out of holding time LOD = Limit of Detection

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.) 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

Client: Arcadis U.S., Inc.

Description: FTBL-H3151-01-SO-100120

Date Sampled:10/01/2020 0900 % Solids: 86.2 10/06/2020 2331

Date Received: 10/05/2020

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 10/15/2020 1842 SES 10/14/2020 1109 69796

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	?un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1

i emdoroocianesanomic acia (i i os)	1703	-23-1 11 A3 by 1D 301	0.00033	0.0011 0.00055	0.00022 Hig/kg 1
Surrogate	Run 1 / Q % Recovery	Acceptance Limits			
13C2_6:2FTS	98	50-150			
13C2_8:2FTS	87	50-150			
13C2_PFDoA	107	50-150			
13C2_PFTeDA	85	50-150			
13C3_PFBS	72	50-150			
13C3_PFHxS	79	50-150			
13C4_PFBA	86	50-150			
13C4_PFHpA	89	50-150			
13C5_PFHxA	89	50-150			
13C5_PFPeA	87	50-150			
13C6_PFDA	91	50-150			
13C7_PFUdA	90	50-150			
13C8_PFOA	94	50-150			
13C8_PFOS	81	50-150			
13C9_PFNA	91	50-150			
d5-EtFOSAA	93	50-150			
d3-MeFOSAA	90	50-150			

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Laboratory ID: VJ05046-004

Matrix: Solid

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-H3151-01-GW-100120

Date Sampled:10/01/2020 0925 Date Received: 10/05/2020 Laboratory ID: VJ05046-005

Matrix: Aqueous

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch
1 SOP SPE PFAS by ID SOP QSM B-15 1 10/13/2020 2222 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.7	U	7.4	3.7	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	38		7.4	3.7	1.9	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.4	3.7	1.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.4	3.7	1.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	6.3		3.7	1.9	0.93	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	95		3.7	1.9	0.93	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	31		3.7	1.9	0.93	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.9	U	3.7	1.9	0.93	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.9	U	3.7	1.9	0.93	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	16		3.7	1.9	0.93	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	39		3.7	1.9	0.93	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	3.3	J	3.7	1.9	0.93	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	38		3.7	1.9	0.93	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	52		3.7	1.9	0.93	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.9	<del>UQ</del> UJ	3.7	1.9	0.93	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.9	U	3.7	1.9	0.93	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.9	U	3.7	1.9	0.93	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	110		3.7	1.9	0.93	ng/L	1

Surrogate	Q 9	Run 1 6 Recovery	Acceptance Limits
13C2_6:2FTS		102	50-150
13C2_8:2FTS		84	50-150
13C2_PFDoA		68	50-150
13C2_PFTeDA	N	41	50-150
13C3_PFBS		86	50-150
13C3_PFHxS		78	50-150
13C4_PFBA		90	50-150
13C4_PFHpA		95	50-150
13C5_PFHxA		98	50-150
13C5_PFPeA		99	50-150
13C6_PFDA		85	50-150
13C7_PFUdA		76	50-150
13C8_PFOA		97	50-150
13C8_PFOS		54	50-150
13C9_PFNA		89	50-150
d5-EtFOSAA		78	50-150
d3-MeFOSAA		74	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ
H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

 $E = Quantitation \ of \ compound \ exceeded \ the \ calibration \ range$   $P = The \ RPD \ between \ two \ GC \ columns \ exceeds \ 40\%$   $LOD = Limit \ of \ Detection$ 

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Laboratory ID: VJ05046-006

Description: FTBL-B3121-02-SO-100120

Matrix: Solid

% Solids: 82.1 10/06/2020 2331

Date Received: 10/05/2020

Date Sampled:10/01/2020 1045

Run Prep Method SOP SPE

Analytical Method Dilution Analysis Date Analyst PFAS by ID SOP QSM B-15

10/15/2020 1853 SES

Prep Date

Batch 10/14/2020 1109 69796

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	lun
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00049	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00049	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00049	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0010	U	0.0020	0.0010	0.00049	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00049	U	0.00098	0.00049	0.00020	mg/Kg	1

Surrogate Q % Rec	overy Limits
13C2_6:2FTS	36 50-150
13C2_8:2FTS	90 50-150
13C2_PFDoA	39 50-150
13C2_PFTeDA	34 50-150
13C3_PFBS	59 50-150
13C3_PFHxS	75 50-150
13C4_PFBA	33 50-150
13C4_PFHpA	38 50-150
13C5_PFHxA	31 50-150
13C5_PFPeA	35 50-150
13C6_PFDA	94 50-150
13C7_PFUdA	86 50-150
13C8_PFOA	37 50-150
13C8_PFOS	78 50-150
13C9_PFNA	37 50-150
d5-EtFOSAA	35 50-150
d3-MeFOSAA	36 50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis

LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-B3121-02-GW-100120

Date Sampled:10/01/2020 1100
Date Received: 10/05/2020

Laboratory ID: VJ05046-007

Matrix: Aqueous

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch
1 SOP SPE PFAS by ID SOP QSM B-15 1 10/13/2020 2233 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	8.0		3.5	1.8	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	11		3.5	1.8	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	7.9		3.5	1.8	0.87	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	6.1		3.5	1.8	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	9.6		3.5	1.8	0.87	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.4	J	3.5	1.8	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	14		3.5	1.8	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	13		3.5	1.8	0.87	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	<del>UQ</del> UJ	3.5	1.8	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	19	<b>⊖</b> J+	3.5	1.8	0.87	ng/L	1

Surrogate	0 0/		Acceptance
	Q %	Recovery	Limits
13C2_6:2FTS		97	50-150
13C2_8:2FTS		82	50-150
13C2_PFDoA		54	50-150
13C2_PFTeDA	N	46	50-150
13C3_PFBS		73	50-150
13C3_PFHxS		58	50-150
13C4_PFBA		73	50-150
13C4_PFHpA		100	50-150
13C5_PFHxA		101	50-150
13C5_PFPeA		96	50-150
13C6_PFDA		73	50-150
13C7_PFUdA		67	50-150
13C8_PFOA		90	50-150
13C8_PFOS	N	41	50-150
13C9_PFNA		82	50-150
d5-EtFOSAA		60	50-150
d3-MeFOSAA		64	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

DL = Detection Limit J = Estimated result < LOQ and  $\geq DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

# Inorganic non-metals

Client: Arcadis U.S., Inc.

Laboratory ID: VJ05046-008

Description: FTBL-B3121-01-SO-100120

Matrix: Solid

% Solids: 86.7 10/06/2020 2331

Date Received: 10/05/2020

Date Sampled:10/01/2020 1230

Run Prep Method

Analytical Method Dilution Analysis Date Analyst (Soil pH meas) 9045D

10/16/2020 1742 AAB

Prep Date

Batch 70227

Parameter	CAS Number	Analytical Method	Result Q	LOQ	LOD	DL	Units Run
Soil pH measured in water @ 21.1 ° C		9045D	5.5			•	su 1

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

N = Recovery is out of criteria

P = The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

W = Reported on wet weight basis LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

S = MS/MSD failure

Client: Arcadis U.S., Inc.

Description: FTBL-B3121-01-SO-100120

Date Sampled:10/01/2020 1230

Date Received: 10/05/2020

Laboratory ID: VJ05046-008

Matrix: Solid

% Solids: 86.7 10/06/2020 2331

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 10/15/2020 1904 SES 10/14/2020 1109 69796

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00061	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1

Surrogate	Run 1 A Q % Recovery	cceptance Limits
13C2_6:2FTS	88	50-150
13C2_8:2FTS	93	50-150
13C2_PFDoA	92	50-150
13C2_PFTeDA	80	50-150
13C3_PFBS	71	50-150
13C3_PFHxS	76	50-150
13C4_PFBA	84	50-150
13C4_PFHpA	85	50-150
13C5_PFHxA	84	50-150
13C5_PFPeA	88	50-150
13C6_PFDA	86	50-150
13C7_PFUdA	87	50-150
13C8_PFOA	84	50-150
13C8_PFOS	77	50-150
13C9_PFNA	88	50-150
d5-EtFOSAA	91	50-150
d3-MeFOSAA	83	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis

LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-B3121-01-GW-100120

Laboratory ID: VJ05046-009 Matrix: Aqueous

Date Sampled:10/01/2020 1255 Date Received: 10/05/2020

Run Prep Method 1 SOP SPE

Analytical Method Dilution Analysis Date Analyst PFAS by ID SOP QSM B-15

10/13/2020 2243 SES

Prep Date Batch 10/13/2020 1008 69662

	Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
•	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	58		7.0	3.5	1.7	ng/L	1
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.5	U	7.0	3.5	1.7	ng/L	1
	Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	7.5		3.5	1.8	0.87	ng/L	1
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	26		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	64		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
	Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
	Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	110		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	130		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	8.4		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	47		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	200		3.5	1.8	0.87	ng/L	1
	Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
	Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
	Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.5	1.8	0.87	ng/L	1
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	26		3.5	1.8	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	
13C2_6:2FTS		105	50-150	
13C2_8:2FTS		105	50-150	
13C2_PFDoA		87	50-150	
13C2_PFTeDA		67	50-150	
13C3_PFBS		87	50-150	
13C3_PFHxS		94	50-150	
13C4_PFBA		103	50-150	
13C4_PFHpA		95	50-150	
13C5_PFHxA		100	50-150	
13C5_PFPeA		102	50-150	
13C6_PFDA		99	50-150	
13C7_PFUdA		91	50-150	
13C8_PFOA		104	50-150	
13C8_PFOS		80	50-150	
13C9_PFNA		101	50-150	
d5-EtFOSAA		98	50-150	
d3-MeFOSAA		89	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-EB-01-100120 Date Sampled:10/01/2020 1430

Laboratory ID: VJ05046-010

Matrix: Aqueous

Date Received: 10/05/2020

Run Prep Method SOP SPE

Analytical Method Dilution PFAS by ID SOP QSM B-15

Analysis Date Analyst 10/13/2020 2003 SES

Prep Date

Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.2	U	8.4	4.2	2.1	ng/L 1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.2	<del>UQ</del> U	8.4	4.2	2.1	ng/L 1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.2	U	8.4	4.2	2.1	ng/L 1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.2	U	8.4	4.2	2.1	ng/L 1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L 1

Acceptance

	Ruii Ac	Ruii i Acceptance					
Surrogate	Q	% Recovery	Limits				
13C2_6:2FTS	N	153	50-150				
13C2_8:2FTS		139	50-150				
13C2_PFDoA		109	50-150				
13C2_PFTeDA		119	50-150				
13C3_PFBS		108	50-150				
13C3_PFHxS		117	50-150				
13C4_PFBA		120	50-150				
13C4_PFHpA		118	50-150				
13C5_PFHxA		114	50-150				
13C5_PFPeA		124	50-150				
13C6_PFDA		120	50-150				
13C7_PFUdA		117	50-150				
13C8_PFOA		134	50-150				
13C8_PFOS		105	50-150				
13C9_PFNA		122	50-150				
d5-EtFOSAA		128	50-150				
d3-MeFOSAA		121	50-150				

Run 1

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-EB-02-100120

Laboratory ID: VJ05046-011 Matrix: Aqueous

Date Sampled:10/01/2020 1435

Date Received: 10/05/2020

Run Prep Method SOP SPE

Analytical Method Dilution PFAS by ID SOP QSM B-15

Analysis Date Analyst 10/13/2020 2014 SES

Prep Date

Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units I	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.3	U	8.6	4.3	2.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.3	<del>UQ</del> U	8.6	4.3	2.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.3	U	8.6	4.3	2.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.3	U	8.6	4.3	2.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.2	U	4.3	2.2	1.1	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	167	50-150
13C2_8:2FTS		117	50-150
13C2_PFDoA		104	50-150
13C2_PFTeDA		100	50-150
13C3_PFBS		92	50-150
13C3_PFHxS		101	50-150
13C4_PFBA		111	50-150
13C4_PFHpA		109	50-150
13C5_PFHxA		109	50-150
13C5_PFPeA		112	50-150
13C6_PFDA		109	50-150
13C7_PFUdA		105	50-150
13C8_PFOA		127	50-150
13C8_PFOS		91	50-150
13C9_PFNA		107	50-150
d5-EtFOSAA		115	50-150
d3-MeFOSAA		105	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-EB-03-100120

Laboratory ID: VJ05046-012 Matrix: Aqueous

Date Sampled:10/01/2020 1440

Date Received: 10/05/2020

SOP SPE

Run Prep Method

Analytical Method Dilution Analysis Date Analyst Prep Date Batch PFAS by ID SOP QSM B-15 10/13/2020 2024 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.7	<del>UQ</del> U	7.3	3.7	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1

(				 	1.0	0.71	
Surrogate	Q	Run 1 % Recovery	Acceptance Limits				
13C2_6:2FTS	N	167	50-150				
13C2_8:2FTS		120	50-150				
13C2_PFDoA		103	50-150				
13C2_PFTeDA		100	50-150				
13C3_PFBS		98	50-150				
13C3_PFHxS		102	50-150				
13C4_PFBA		116	50-150				
13C4_PFHpA		117	50-150				
13C5_PFHxA		109	50-150				
13C5_PFPeA		114	50-150				
13C6_PFDA		112	50-150				
13C7_PFUdA		107	50-150				
13C8_PFOA		136	50-150				
13C8_PFOS		93	50-150				
13C9_PFNA		111	50-150				
d5-EtFOSAA		118	50-150				
d3-MeFOSAA		114	50-150				

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

W = Reported on wet weight basis H = Out of holding time LOD = Limit of Detection Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-EB-04-100120

Laboratory ID: VJ05046-013 Matrix: Aqueous

Date Sampled:10/01/2020 1445 Date Received: 10/05/2020

Run Prep Method SOP SPE

PFAS by ID SOP QSM B-15

Analytical Method Dilution Analysis Date Analyst 10/13/2020 2045 SES

Prep Date

Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.1	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.89	ng/L	1

		ceptance
Surrogate	Q % Recovery	Limits
13C2_6:2FTS	140	50-150
13C2_8:2FTS	116	50-150
13C2_PFDoA	103	50-150
13C2_PFTeDA	103	50-150
13C3_PFBS	98	50-150
13C3_PFHxS	105	50-150
13C4_PFBA	111	50-150
13C4_PFHpA	108	50-150
13C5_PFHxA	107	50-150
13C5_PFPeA	112	50-150
13C6_PFDA	114	50-150
13C7_PFUdA	106	50-150
13C8_PFOA	123	50-150
13C8_PFOS	97	50-150
13C9_PFNA	112	50-150
d5-EtFOSAA	112	50-150
d3-MeFOSAA	108	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-EB-05-100120

Laboratory ID: VJ05046-014 Matrix: Aqueous

Date Sampled:10/01/2020 1450 Date Received: 10/05/2020

Run Prep Method SOP SPE

Analytical Method Dilution PFAS by ID SOP QSM B-15

Analysis Date Analyst 10/13/2020 2056 SES

Prep Date

Batch 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1

Acceptance

		Ruii A	Leptance
Surrogate	Q	% Recovery	Limits
13C2_6:2FTS		141	50-150
13C2_8:2FTS		116	50-150
13C2_PFDoA		96	50-150
13C2_PFTeDA		102	50-150
13C3_PFBS		95	50-150
13C3_PFHxS		100	50-150
13C4_PFBA		109	50-150
13C4_PFHpA		113	50-150
13C5_PFHxA		108	50-150
13C5_PFPeA		111	50-150
13C6_PFDA		112	50-150
13C7_PFUdA		101	50-150
13C8_PFOA		125	50-150
13C8_PFOS		91	50-150
13C9_PFNA		111	50-150
d5-EtFOSAA		111	50-150
d3-MeFOSAA		108	50-150

Run 1

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

Client: Arcadis U.S., Inc.

Description: FTBL-FB-02-100120

Laboratory ID: VJ05046-015

Matrix: Aqueous

Date Sampled:10/01/2020 1500

Date Received: 10/05/2020

Prep Date Batch

Run Prep Method Analytical Method Dilution Analysis Date Analyst SOP SPE PFAS by ID SOP QSM B-15 10/13/2020 2118 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.3	U	8.5	4.3	2.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	4.3	U	8.5	4.3	2.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.3	U	8.5	4.3	2.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	4.3	U	8.5	4.3	2.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.1	U	4.2	2.1	1.1	ng/L	1

Periluorooctariesulloriic aciu (PPO3)	1703	1-23-1 PFA3 by ID 30P	2.1 0	4.2	2.1	1.1	TIG/L I
Surrogate	Run 1 Q % Recovery	Acceptance Limits					
13C2_6:2FTS	149	50-150					
13C2_8:2FTS	122	50-150					
13C2_PFDoA	105	50-150					
13C2_PFTeDA	106	50-150					
13C3_PFBS	97	50-150					
13C3_PFHxS	107	50-150					
13C4_PFBA	117	50-150					
13C4_PFHpA	120	50-150					
13C5_PFHxA	115	50-150					
13C5_PFPeA	119	50-150					
13C6_PFDA	115	50-150					
13C7_PFUdA	110	50-150					
13C8_PFOA	131	50-150					
13C8_PFOS	97	50-150					
13C9_PFNA	114	50-150					
d5-EtFOSAA	120	50-150					
d3-MeFOSAA	114	50-150					

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

W = Reported on wet weight basis H = Out of holding time

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.) 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-FBNAFS-02-SO-100120

Laboratory ID: VJ05046-016

Matrix: Solid

% Solids: 85.5 10/06/2020 2331

Date Received: 10/05/2020

Date Sampled:10/01/2020 1545

Run Prep Method SOP SPE

Analytical Method Dilution Analysis Date Analyst PFAS by ID SOP QSM B-15

10/18/2020 1939 KMM2 10/16/2020 0930 69797

Prep Date

Batch

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0021	0.0011	0.00052	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00050	U	0.0010	0.00050	0.00021	mg/Kg	1

Surrogate	Run 1 Acceptance Q % Recovery Limits
13C2_6:2FTS	105 50-150
13C2_8:2FTS	99 50-150
13C2_PFDoA	106 50-150
13C2_PFTeDA	96 50-150
13C3_PFBS	89 50-150
13C3_PFHxS	95 50-150
13C4_PFBA	95 50-150
13C4_PFHpA	99 50-150
13C5_PFHxA	100 50-150
13C5_PFPeA	100 50-150
13C6_PFDA	98 50-150
13C7_PFUdA	95 50-150
13C8_PFOA	96 50-150
13C8_PFOS	91 50-150
13C9_PFNA	96 50-150
d5-EtFOSAA	97 50-150
d3-MeFOSAA	94 50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-FBNAFS-02-GW-100120

Date Sampled:10/01/2020 1640
Date Received: 10/05/2020

Laboratory ID: VJ05046-017

Matrix: Aqueous

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch
1 SOP SPE PFAS by ID SOP QSM B-15 1 10/13/2020 2254 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	45		7.2	3.6	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.6	U	7.2	3.6	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.4	J	3.6	1.8	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	8.4		3.6	1.8	0.90	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	33		3.6	1.8	0.90	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	31		3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	66		3.6	1.8	0.90	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.8	J	3.6	1.8	0.90	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	16		3.6	1.8	0.90	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	110		3.6	1.8	0.90	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.90	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	7.5		3.6	1.8	0.90	ng/L	1

Surrogate	Run 1 Ao Q % Recovery	cceptance Limits
13C2_6:2FTS	112	50-150
13C2_8:2FTS	120	50-150
13C2_PFDoA	106	50-150
13C2_PFTeDA	97	50-150
13C3_PFBS	104	50-150
13C3_PFHxS	103	50-150
13C4_PFBA	102	50-150
13C4_PFHpA	110	50-150
13C5_PFHxA	108	50-150
13C5_PFPeA	113	50-150
13C6_PFDA	116	50-150
13C7_PFUdA	108	50-150
13C8_PFOA	109	50-150
13C8_PFOS	103	50-150
13C9_PFNA	106	50-150
d5-EtFOSAA	109	50-150
d3-MeFOSAA	99	50-150

LOQ = Limit of Quantitation
U = Not detected at or above the LOQ

B = Detected in the method blank
N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

DL = Detection Limit J = Estimated result < LOQ and  $\geq DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

## Inorganic non-metals

Client: Arcadis U.S., Inc. Laboratory ID: VJ05046-018

Description: FTBL-FBNAFS-01-SO-100120 Matrix: Solid

Date Sampled:10/01/2020 1725 % Solids: 89.9 10/06/2020 2331

Date Received: 10/05/2020

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch (Soil pH meas) 9045D 10/16/2020 1744 AAB 70227

CAS Analytical Parameter Number Result Q LOQ LOD DL Units Run Method

Soil pH measured in water @ 21.2 ° C 9045D 6.1 su

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$  Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-FBNAFS-01-SO-100120

Laboratory ID: VJ05046-018

Matrix: Solid

Date Sampled:10/01/2020 1725 % Solids: 89.9 10/06/2020 2331

Date Received: 10/05/2020

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 10/18/2020 1949 KMM2 10/16/2020 0930 69797

Parameter	CAS Number	Analytical Method	Result	Ο	LOQ	LOD	DL	Units F	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012		0.0023	0.0012	0.00059	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0023	0.0012	0.00059	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00091	J	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0024		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0021		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0012		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0041		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0032		0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00023	mg/Kg	1

	Run 1 A	Acceptance
Surrogate	Q % Recovery	Limits
13C2_6:2FTS	107	50-150
13C2_8:2FTS	96	50-150
13C2_PFDoA	102	50-150
13C2_PFTeDA	97	50-150
13C3_PFBS	89	50-150
13C3_PFHxS	88	50-150
13C4_PFBA	94	50-150
13C4_PFHpA	99	50-150
13C5_PFHxA	100	50-150
13C5_PFPeA	96	50-150
13C6_PFDA	97	50-150
13C7_PFUdA	96	50-150
13C8_PFOA	97	50-150
13C8_PFOS	88	50-150
13C9_PFNA	97	50-150
d5-EtFOSAA	103	50-150
d3-MeFOSAA	102	50-150

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-FBNAFS-01-GW-100120

Date Sampled:10/01/2020 1810
Date Received: 10/05/2020

Laboratory ID: VJ05046-019

Matrix: Aqueous

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch 1 SOP SPE PFAS by ID SOP QSM B-15 1 10/13/2020 2305 SES 10/13/2020 1008 69662 2 SOP SPE PFAS by ID SOP QSM B-15 5 10/14/2020 1435 SES 10/13/2020 1008 69662

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	210		7.3	3.7	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	3.7	U	7.3	3.7	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.7	J	3.6	1.8	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.2	J	3.6	1.8	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	260		3.6	1.8	0.91	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	460		3.6	1.8	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	630		3.6	1.8	0.91	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	59		3.6	1.8	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	280		3.6	1.8	0.91	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1000	DJ	18	9.0	4.5	ng/L	2
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	1.8	U	3.6	1.8	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	12		3.6	1.8	0.91	ng/L	1

Surrogate (	Run 1 2 % Recovery	Acceptance Limits Q	Run 2 A % Recovery	Acceptance Limits
13C2_6:2FTS	105	50-150	100	50-150
13C2_8:2FTS	115	50-150	87	50-150
13C2_PFDoA	82	50-150	87	50-150
13C2_PFTeDA	51	50-150	87	50-150
13C3_PFBS	90	50-150	92	50-150
13C3_PFHxS	96	50-150	97	50-150
13C4_PFBA	105	50-150	95	50-150
13C4_PFHpA	99	50-150	95	50-150
13C5_PFHxA	98	50-150	95	50-150
13C5_PFPeA	99	50-150	94	50-150
13C6_PFDA	105	50-150	95	50-150
13C7_PFUdA	96	50-150	98	50-150
13C8_PFOA	101	50-150	97	50-150
13C8_PFOS	78	50-150	100	50-150
13C9_PFNA	102	50-150	99	50-150
d5-EtFOSAA	98	50-150	102	50-150
d3-MeFOSAA	94	50-150	95	50-150

LOQ = Limit of QuantitationB = Detected in the method blankE = Quantitation of compound exceeded the calibration rangeDL = Detection LimitQ = Surrogate failureU = Not detected at or above the LOQN = Recovery is out of criteriaP = The RPD between two GC columns exceeds 40%J = Estimated result < LOQ and  $\ge$  DLL = LCS/LCSD failureH = Out of holding timeW = Reported on wet weight basisLOD = Limit of DetectionS = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)* 

Client: Arcadis U.S., Inc.

Description: FTBL-FBNAFS-03-SO-100120

Date Sampled:10/01/2020 1745 % Solids: 89.3 10/06/2020 2331

Date Received: 10/05/2020

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 10/18/2020 2000 KMM2 10/16/2020 0930 69797

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00088	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0011	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0011	J	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0014		0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1

r emadrodetariesarionic acia (i 1 03)	'	1703-23-1 11 A3 by 10 30	0.00000	0.0012 0.00000	0.00024 Hig/Rg 1
Surrogate	Run 1 Q % Recove				
13C2_6:2FTS	96	50-150			
13C2_8:2FTS	88	50-150			
13C2_PFDoA	96	50-150			
13C2_PFTeDA	95	50-150			
13C3_PFBS	89	50-150			
13C3_PFHxS	89	50-150			
13C4_PFBA	95	50-150			
13C4_PFHpA	98	50-150			
13C5_PFHxA	99	50-150			
13C5_PFPeA	95	50-150			
13C6_PFDA	95	50-150			
13C7_PFUdA	97	50-150			
13C8_PFOA	95	50-150			
13C8_PFOS	88	50-150			
13C9_PFNA	96	50-150			
d5-EtFOSAA	94	50-150			
d3-MeFOSAA	96	50-150			

LOQ = Limit of Quantitation U = Not detected at or above the LOQ B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure

H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis

LOD = Limit of Detection

Laboratory ID: VJ05046-020

Matrix: Solid

S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.) 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

Client ID: 4367 - Pace Analytical Services

SDG: 220101408

PM: DLH



Pace Analytical

	Workorder: VJ05046	We	orkorder Name:	Fort Bel	voir PFAS SI	Ov	vner Receiv	ved Date:		F	Results F	equested	Ву:	
Repo	ort To:		Subcontra	ct To:						Requ	ested A	nalysis		
Nisre	en Saikaly		Project # 3	3000199	2.3DL10									
Pace	Analytical													
106	Vantage Point Drive		Pace Golf	Coast										
Colu	bmia SC, 29223		7979 Inno	vation Pa	ark Drive,						11			
803-	227-2704		Baton Ro	uge, LA 7	0820						11		111	
nsaik	aly@shealylab.com						Preserved	Containers			111			
		Sample	Collect								11			
Item	Sample ID	Туре	Date/Time	Lab ID		Matrix	NON		U		11			
1			1				2		700					LAB USE ONLY
2	FTBL-H3151-01-SO-10	0120 1	10/01/2020 09:00	VJ05046	5-004	Solid	х		х	95				
3	FTBL-B3121-01-SO-10	0120 1	10/01/2020 12:30	VJ05046	5-008	Solid	x		X					2
4	FTBL-FBNAFS-01-SO-1	00120 1	10/01/2020 17:25	VJ05046	5-018	Solid	x		х					3
5						Solid	х		х					
6						Solid	x		х					
7						Solid	x		х					
8						Solid	x		х					
9						Solid	x		х					
10						Solid	x		х					
Trans	sfers Released By			/Time	Reveived	Ву		Date	/Time			Comme	nts	
1	(	195	10/12	1530							160	03-34	64-5	818
2	7	Fedex		13/20	Rach	il ala	wadhi	1017	3/20	14:10			-, -	- 0
3							10	1	*					

Cooler Temperature on Receipt	D.1 FOLO.C	Custody Seal Y or N	Received on Ice Y or N	Sample Intact Y or N
***In order to maintain client	confidentiality le	cation/name of the campling cite	campler's name and signature may not be	provided on this COC

Friday, June 17, 2016 11:01:34 AM

FMT-ALL-C-002rev.00 24March2009

Page 1 of 1

Chain of Custody

^{***}In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC This chain of custody is considered complete as is since this information is available in the owner laboratory.



**Report#:** 220101408

**Project ID:** VJ05046-Fort Belvoir PFAS SI **Report Date:** 10/22/2020

# Sample Results

 FTBL-H3151-01-SO Collect Date
 10/01/2020 09:00
 LAB ID
 22010140801

 100120
 Receive Date
 10/13/2020 14:10
 Matrix
 Solid

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date		tion Analysis Date By A		Analytical Batch	
NA	NA	NA	1	10/20/2020	11:22	PLH	695062		
CAS#	Parameter			Result	DL	LOD	LOQ	Units	
C-012	Total Organi	c Carbon		1140	153	200	250	mg/kg	

FTBL-B3121-01-SO- Collect Date 10/01/2020 12:30 LAB ID 22010140802

100120 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date		s Date By Ana		
NA	NA	NA	1	10/20/2020	11:32	PLH	695062	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
C-012	Total Organi	c Carbon		2990	153	200	250	mg/kg

FTBL-FBNAFS-01-SO- Collect Date 10/01/2020 17:25 LAB ID 22010140803

100120 Receive Date 10/13/2020 14:10 Matrix Solid

EPA 9060A *Results Reported on Dry Weight Basis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Da	ate	Ву	Analytical Batch	
NA	NA	NA	1	10/20/2020	12:05	PLH	695062	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
C-012	Total Organi	c Carbon		6700	153	200	250	mg/kg



# Fort Belvoir PFAS PA/SI

# **DATA REVIEW**

# Fort Belvoir, Virginia

Perfluoroalkyl Substances (PFAS) Analysis

SDG # WC11006

Analyses Performed By: Pace South Carolina formerly Shealy Environmental Services West Columbia, South Carolina

Report #41574R

Review Level: Stage 3/4 Project: 30001992.3DL10

# **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # WC11006 for samples collected in association with the Fort Belvoir Site. The review was conducted as a Stage 3/4 evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

0 1 15	Sample Sample Recent Sample		А	nalysis			
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	PFAS	тос	рН
FTBL-B1495-01-SO-031021	WC11006-001	Soil	3/10/2021		Х		
FTBL-B1495-02-SO-031021	WC11006-002	Soil	3/10/2021		Х		
FTBL-B1495-03-SO-031021	WC11006-003	Soil	3/10/2021		Х		
FTBL-B1495-04-SO-031021	WC11006-004	Soil	3/10/2021		Х		

#### Notes:

1. Stage 4 validation was performed on sample FTBL-B1495-02-SO-031021.

# **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	orted		mance ptable	Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		Х	
Master tracking list		Х		Х	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with USEPA Method 537, Pace (Shealy) Laboratories SOP ME00213-12 Determination of Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS (Isotope Dilution) QSM 5.3 Table B-15, Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, DoD Final Data Validation Guidelines Module 3: PFAS, May 2020, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified, and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes:

- Concentration (C) Qualifiers
  - U The analyte was not detected and was reported as less than the LOD. The LOD has been adjusted for any dilution or concentration of the sample.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The reported result was an estimated value with an unknown bias.
  - J+ The result was an estimated quantity, but the result may be biased high.
  - J- The result was an estimated quantity, but the result may be biased low.
  - UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - X The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

A fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

#### PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA modified	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
537 DoD QSM 5.3	Water	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

The holding time has been changed from the original holding time documented in EPA 537 of 14 days for extraction to 28 days. This was documented in EPA Technical Brief EPA/600/F-17/022h Updated January 2020. Utilizing the new guidance of 28 days all samples were analyzed within the specified holding time criteria.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, instrument, and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Instrument blanks measure carryover in the instrument from one sample to another. Method blanks measure laboratory contamination. Equipment rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the detection limit (DL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Calibration

Mass calibration and system performance were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration,  $r^2 \ge 0.99$ . Analytes must be within 70-130% of their true value for each calibration standard.

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with the initial and continuing calibrations were within the specified control limits.

#### 4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 70 to 130%.

All compounds associated with ISC recoveries were within control limits.

#### 4.4 Ion Transitions

Quantitation of analytes must use the ion transitions documented in DoD QSM 5.3 Table B-15.

The ion transitions were as specified in DoD QSM 5.3.

#### 5. Isotopically labeled Standards

#### 5.1 Extracted Internal Standards (EIS)

Labeled standards must be added to all field samples and QC samples prior to extraction. EIS recoveries must be within 50% to 150% of ICAL midpoint standard area or area measured in the initial CCV on days when ICAL not performed.

All EIS recoveries were within control limits.

#### 6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be  $\leq 30\%$ .

A MS/MSD analysis was not performed on a sample associated with this SDG.

#### 7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

#### 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices and 50% for soils is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of two times the LOQ is applied for water matrices and three time the LOQ for soil matrices.

A field duplicate sample was not collected on sample associated with this SDG.

## 9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

## 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

## **DATA VALIDATION CHECKLIST FOR PFAS**

PFAS: 537M/DoD QSM 5.3	Rep	oorted		mance ptable	Not
	No	Yes	No	Yes	Required
LIQUID CHROMATOGRAPHY/MASS SPECTROME	TRY (LC	/MS/MS)			
Stage 2 Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		X		Х	
B. Equipment blanks	Х				Х
C. Field blanks	Х				Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate (LCSD) %R	Х				X
LCS/LCSD Precision (RPD)	Х				Х
Matrix Spike (MS) %R	Х				X
Matrix Spike Duplicate (MSD) %R	Х				Х
MS/MSD Precision (RPD)	Х				Х
Lab Duplicate (RPD)	Х				Х
Field Duplicate (RPD)	Х				Х
Extracted Internal Standard %R		Х		Х	
Dilution Factor		Х		Х	
Moisture Content		Х		Х	
Stage 3/4 Validation	ı			ı	1
Instrument tune and performance check		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument sensitivity check		Х		Х	
Ion transitions used		Х		Х	
Compound identification and quantitation			-	1	
A. Reconstructed ion chromatograms		Х		Х	
B. Quantitation Reports		Х		Х	
C. RT of sample compounds within the established RT windows		Х		Х	

PFAS: 537M/DoD QSM 5.3	Rep	orted		mance ptable	Not
	No	Yes	Yes	Required	
LIQUID CHROMATOGRAPHY/MASS SPECTROME	TRY (LC/	MS/MS)			
D. Ion Ratio %R		Х		Х	
E. Transcription/calculations acceptable		X		Х	
F. Reporting limits adjusted to reflect sample dilutions		Х		Х	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Lyndi Mott, Arcadis

SIGNATURE:

DATE: June 2, 2021

PEER REVIEW: Dennis Capria, Arcadis

DATE: June 15, 2021

# Stage 3 / 4 PFAS Calibration Standards

 SDG #:
 WC11006
 Date:
 6/1/2021

 Lab:
 Pace (Shealy)
 Page:
 1

 Project:
 Fort Belvoir
 Validated by:
 LWM

Method: EPA modified 537 per DoD QSM 5.3

Instrument : LCMSMS02 PFOS 3/16/2021 Calibration

Page 73 of SDG WC11006

							Calc		%R Calc		1
					Calculated	Reported	Amount		Amount/	Reported	
Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	RF	RF	ng/L	Tvalue ng/L	Tvalue	%R	
46.4	7023	110911	1000	0.063321	1.3646776	1.259694	50.27	46.4	108.33	108	MATCH
92.8	14535	115318	1000	0.126043	1.3582195	1.259694	100.06	92.8	107.82	108	MATCH
185.6	28651	118684	1000	0.241406	1.3006775	1.259694	191.64	185.6	103.25	103	MATCH
464	75009	116083	1000	0.646167	1.3926012	1.259694	512.96	464	110.55	111	MATCH
928	139610	122282	1000	1.141705	1.2302858	1.259694	906.34	928	97.67	97.7	MATCH
1856	259280	118644	1000	2.185361	1.1774576	1.259694	1734.84	1856	93.47	93.5	MATCH
4640	678222	118147	1000	5.740493	1.2371752	1.259694	4557.05	4640	98.21	98.2	MATCH
9280	1351591	118797	1000	11.37732	1.2260039	1.259694	9031.81	9280	97.33	97.3	MATCH
13920	1990538	120714	1000	16.4897	1.1846051	1.259694	13090.24	13920	94.04	94.0	MATCH
18560	2714159	129961	1000	20.88441	1.1252377	1.259694	16578.96	18560	89.33	89.3	MATCH
				A - DE	4 3506044	l <del></del>					

Avg RF 1.2596941 MATCH

Calculated Amount ng/L = ((Area Ratio x EIS Conc)/RF)

# Stage 3 / 4 PFAS ICV CCV Standards %R

 SDG #:
 WC11006
 Date:
 6/2/2021

 Lab:
 Pace (Shealy)
 Page:
 2

 Project:
 Fort Belvoir
 Validated by:
 LWM

Method: EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02

ICV 500_SVLC-1384 3/16/2021 16:21 Page 370 of SDG WC11006

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFHpA	464.63	500	92.93	92.9	MATCH
PFPeA	460.29	500	92.06	92.1	MATCH
PFOS	403.25	462.75	87.14	87.1	MATCH

Instrument: LCMSMS02

CCV 1000_SVLC-1409 3/16/2021 23:36 Page 396 of SDG WC11006

		ICV TV		Reported	
Analyte	ICV ng/L	ng/L	Calculated %R	%R	
PFHpA	986.24	1000	98.62	98.6	MATCH
PFPeA	963.96	1000	96.40	96.4	MATCH
PFOS	907.6	928	97.80	97.8	MATCH

# Stage 3 / 4 PFAS LCS

SDG #: WC11006 Lab:

Project:

Pace (Shealy)

Fort Belvoir

Date: 6/2/2021

Page: 3

Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02

LCS WQ85713-002 Page 500 of SDG WC11006

							Extract						
						Calculated	Final	Extracted					
			EIS Conc			Amount	Volume	Sample	Calculated	Tvalue	Calculated	Reported	
Analyte	Std Area	EIS Area	ng/L	Area Ratio	Avg RF	ng/L	mls	Weight gm	mg/kg	mg/kg	% R	%R	
PFHpA	99410	655784	1001	0.15159	1.05638	143.64	10	1	0.00158	0.0020	78.92	79	MATCI
PFPeA	118547	764447	1001	0.155075	1.01995	152.19	10	1	0.00167	0.0020	83.62	84	MATCH
PFOS	24051	112377	1001	0.214021	1.259694	170.07	10	1	0.00187	0.0019	98.36	101	MATCH

Differences in %R may be due to rounding of the true value

Calculated Amount ng/L = ((Area Ratio x EIS Conc)/RF)

ug/kg = [(ng/L x FV L)/ Weight g]

ug/kg dry weight = ug/kg / (%TS/100)

mg/kg = (ug/kg / 1000 )/0.91 extract volume correction factor

# Stage 3 / 4 PFAS Sample Concentration

 SDG #:
 WC11006
 Date:
 6/1/2021

 Lab:
 Pace (Shealy)
 Page:
 4

 Project:
 Fort Belvoir
 Validated by:
 LWM

Method: EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B1495-02-SO-031021 Lab ID:WC11006-002 Page 39 of SDG WC11006

FV = 10 ml; Weight = 1 gm; TS = 89.1%

								WCIgnt - I gm	,
							Dry		
							Weight		
			EIS Conc			Calculated	Value		Reported
Analyte	Area	EIS Area	ng/L	Area Ratio	Avg RF	Amount ug/kg	ug/kg	mg/kg	mg/kg
PFHpA	76845	626271	1001	0.122702	1.05638	1.1627	1.3049	0.00143	0.0014
PFPeA	248058	753623	1001	0.329154	1.01995	3.2304	3.6256	0.00398	0.0040
PFOS	76055	115459	1001	0.658719	1.259694	5.2344	5.8748	0.00646	0.0065

MATCH MATCH MATCH

Calculated Amount ng/L = ((Area Ratio x EIS Conc)/RF)
ug/kg = [(ng/L x FV L)/ Weight g]
ug/kg dry weight = ug/kg / (%TS/100)

mg/kg = (ug/kg / 1000)/0.91 extract volume correction factor

# Stage 3 / 4 PFAS EIS

SDG #:	WC11006	Date:	6/1/2021
Lab:	Pace (Shealy)	Page:	5
Project:	Fort Belvoir	Validated by:	LWM

**Method:** EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B1495-02-SO-031021 Lab ID:WC11006-002

EIS 13C8_PFOS

REPORTED EIS %R 94

%R = 100 * EIS Area
ICAL 1000 EIS Area

EIS Area 115459 Page 41 of SDG WC11006
ICAL 1000 EIS Area 122282 Page 80 of SDG WC11006
%R 94.4 MATCH

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

Pace Analytical

#### PACE ANALYTICAL SERVICES, LLC

105 Vantage Point Drive - West Columbia, SC 29172 Telephone No. 803-791-9700 Fax No. 803-791-9111 www.pacelabs.com Number 118244

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Sample ID / Description (Containers to each sample may be combined on	one Me.)	Collection C Data(s)	ollection Time (fallitery)	CuComposit.	Ayes Sold	America	32	SCWH.	1401	NOON	6035 RW	Part	PFAS	2								Remarks / Cooler LD.
F181-81495 -01-50-031	021	3/10/21	1130	ረ	X	1					W Line		X									
PTOL-BI495-02-50-031	021	1	305		<u>X</u>	1							X			,						
FTBL-81495-03-50-031	021		400	_	X	1							$\geq$									
12181-131495-04-50-03	1021		210	L	_X	1			_				$\geq$	1_								
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4. Relinquished by	fad	ex	Date 311(12)		Tone 095	Ó	4. La	thorat	ary r	(ecgiv	ed b	y m	r	Ho	$n^{\alpha}$	シュ	_		Date 3)	ille	Jm.	ns 0957)
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## PACE ANALYTICAL SERVICES, LLC



### Samples Receipt Checklist (SRC) (ME0018C-15)

Issuing Authority: Pace ENV - WCOL

Revised:9/29/2020 Page 1 of 1

### Sample Receipt Checklist (SRC)

Client: Arcadis Cooler Inspected by/date: MEH / @3/11/2021 Lot #; WC11006
Means of receipt: Pace Client UPS FedEx Other:
Yes No 1. Were custody seals present on the cooler?
Yes No VNA 2. If custody seals were present, were they intact and unbroken?
pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA
Original temperature upon receipt / Derived (Corrected) temperature upon receipt
2.7 /2.7 °C NA /NA °C NA /NA °C NA /NA °C
Method: ✓ Temperature Blank Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C
Method of coolant: ✓ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None
Yes No No If temperature of any cooler exceeded 6.0°C, was Project Manager Notified?  PM was Notified by: phone / email / face-to-face (circle one).
✓ Yes No No NA 4. Is the commercial courier's packing slip attached to this form?
✓ Yes No 5. Were proper custody procedures (relinquished/received) followed?
✓ Yes No  6. Were sample [Ds listed on the COC?
✓ Yes No 7. Were sample IDs listed on all sample containers?
✓ Yes No. 8. Was collection date & time listed on the COC?
✓ Yes No  9. Was collection date & time listed on all sample containers?
✓ Yes No 10. Did all container label information (ID, date, time) agree with the COC?
✓ Yes No 11. Were tests to be performed listed on the COC?
Yes No 12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
✓ Yes  No 13. Was adequate sample volume available?
✓ Yes No 14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ✓ No 15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
Yes No No NA 16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (%"or 6mm in diameter) in any of the VOA vials?
Yes No ✓ NA 17. Were all DRO/metals/nutrient samples received at a pH of < 2?
Yes No No NA 18. Were all cyanide samples received at a pH ≥ 12 and sulfide samples received at a pH ≥ 9?
Yes No
20. Ware client expends (respected in segments) in the Market D. Lander D. L
Yes No VA 20. Were client remarks requests (i.e. requested dilutions, MS/MSD designations, etc)
✓ Yes No 21. Was the quote number listed on the container label? If yes, Quote # ²³⁹¹²
Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)
The state of the s
in sample receiving with NA mL of circle one: 112SO4, HNO3, HCl, NaOH using SR # NA Time of preservation NA If more than one preservative is needed, please note in the comments below.
Sample(s) NA were received with bubbles >6 mm in diameter.
Samples(s) NA were received with TRC $\geq$ 0.5 mg/L (If #19 is $no$ ) and were
adjusted accordingly in sample receiving with sodium thiosulfate (Na ₂ S ₂ O ₃ ) with Shealy ID; NA
SR barcode labels applied by: MBH Date: 3/1/10(
Comments:

Client: Arcadis U.S., Inc.

Description: FTBL-B1495-01-SO-031021

Matrix: Solid Date Sampled:03/10/2021 1130 % Solids: 80.3 03/11/2021 2358

Date Received: 03/11/2021

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 03/17/2021 0030 JJG 03/15/2021 1121 85713

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0012	U	0.0024	0.0012	0.00060	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.00060	U	0.0012	0.00060	0.00024	mg/Kg	1

r emdoroocianesanomic acia (r r OS)		1703-23-1 11 A3 by 1D 30	0.00000	0.0012 0.00000	0.00024 Hig/Ng I
Surrogate	Ru Q % Rec	n 1 Acceptance covery Limits			
13C2_6:2FTS	(	99 50-150			
13C2_8:2FTS	(	94 50-150			
13C2_PFDoA	1	03 50-150			
13C2_PFTeDA	1	04 50-150			
13C3_PFBS	8	50-150			
13C3_PFHxS	C	97 50-150			
13C4_PFBA	1	04 50-150			
13C4_PFHpA	1	06 50-150			
13C5_PFHxA	1	01 50-150			
13C5_PFPeA	1	06 50-150			
13C6_PFDA	1	00 50-150			
13C7_PFUdA	1	03 50-150			
13C8_PFOA	1	07 50-150			
13C8_PFOS	(	98 50-150			
13C9_PFNA	1	01 50-150			
d5-EtFOSAA	1	03 50-150			
d3-MeFOSAA	1	08 50-150			

LOQ = Limit of Quantitation

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

DL = Detection Limit

Q = Surrogate failure L = LCS/LCSD failure

U = Not detected at or above the LOQ H = Out of holding time

N = Recovery is out of criteria W = Reported on wet weight basis

P = The RPD between two GC columns exceeds 40% LOD = Limit of Detection

 $J = Estimated \ result < LOQ \ and \ge DL$ 

Laboratory ID: WC11006-001

S = MS/MSD failure

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Client: Arcadis U.S., Inc.

Description: FTBL-B1495-02-SO-031021

Laboratory ID: WC11006-002 Matrix: Solid

% Solids: 89.1 03/11/2021 2358

Date Received: 03/11/2021

Date Sampled:03/10/2021 1305

Run Prep Method SOP SPE

Analytical Method Dilution Analysis Date Analyst PFAS by ID SOP QSM B-15

03/17/2021 0040 JJG

Prep Date 03/15/2021 1121 85713

	Batch	
1	85713	

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	≀un
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00056	mg/Kg	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0012	J	0.0022	0.0011	0.00056	mg/Kg	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00056	mg/Kg	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00056	mg/Kg	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00068	J	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.0014		0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0038		0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.0040		0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0065		0.0011	0.00055	0.00022	mg/Kg	1

	Run 1	Acceptance	
Surrogate	Q % Recover	y Limits	
13C2_6:2FTS	95	50-150	
13C2_8:2FTS	92	50-150	
13C2_PFDoA	93	50-150	
13C2_PFTeDA	99	50-150	
13C3_PFBS	83	50-150	
13C3_PFHxS	91	50-150	
13C4_PFBA	96	50-150	
13C4_PFHpA	98	50-150	
13C5_PFHxA	94	50-150	
13C5_PFPeA	99	50-150	
13C6_PFDA	100	50-150	
13C7_PFUdA	105	50-150	
13C8_PFOA	100	50-150	
13C8_PFOS	94	50-150	
13C9_PFNA	95	50-150	
d5-EtFOSAA	94	50-150	
d3-MeFOSAA	92	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ

H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria W = Reported on wet weight basis

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40%

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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LOD = Limit of Detection

Client: Arcadis U.S., Inc.

Description: FTBL-B1495-03-SO-031021

Date Sampled:03/10/2021 1400

Date Received: 03/11/2021

Laboratory ID: WC11006-003

Matrix: Solid

% Solids: 88.7 03/11/2021 2358

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 03/17/2021 0051 JJG 03/15/2021 1121 85713

Run 1

	Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units F	Run
•	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.00095	U	0.0019	0.00095	0.00048	mg/Kg	1
	Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00048	U	0.00096	0.00048	0.00019	mg/Kg	1
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0020		0.00096	0.00048	0.00019	mg/Kg	1

Acceptance

Surrogate	Q	% Recovery	Limits	
13C2_6:2FTS		98	50-150	
13C2_8:2FTS		113	50-150	
13C2_PFDoA		105	50-150	
13C2_PFTeDA		109	50-150	
13C3_PFBS		84	50-150	
13C3_PFHxS		101	50-150	
13C4_PFBA		104	50-150	
13C4_PFHpA		104	50-150	
13C5_PFHxA		104	50-150	
13C5_PFPeA		103	50-150	
13C6_PFDA		102	50-150	
13C7_PFUdA		109	50-150	
13C8_PFOA		108	50-150	
13C8_PFOS		94	50-150	
13C9_PFNA		104	50-150	
d5-EtFOSAA		106	50-150	
d3-MeFOSAA		101	50-150	

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure U = Not detected at or above the LOQ N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40%  $J = Estimated \ result < LOQ \ and \ge DL$ L = LCS/LCSD failure W = Reported on wet weight basis S = MS/MSD failure H = Out of holding time LOD = Limit of Detection

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Client: Arcadis U.S., Inc.

Description: FTBL-B1495-04-SO-031021

Date Sampled:03/10/2021 1210

Matrix: Solid

Laboratory ID: WC11006-004

% Solids: 80.7 03/11/2021 2358

Date Received: 03/11/2021

Run Prep Method Analytical Method Dilution Analysis Date Analyst Prep Date Batch SOP SPE PFAS by ID SOP QSM B-15 03/17/2021 0102 JJG 03/15/2021 1121 85713

	Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units R	Run
•	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	0.0011	U	0.0022	0.0011	0.00055	mg/Kg	1
	Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	0.00055	U	0.0011	0.00055	0.00022	mg/Kg	1
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	0.0017		0.0011	0.00055	0.00022	mg/Kg	1

	Surrogate	Q	Run 1 % Recovery	Acceptan Limits	
•	13C2_6:2FTS		95	50-150	
	13C2_8:2FTS		104	50-150	
	13C2_PFDoA		99	50-150	
	13C2_PFTeDA		107	50-150	
	13C3_PFBS		80	50-150	
	13C3_PFHxS		94	50-150	
	13C4_PFBA		100	50-150	
	13C4_PFHpA		99	50-150	
	13C5_PFHxA		99	50-150	
	13C5_PFPeA		102	50-150	
	13C6_PFDA		96	50-150	
	13C7_PFUdA		102	50-150	
	13C8_PFOA		102	50-150	
	13C8_PFOS		100	50-150	
	13C9_PFNA		100	50-150	
	d5-EtFOSAA		103	50-150	
	d3-MeFOSAA		104	50-150	

LOQ = Limit of Quantitation U = Not detected at or above the LOQ H = Out of holding time

B = Detected in the method blank N = Recovery is out of criteria

E = Quantitation of compound exceeded the calibration range P = The RPD between two GC columns exceeds 40% W = Reported on wet weight basis LOD = Limit of Detection

DL = Detection Limit  $J = Estimated \ result < LOQ \ and \ge DL$ 

Q = Surrogate failure L = LCS/LCSD failure S = MS/MSD failure

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# **APPENDIX N Site Inspection Laboratory Analytical Results**





		OSD Tapwater Risk Screening Level	AOPI	1980s Plane	Crash	1980s Plane (	Crash	Building 1436 (LRC) FTBL-B1436-01		Building 3121 (LRC)  FTBL-B3121-01  FTBL-B3121-01-GW- 100120		
			Location	FTBL-1980	PC-01	FTBL-1980P	C-02					
Analyte	CAS		Sample ID	FTBL-1980PC-01-GW- 093020 9/30/2020		FTBL-1980PC-093020	02-GW-	FTBL-B1436-0				
			Sample Date			09/30/202	0	09/27/2020		10/01/20	20	
			Sample Type	N		N		N		N		
			Matrix	Groundw	Groundwater		oundwater Groundwater		Groundwater		Groundwa	ater
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	
PFASs												
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	8.5	UJ-	13	UJ-	420		58		
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	8.5	UJ-	13	UJ-	8.0	UJ	7.0	U	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	8.5	UJ-	13	UJ-	8.0	UJ	7.0	U	
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	8.5	UJ-	13	UJ-	8.0	UJ	7.0	U	
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	2.2	J-	6.7	UJ-	460		7.5		
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	3.4	J-	6.3	J-	1,200	J	64		
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	4.2	UJ-	6.7	UJ-	4.0	UJ	3.5	U	
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	4.2	UJ-	6.7	UJ-	4.0	UJ	3.5	U	
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	4.2	UJ-	6.7	UJ-	570		110		
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	15	J-	14	J+	1,100	J	26		
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	3.3	J-	4.6	J-	3,000	J	130		
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	4.2	UJ-	6.7	UJ-	2.5	J+	8.4		
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	11	J+	13	J+	1,400	J	26		
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	4.2	UJ-	11	J-	270	J	47		
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	2.3	J-	4.3	J-	5,500		200		
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	4.2	UJ-	6.7	UJ-	4.0	R	3.5	U	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	4.2	UJ-	6.7	UJ-	4.0	UJ	3.5	U	
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	4.2	UJ-	6.7	UJ-	4.0	UJ	3.5	U	





			AOPI	Building 3121	(LRC)	Building 3121	(LRC)	Building 70	7 (LRC)	DAAF Fire St	ation	FBNA Fire Station	
		OSD Tapwater Risk Screening Level	Location	FTBL-B312	1-02	FTBL-B312	1-03	FTBL-B7(	07-01	FTBL-DAAF	<b>-</b> -01	FTBL-FBNAF	FS-01
Analyte	CAS		Sample ID	FTBL-B3121-0 100120		FTBL-B3121-0		FTBL-B707- 09282		FTBL-DAAF-0 092820		FTBL-FBNAFS- 100120	
			Sample Date	ample Date 10/01/2020		09/29/202	20	09/28/20	)20	09/28/202	<b>!</b> 0	10/01/2020	
			Sample Type	N		N		N		N		N	
			Matrix	Groundwa	ter	Groundwa	iter	Groundw	rater	Groundwater		Groundwater	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs													
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	7.0	U	7.3	U	16		970	J	210	
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	7.0	U	7.3	U	7.6	U	13	J+	7.3	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.0	U	7.3	U	7.6	U	7.2	U	7.3	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.0	U	7.3	U	7.6	U	7.2	U	7.3	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	8.0		4.3		15		230		2.7	J
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	7.9		3.6	U	22		270		260	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.5	U	3.6	U	3.8	U	3.6	U	3.6	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.5	U	3.6	U	3.8	U	3.6	U	3.6	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	6.1		3.6	U	27		270		460	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	11		21		700		1,900	J	2.2	J
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	9.6		2.8	J	68		790		630	
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	2.4	J	3.6	U	2.6	J	54		59	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	19	J+	10		220		2,500	J	12	
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	14		3.0	J	67		330		280	
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	13		2.7	J	62		1,300	J	1,000	J
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.5	UJ	3.6	U	3.8	U	3.6	U	3.6	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.5	U	3.6	U	3.8	U	3.6	UJ	3.6	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.5	U	3.6	U	3.8	U	3.6	U	3.6	U





			AOPI	FBNA Fire S	tation	FBNA Fire St	ation	FTBL-66 and F	TBL-68	FTBL-66 and F	FTBL-68
			Location	FTBL-FBNA	FS-02	FTBL-PSA2009	-MW42	FTBL-AOPC20	-MW02	FTBL-FATTS-L	FM-MW08
Analyte	CAS	OSD Tapwater Risk Screening	Sample ID	FTBL-FBNAFS 100120		FTBL-PSA2009- 093020	·MW42-	FTBL-AOPC20 092920		FTBL-FATTS-LT 093020	
		Level	Sample Date	10/01/20	20	09/30/202	0	09/29/202	20	09/30/20	20
			Sample Type	N		N		N		N	
			Matrix	Groundwa	ater	Groundwa	ter	Groundwa	iter	Groundwa	ater
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs											
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	45		7.0	U	7.5	U	7.2	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	7.2	U	7.0	U	7.5	U	7.2	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.2	U	7.0	U	7.5	U	7.2	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.2	U	7.0	U	7.5	U	7.2	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	3.4	J	3.5	U	5.1		5.3	
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	33		2.2	J	11		5.3	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.6	U	3.5	U	3.8	U	3.6	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.6	U	3.5	U	3.8	U	3.6	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	31		3.5	U	5.2		2.2	J
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	8.4		3.5	U	10		3.6	U
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	66		2.4	J	10		2.9	J
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	2.8	J	3.5	U	2.7	J	3.6	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	7.5		2.2	J	3.8		3.6	U
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	16		2.1	J	10		2.9	J
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	110		3.3	J	13		4.1	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.6	U	3.5	U	3.8	U	3.6	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.6	U	3.5	U	3.8	U	3.6	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.6	U	3.5	U	3.8	U	3.6	U





			AOPI	FTBL-66 and I	TBL-68	FTBL-66 and F	TBL-68	FTBL-66 and F	TBL-68	FTBL-1	2
			Location	FTBL-M18-I	MW31	FTBL-M26-L	ГМ-06	FTBL-M07-N	/W02	FTBL-12	-01
Analyte	CAS	OSD Tapwater Risk Screening	Sample ID	FTBL-M18-N 092920		FTBL-M26-L1 093020		FTBL-M07-MW0	2-100120	FTBL-12-01-G\	W-092820
		Level	Sample Date	09/29/20	20	09/30/202	20	10/01/202	20	09/28/20	20
			Sample Type	N		N		N		N	
			Matrix	Groundw	ater	Groundwa	ter	Groundwa	ater	Groundw	ater
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs							•				
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	7.2	U	7.1	U	7.3	U	10,000	J
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	7.2	U	7.1	U	7.3	U	35	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.2	U	7.1	U	7.3	U	7.2	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.2	U	7.1	U	7.3	U	7.2	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	2.7	J	3.6	U	2.8	J	730	J
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	8.4		6.9		9.1		960	J
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.6	U	3.6	U	3.6	U	12	
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.6	U	3.6	U	3.6	U	3.6	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	4.8		3.6	U	4.4		1,700	J
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	12		4.9		4.5		16,000	J
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	8.9		3.4	J	7.1		6,400	J
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	3.6	U	3.6	U	3.6	U	340	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	7.0		1.9	J	2.5	J	6,200	J
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	8.4		4.5		11		12,000	J
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	8.7		3.6		6.1		5,800	J
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.6	U	3.6	U	3.6	U	3.6	UJ
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.6	U	3.6	U	3.6	U	3.6	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.6	U	3.6	U	3.6	U	2.3	J





			AOPI	FTBL-1	2	FTBL-1	2	FTBL-12	2	Hangar :	3145	Hangar 3	3151
			Location	FTBL-12	-01	FTBL-12	-02	FTBL-12-	03	FTBL-H31	45-01	FTBL-H31	51-01
Analyte	CAS	OSD Tapwater Risk Screening	Sample ID	DUP-1-GW-0 FTBL-12-01-G\		FTBL-12-02 092920		FTBL-12-03-GW	/-092820	FTBL-H3145 09292		FTBL-H3151 10012	
		Level	Sample Date	09/28/20	20	09/29/20	20	09/28/202	<u>.</u> 0	09/29/2	020	10/01/20	020
			Sample Type	FD		N		N		N		N	
			Matrix	Groundw	ater	Groundwa	ater	Groundwa	ter	Groundv	vater v	Groundw	vater
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs													
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	10,000	J	8,500	J	15,000	J	4.5	J	38	
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	29		44	J	270	J	7.0	U	7.4	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.5	U	35	U	140	R	7.0	U	7.4	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.5	U	35	U	140	UJ-	7.0	U	7.4	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	740	J	1,600	J	3,100	J	3.8		6.3	
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	940	J	1,400	J	2,600	J	11		31	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	11		9.8	J	44	J	3.5	U	3.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.8	U	18	U	72	UJ-	3.5	U	3.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	1,700	J	2,000	J	4,700	J	3.4	J	16	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	16,000	J	14,000	J	60,000	J	14		95	
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	6,400	J	9,500	J	20,000	J	13		39	
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	340		290	J	2,700	J	3.5	U	3.3	J
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	5,900	J	4,300	J	28,000	J	28		110	
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	12,000	J	9,200	J	52,000	J	8.6		38	
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	5,700	J	7,500	J	12,000	J	18		52	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.8	UJ	18	U	72	R	3.5	U	3.7	UJ
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.8	U	18	U	72	UJ-	3.5	U	3.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	2.2	J	18	U	46	J	3.5	U	3.7	U





			AOPI	Hangar 3	232	Hangar 32	32	Lewis Village	Car Fire	North Post Fi	re Station
			Location	FTBL-H32	32-01	FTBL-MW-	1R	FTBL-LVC	F-01	FTBL-NPI	FS-01
Analyte	CAS	OSD Tapwater Risk Screening	Sample ID	FTBL-H3232- 09302		FTBL-MW-1R-0	93020	FTBL-LVCF-092720		FTBL-NPFS- 09272	
		Level	Sample Date	09/30/20	)20	09/30/202	0	09/27/20	20	09/27/20	020
			Sample Type	N		N		N		N	
			Matrix	Groundw	ater	Groundwa	er	Groundw	ater	Groundw	vater
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs											
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	7.2	U	17	J-	11		52	
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	7.2	U	5.3	J-	7.2	U	7.5	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.2	U	7.3	U	7.2	U	7.5	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.2	U	7.3	U	7.2	U	7.5	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	18		38	J-	12		21	
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	15		42		15		36	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.6	U	3.2	J	3.6	U	3.8	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.6	U	3.7	U	3.6	U	3.8	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	12		56		6.4		46	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	230		800	J	13		140	
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	38		170		19		81	
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	2.1	J	9.3		3.6	U	4.6	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	130		1,400	J	16		330	
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	59		110		21		44	
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	24		120		53		100	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.6	UJ	3.7	U	3.6	U	3.8	R
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.6	U	3.7	U	3.6	U	3.8	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.6	U	3.7	U	3.6	U	3.8	U





			AOPI	Old and New S Post Fire Stat		Old and New Post Fire Sta	
			Location	FTBL-OSPFS	S-01	FTBL-OSPF	S-01
Analyte	CAS	OSD Tapwater Risk Screening	Sample ID	FTBL-OSPFS-0 092920	1-GW-	DUP-3-092920 OSPFS-01-GW	
		Level	Sample Date	09/29/2020	)	09/29/202	20
			Sample Type	N		FD	
			Matrix	Groundwat	er	Groundwa	iter
			Units	Result	Qual	Result	Qual
PFASs							
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	980	J	1,000	J
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	59		60	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.5	U	7.4	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.5	U	7.4	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	91		94	
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	160		150	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.8	U	3.7	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.8	U	3.7	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	140		130	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	680	J	600	J
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	450		410	
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	24		26	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	1,100	J	840	J
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	160		150	
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	550		560	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.8	UJ	3.7	UJ
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.8	U	3.7	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.8	U	3.7	U



# Appendix N - Site Inspection Laboratory Analytical Results - Groundwater USAEC PFAS Preliminary Assessment/Site Inspection Fort Belvoir, Virginia

### Notes:

1. Bolded values indicate the result was detected greater than the limit of detection.

2. Gray-shaded values indicate the result was detected greater than the Office of the Secretary of Defense (OSD) risk screening levels for tap water (OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.).

### Acronyms/Abbreviations:

-- = not applicable

AOPI = area of potential interest

CAS = Chemical Abstracts Service number

DAAF = Davison Army Airfield

FD = field duplicate sample

FBNA = Fort Belvoir North Area

FTBL = Fort Belvoir

GW = groundwater

ID = identification

LRC = Logistics Readiness Center

N = primary sample

ng/L = nanograms per liter (parts per trillion)

PFAS = per- and polyfluoroalkyl substances

Qual = qualifier

### Qualifiers:

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only.

- J+ = The result is an estimated quantity; the result may be biased high.
- J- = The result is an estimated quantity; the result may be biased low.
- R = The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. Rejection of the data was decided by the project team and USACE chemist. However, the detected compounds are present in the sample but may be biased low because the sediment layer was not included in the analysis.
- U = The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).
- UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation (LOQ) is approximate and may be inaccurate or imprecise.
- UJ- = The analyte was analyzed for but was not detected. The reported limit of quantitation (LOQ) is approximate and may be inaccurate or imprecise.



				AOPI	1980s Plane Cr	ash	1980s Plane Cra	sh	Building 1436 (LI	RC)	Building 1436 (L	RC)	Building 3121 (	(LRC)
				Location	FTBL-1980PC	-01	FTBL-1980PC-0	2	FTBL-B1436-0	1	FTBL-B1436-0	2	FTBL-B3121	-01
		OSD Residential	OSD Industrial/ Commercial	Sample ID	FTBL-1980PC-01-S0	D-093020	FTBL-1980PC-02-SO-	093020	FTBL-B1436-01-SO-	092720	FTBL-B1436-02-SO-	092720	FTBL-B3121-01-S0	D-100120
Analyte	CAS	Risk	Risk	Sample Date	09/30/2020		09/30/2020		09/27/2020		09/27/2020		10/01/2020	b
		Screening Level	Screening Level	Sample Type	N		N		N		N		N	
			Levei	Matrix	Soil		Soil		Soil		Soil		Soil	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs														
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2			mg/kg	0.0028	U	0.0024	U	0.078		0.0021	U	0.0024	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4			mg/kg	0.0028	U	0.0024	U	0.0019	U	0.0021	U	0.0024	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6			mg/kg	0.0028	U	0.0024	U	0.0019	U	0.0021	U	0.0024	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9			mg/kg	0.0028	U	0.0024	U	0.0019	U	0.0021	U	0.0024	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.9	25	mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
Perfluorobutanoic acid (PFBA)	375-22-4			mg/kg	0.0014	U	0.0012	U	0.00089	J	0.0011	U	0.0012	U
Perfluorodecanoic acid (PFDA)	335-76-2			mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
Perfluorododecanoic acid (PFDoA)	307-55-1			mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
Perfluoroheptanoic acid (PFHpA)	375-85-9			mg/kg	0.0014	U	0.0012	U	0.0016		0.0011	U	0.0012	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4			mg/kg	0.0014	U	0.0012	U	0.0025		0.0011	U	0.0012	U
Perfluorohexanoic acid (PFHxA)	307-24-4			mg/kg	0.0014	U	0.0012	U	0.0024		0.0011	U	0.0012	U
Perfluorononanoic acid (PFNA)	375-95-1			mg/kg	0.0014	U	0.0012	U	0.0031		0.0011	U	0.0012	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.13	1.6	mg/kg	0.0014	U	0.0012	U	0.018		0.0010	J	0.0012	U
Perfluorooctanoic acid (PFOA)	335-67-1	0.13	1.6	mg/kg	0.0014	U	0.0012	U	0.0032		0.0011	U	0.0012	U
Perfluoropentanoic acid (PFPeA)	2706-90-3			mg/kg	0.0014	U	0.0012	U	0.0045		0.0011	U	0.0012	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7			mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8			mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8			mg/kg	0.0014	U	0.0012	U	0.00095	U	0.0011	U	0.0012	U
тос														
Total Organic Carbon				mg/kg	200	J			1,060				2,990	
Grain Size														
Clay				%	-				13.1		-		6	
Gravel				%					7.2				38.8	
Sand				%					67.1		-		44	
Sieve No. 200, % passing			-	% passing					25.7		-		17.2	
Sieve No. 4, % passing				% passing					92.8		1		61.2	
Silt				%					12.6				11.2	
General Chemistry														
Percent Moisture				%	18.3		14.9		11.9		6.6		13.3	
рН				SU	4.4	J			5.2	J			5.5	J



				AOPI	Building 3121 (LRC)	Building 3	121 (LRC)	DAAF Fire Station	on	DAAF Fire Station		DAAF Fire Sta	ition	FBNA Fire Stat	tion
				Location	FTBL-B3121-01	FTBL-B:	3121-03	FTBL-DAAF-01		FTBL-DAAF-01		FTBL-DAAF-	02	FTBL-FBNAFS	S-01
		OSD Residential	OSD Industrial/ Commercial	Sample ID	FTBL-B3121-02-SO-100120	FTBL-B3121-0	3-SO-092920	FTBL-DAAF-01-SO-0	92820	DUP-1-092820 / FTBL-DAA 092820	F-01-SO-	FTBL-DAAF-02-SC	)-092820	FTBL-FBNAFS-01-S0	O-100120
Analyte	CAS	Risk	Risk	Sample Date	10/01/2020	09/29/	2020	09/28/2020		09/28/2020		09/28/2020	)	10/01/2020	
		Screening Level	Screening	Sample Type	N	N		N		FD		N		N	
			Level	Matrix	Soil	Sc	il	Soil		Soil		Soil		Soil	
				Units	Result Qu	al Result	Qua	l Result	Qual	Result	Qua	I Result	Qual	Result	Qual
PFASs															
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2			mg/kg	0.0020 U	0.0021	U	0.0024	U	0.0026	U	0.0023	U	0.0023	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4			mg/kg	0.0020 U	0.0021	U	0.0024	U	0.0026	U	0.0023	UJ	0.0023	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6			mg/kg	0.0020 U		U	0.0024	U	0.0026	U	0.0023	U	0.0023	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9			mg/kg	0.0020 U			+	U	0.0026	U	0.0023	U	0.0023	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.9	25	mg/kg	0.00098 U	0.0011	U	0.0012	U	0.0013	U	0.0012	U	0.0012	U
Perfluorobutanoic acid (PFBA)	375-22-4			mg/kg	0.00098 U	0.0011	U	0.0021		0.0024		0.0010	J	0.00091	J
Perfluorodecanoic acid (PFDA)	335-76-2			mg/kg	0.00098 U	0.0011	U	0.00072	J	0.0010	J	0.00094	J	0.0012	U
Perfluorododecanoic acid (PFDoA)	307-55-1			mg/kg	0.00098 U	0.0011	U	0.0012	U	0.0013	U	0.0012	U	0.0012	U
Perfluoroheptanoic acid (PFHpA)	375-85-9			mg/kg	0.00098 U		U	0.0063		0.0077		0.0040	J-	0.0024	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4			mg/kg	0.00098 U	0.0011	U	0.016		0.027	J	0.019		0.0012	U
Perfluorohexanoic acid (PFHxA)	307-24-4			mg/kg	0.00098 U	0.0011	U	0.016		0.021		0.0060	J-	0.0021	
Perfluorononanoic acid (PFNA)	375-95-1			mg/kg	0.00098 U	0.0011	U	0.0015		0.0022		0.0023	J-	0.0012	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.13	1.6	mg/kg	0.00098 U	0.0011	U	0.045		0.066		0.12		0.0012	U
Perfluorooctanoic acid (PFOA)	335-67-1	0.13	1.6	mg/kg	0.00098 U	0.0011	U	0.0036		0.0051		0.0064	J-	0.0041	
Perfluoropentanoic acid (PFPeA)	2706-90-3			mg/kg	0.00098 U	0.0011	U	0.013		0.016		0.0058		0.0032	
Perfluorotetradecanoic acid (PFTeA)	376-06-7			mg/kg	0.00098 U	0.0011	U	0.0012	U	0.0013	U	0.0012	U	0.0012	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8			mg/kg	0.00098 U	0.0011	U	0.0012	U	0.0013	U	0.0012	U	0.0012	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8			mg/kg	0.00098 U	0.0011	U	0.00077	J	0.0012	J	0.00071	J	0.0012	U
тос															
Total Organic Carbon				mg/kg				8,280						6,700	
Grain Size															
Clay				%				14.2				-			
Gravel				%				12.4				-			
Sand				%				53				-			
Sieve No. 200, % passing				% passing				34.6				-			
Sieve No. 4, % passing				% passing				87.6				-			
Silt				%				20.4							
General Chemistry															
Percent Moisture				%	17.9	19		11.6		13.1		13.9		10.1	
pH				SU				6.2	J					6.1	J



				AOPI	FBNA Fire Station		FBNA Fire Station		FTBL-12		FTBL-12		Hangar 3145		Hangar 3151	
				Location	FTBL-FBNAFS-02	:	FTBL-FBNAFS-03		FTBL-12-01		FTBL-12-02		FTBL-H3145-01		FTBL-H3151-0	D1
		OSD Residential	OSD Industrial/	Sample ID	FTBL-FBNAFS-02-SO-1	00120 F1	BL-FBNAFS-03-SO-100	120	FTBL-12-01-SO-09	2820	FTBL-12-02-SO-09	2920	FTBL-H3145-01-SO-0	92920	FTBL-H3151-01-SO-	-100120
Analyte	CAS	Risk	Commercial Risk	Sample Date	10/01/2020		10/01/2020		09/28/2020		09/29/2020		09/29/2020		10/01/2020	
		Screening Level	Screening	Sample Type	N		N		N		N		N		N	
			Level	Matrix	Soil		Soil		Soil		Soil		Soil		Soil	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs																
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2			mg/kg	0.0021	U	0.0024	U	0.0025	U	0.082		0.0020	U	0.0022	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4			mg/kg	0.0021	U	0.0024	U	0.0025	U	0.043		0.0020	U	0.0022	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6			mg/kg	0.0021	U	0.0024	U	0.0025	U	0.0024	U	0.0020	U	0.0022	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9			mg/kg	0.0021	U	0.0024	U	0.0025	U	0.0024	U	0.0020	U	0.0022	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.9	25	mg/kg	0.0010	U	0.0012	U	0.00080	J	0.028		0.0010	U	0.0011	U
Perfluorobutanoic acid (PFBA)	375-22-4			mg/kg	0.0010	U	0.0012	U	0.0010	J	0.012		0.0010	U	0.0011	U
Perfluorodecanoic acid (PFDA)	335-76-2			mg/kg	0.0010	U	0.0012	U	0.0013	U	0.0016		0.0010	U	0.0011	U
Perfluorododecanoic acid (PFDoA)	307-55-1			mg/kg	0.0010	U	0.0012	U	0.0013	U	0.0012	U	0.0010	U	0.0011	U
Perfluoroheptanoic acid (PFHpA)	375-85-9			mg/kg	0.0010	U	0.00088	J	0.0023		0.017		0.0010	U	0.0011	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4			mg/kg	0.0010	U	0.0012	U	0.042		0.44	J	0.0010	U	0.0011	U
Perfluorohexanoic acid (PFHxA)	307-24-4			mg/kg	0.0010	U	0.0011	J	0.0077		0.14		0.0010	U	0.0011	U
Perfluorononanoic acid (PFNA)	375-95-1			mg/kg	0.0010	U	0.0012	U	0.0022		0.013		0.0010	U	0.0011	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.13	1.6	mg/kg	0.0010	U	0.0012	U	0.10		1.2	J	0.0010	U	0.0011	U
Perfluorooctanoic acid (PFOA)	335-67-1	0.13	1.6	mg/kg	0.0010	U	0.0011	J	0.044		0.19		0.0010	U	0.0011	U
Perfluoropentanoic acid (PFPeA)	2706-90-3			mg/kg	0.0010	U	0.0014		0.0052		0.050		0.0010	U	0.0011	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7			mg/kg	0.0010	U	0.0012	U	0.0013	U	0.0012	U	0.0010	U	0.0011	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8			mg/kg	0.0010	U	0.0012	U	0.0014		0.00098	J	0.0010	U	0.0011	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8			mg/kg	0.0010	U	0.0012	U	0.0026		0.0023		0.0010	U	0.0011	U
тос																
Total Organic Carbon				mg/kg					1,880				2,120		1,140	
Grain Size																
Clay				%					13.1				6.2		6.8	
Gravel				%					1.3				0.2		15.5	
Sand			-	%					67.2				64		64	
Sieve No. 200, % passing				% passing					31.5				35.8		20.5	
Sieve No. 4, % passing				% passing					98.7				99.8		84.5	
Silt				%					18.4				29.6		13.7	
General Chemistry																
Percent Moisture				%	14.5		10.7		22.1		16.6		15		13.8	
рН				SU					5.3	J			8.2	J	5.4	J



				AOPI	Lewis Village Ca	ar Fire	North Post Fire S	Station	North Post Fire S	ation	Old and New South Po Stations	st Fire	Old and New South Postations	ost Fire
				Location	FTBL-LVCF-	01	FTBL-NPFS-	01	FTBL-NPFS-0	2	FTBL-OSPFS-01		FTBL-OSPFS-0	)2
		OSD Residential	OSD Industrial/	Sample ID	FTBL-LVCF-01-SC	-092720	FTBL-NPFS-01-SC	-092720	FTBL-NPFS-02-SO-	092720	FTBL-OSPFS-01-SO-0	92920	FTBL-OSPFS-02-SO-	-092920
Analyte	CAS	Risk	Commercial Risk	Sample Date	09/27/2020	)	09/27/2020	)	09/27/2020		09/29/2020		09/29/2020	
		Screening Level	Screening	Sample Type	N		N		N		N		N	
			Level	Matrix	Soil		Soil		Soil		Soil		Soil	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs														
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2			mg/kg	0.0021	U	0.0024	U	0.0024	U	0.0024	U	0.0021	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4			mg/kg	0.0021	U	0.0024	U	0.0024	U	0.0024	U	0.0021	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6			mg/kg	0.0021	U	0.0024	U	0.0024	U	0.0024	U	0.0021	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9			mg/kg	0.0021	U	0.0024	U	0.0024	U	0.0024	U	0.0021	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.9	25	mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluorobutanoic acid (PFBA)	375-22-4			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.00077	J
Perfluorodecanoic acid (PFDA)	335-76-2			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluorododecanoic acid (PFDoA)	307-55-1			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluoroheptanoic acid (PFHpA)	375-85-9			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.00065	J
Perfluorohexane sulfonic acid (PFHxS)	355-46-4			mg/kg	0.0011	U	0.0047		0.0012	U	0.0012	U	0.0010	U
Perfluorohexanoic acid (PFHxA)	307-24-4			mg/kg	0.0011	U	0.00064	J	0.0012	U	0.0012	U	0.00079	J
Perfluorononanoic acid (PFNA)	375-95-1			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.00061	J
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.13	1.6	mg/kg	0.0011	U	0.19		0.0021		0.0022		0.010	
Perfluorooctanoic acid (PFOA)	335-67-1	0.13	1.6	mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluoropentanoic acid (PFPeA)	2706-90-3			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0019	
Perfluorotetradecanoic acid (PFTeA)	376-06-7			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8			mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		-	mg/kg	0.0011	U	0.0012	U	0.0012	U	0.0012	U	0.0010	U
тос														
Total Organic Carbon				mg/kg	568		4,620				4,760			
Grain Size														
Clay				%	18.1		11.9				16.6			
Gravel				%	2		19.4				8.4			
Sand				%	34.4		40.1				36.7			
Sieve No. 200, % passing				% passing	63.6		40.5				54.9			
Sieve No. 4, % passing				% passing	98		80.6				91.6			
Silt				%	45.5		28.6				38.3			
General Chemistry														
Percent Moisture				%	17.5		17		11		12		12.9	
рН				SU	4.5	J	7.1	J			6.9	J		



				AOPI				Buildir	ng 1495			
			OSD	Location	FTBL-B1495-0	1	FTBL-B1495-0	2	FTBL-B1495-0	)3	FTBL-B1495-0	04
		OSD Residential	Industrial/ Commercial	Sample ID	FTBL-B1495-01-SO-	031021	FTBL-B1495-02-SO-0	31021	FTBL-B1495-03-SO-	031021	FTBL-B1495-04-SO	-031021
Analyte	CAS	Risk	Risk	Sample Date	03/10/2021		03/10/2021		03/10/2021		03/10/2021	
		Screening Level	Screening Level	Sample Type	N		N		N		N	
			Level	Matrix	Soil		Soil		Soil		Soil	
				Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs												
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2			mg/kg	0.0024	U	0.0012	J	0.0019	U	0.0022	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4			mg/kg	0.0024	U	0.0022	U	0.0019	U	0.0022	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6			mg/kg	0.0024	U	0.0022	U	0.0019	U	0.0022	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9			mg/kg	0.0024	U	0.0022	U	0.0019	U	0.0022	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.9	25	mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluorobutanoic acid (PFBA)	375-22-4			mg/kg	0.0012	U	0.00068	J	0.00096	U	0.0011	U
Perfluorodecanoic acid (PFDA)	335-76-2			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluorododecanoic acid (PFDoA)	307-55-1			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluoroheptanoic acid (PFHpA)	375-85-9			mg/kg	0.0012	U	0.0014		0.00096	U	0.0011	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluorohexanoic acid (PFHxA)	307-24-4			mg/kg	0.0012	U	0.0038		0.00096	U	0.0011	U
Perfluorononanoic acid (PFNA)	375-95-1			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.13	1.6	mg/kg	0.0012	U	0.0065		0.0020		0.0017	
Perfluorooctanoic acid (PFOA)	335-67-1	0.13	1.6	mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluoropentanoic acid (PFPeA)	2706-90-3			mg/kg	0.0012	U	0.0040		0.00096	U	0.0011	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8			mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		-	mg/kg	0.0012	U	0.0011	U	0.00096	U	0.0011	U
тос												
Total Organic Carbon				mg/kg			-					
Grain Size												
Clay				%								
Gravel				%								
Sand				%								
Sieve No. 200, % passing				% passing								
Sieve No. 4, % passing				% passing								
Silt				%								
General Chemistry												
Percent Moisture				%								
рН				SU								

Appendix N - Site Inspection Laboratory Analytical Results - Soil USAEC PFAS Preliminary Assessment/Site Inspection Fort Belvoir, Virginia



### Notes:

- 1. Bolded values indicate the result was detected greater than the limit of detection.
- 2. All laboratory reported results in nanograms per gram (ng/g) were converted to milligrams per kilogram (mg/kg).
- 3. Data are compared to the Office of the Secretary of Defense (OSD) risk screening levels for the residential and commercial/industrial scenario (OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.).
- 4. Gray-shaded values indicate the result was detected greater than the residential scenario risk screening levels (OSD 2021). There were no detections greater than the commercial/industrial scenario risk screening levels.

### Acronyms/Abbreviations:

-- = not applicable/not analyzed

% = percent

AOPI = area of potential interest

CAS = Chemical Abstracts Service number

DAAF = Davison Army Airfield

FBNA - Fort Belvoir North Area

FD = field duplicate sample

FTBL = Fort Belvoir

ID = identification

LRC = Logistics Readiness Center

mg/kg = milligrams per kilogram (parts per million)

N = primary sample

PFAS = per- and polyfluoroalkyl substances

Qual = qualifier

SO = soil

### Qualifiers:

- J = The analyte was positively identified; however the associated numerical value is an estimated concentration only.
- J- = The result is an estimated quantity; the result may be biased low.
- U = The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).
- UJ = The analyte was analyzed for but was not detected. The limit of quantitation (LOQ) is approximate and may be inaccurate or imprecise.





			AOPI	FTBL-66 and FTBL-68		FTBL-66 and FTBL-68	
		OSD Tapwater	Location	FTBL-66-68-01		FTBL-66-68-01	
Amalista	CAS	Risk	Sample ID	FTBL-66-68-01-SW-092920		DUP-2-093020 / FTBL-66-68-01-SV	N-092920
Analyte	CAS	Screening Level	Sample Date	09/29/2020		09/29/2020	
			Sample Type	N		FD	
			Matrix	Surface Water		Surface Water	
			Units	Result	Qual	Result	Qual
PFASs							
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2		ng/L	7.0	U	7.0	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4		ng/L	7.0	U	7.0	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6		ng/L	7.0	U	7.0	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9		ng/L	7.0	U	7.0	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	600	ng/L	5.7		4.5	
Perfluorobutanoic acid (PFBA)	375-22-4		ng/L	11		9.5	
Perfluorodecanoic acid (PFDA)	335-76-2		ng/L	3.5	U	3.5	U
Perfluorododecanoic acid (PFDoA)	307-55-1		ng/L	3.5	U	3.5	U
Perfluoroheptanoic acid (PFHpA)	375-85-9		ng/L	6.9		5.5	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4		ng/L	8.1		8.0	
Perfluorohexanoic acid (PFHxA)	307-24-4		ng/L	12		9.3	
Perfluorononanoic acid (PFNA)	375-95-1		ng/L	2.9	J	2.3	J
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	40	ng/L	8.3		7.2	
Perfluorooctanoic acid (PFOA)	335-67-1	40	ng/L	11		9.2	
Perfluoropentanoic acid (PFPeA)	2706-90-3		ng/L	14	J+	14	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		ng/L	3.5	U	3.5	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8		ng/L	3.5	U	3.5	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8		ng/L	3.5	U	3.5	U



# Appendix N - Site Inspection Laboratory Analytical Results - Surface Water USAEC PFAS Preliminary Assessment/Site Inspection Fort Belvoir, Virginia

### Notes:

1. **Bolded** values indicate the result was detected greater than the limit of detection.

2. Gray-shaded values indicate the result was detected greater than the 2021 Office of the Secretary of Defense (OSD) risk screening levels (OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.).

### Acronyms/Abbreviations:

-- = not applicable

% = percent

AOPI = area of potential interest

CAS = Chemical Abstracts Service number

FD = field duplicate sample

FTBL = Fort Belvoir

ID = identification

N = primary sample

ng/L = nanograms per liter (parts per trillion)

OSD = Office of the Secretary of Defense

PFAS = per- and polyfluoroalkyl substances

Qual = qualifier

SW = surface water

### Qualifiers:

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only.

J+ = The result is an estimated quantity; the result may be biased high.

U = The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).



		Sample/Parent ID  Sample Date	FTBL-EB-01	020	FTBL-EB-02-	)20	FTBL-EB-03-	)20	FTBL-E 1001 10/01/	2020	FTBL-EB-09	2020	FTBL-F 100 ⁻ 10/01/	120 /2020	FTBL-F 1001 10/01/	2020	FTBL-F 10012 10/01/	0LR 2020	FTBL-SB-01	2020
Analyte	CAS	Sample Type  Equipment Type	Equipment Tubin		Equipment Water Leve		Equipment Hang Au		Equipment Drill Roo		Equipmen Scre		Field I	Blank	Field E	Blank	Field E	Blank	Source I	3lank 
		Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
PFASs																				
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2	ng/L	8.4	U	8.6	U	7.3	U	7.1	U	7.2	U	8.3	U	8.5	U	8.7	U	7.2	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4	ng/L	8.4	U	8.6	U	7.3	U	7.1	U	7.2	U	8.3	U	8.5	U	8.7	U	7.2	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	8.4	U	8.6	U	7.3	U	7.1	U	7.2	U	8.3	U	8.5	U	8.7	U	7.2	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	8.4	U	8.6	U	7.3	U	7.1	U	7.2	U	8.3	U	8.5	U	8.7	U	7.2	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	4.2	U	4.3	U	3.6	U	3.6	U	3.6	U	4.2	U	4.2	U	4.3	U	3.6	U



# Appendix N - Site Inspection Laboratory Analytical Results - Blanks USAEC PFAS Preliminary Assessment/Site Inspection Fort Belvoir, Virginia

### Notes:

1. **Bolded** values indicate the result was detected greater than the limit of detection

### Acronyms/Abbreviations:

CAS = Chemical Abstracts Service number FTBL = Fort Belvoir ID = identification ng/L = nanograms per liter (parts per trillion) PFAS = per- and polyfluoroalkyl substances Qual = qualifier

### Qualifier

U = The analyte was analyzed for but the result was not detected above the method detection limit.



Analyte	CAS	Sample/Parent ID	FTBL-IDW-GW-100120	
		Sample Date	10/1/2020	
	3,13	Sample Type	N	
		Units	Result	Qual
PFASs			rtoodit	S, Gran
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2	ng/L	180	
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4	ng/L	36	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	ng/L	36	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	ng/L	36	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	ng/L	42	
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	70	
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	18	U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	18	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	85	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	ng/L	540	
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	280	
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	17	J
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	1,100	<u> </u>
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	350	
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	280	
Perfluorotetradecanoic acid (PFTeA)	376-06-7		18	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L ng/L	18	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	_	18	U
Metal	2030-94-0	ng/L	10	
Arsenic	7440-38-2		0.15	U
Barium	7440-38-2	mg/L	0.15 <b>0.16</b>	J
Cadmium	7440-39-3	mg/L		U
Chromium	7440-43-9	mg/L	0.050	J
	7440-47-3	mg/L	0.068	U
Lead	7439-92-1	mg/L	0.10	U
Mercury		mg/L	0.0020	
Selenium Silver	7782-49-2	mg/L	0.20	U
	7440-22-4	mg/L	0.10	U
VOC	75.05.4	,,		11
1,1-Dichloroethene	75-35-4	mg/L	0.25	U
1,2-Dichloroethane	107-06-2	mg/L	0.25	U
2-Butanone (MEK)	78-93-3	mg/L	0.50	U
Benzene	71-43-2	mg/L	0.25	U
Carbon Tetrachloride	56-23-5	mg/L	0.25	U
Chlorobenzene	108-90-7	mg/L	0.25	U
Chloroform	67-66-3	mg/L	0.25	U
Tetrachloroethene	127-18-4	mg/L	0.25	U
Trichloroethene	79-01-6	mg/L	0.25	U
Vinyl chloride	75-01-4	mg/L	0.050	U
SVOC				
1,4-Dichlorobenzene	106-46-7	mg/L	0.040	U
2,4,5-Trichlorophenol	95-95-4	mg/L	0.040	U
2,4,6-Trichlorophenol	88-06-2	mg/L	0.040	U
2,4-Dinitrotoluene	121-14-2	mg/L	0.080	U
2-Methylphenol	95-48-7	mg/L	0.040	U
4-Methylphenol	106-44-5	mg/L	0.040	U
Hexachloro-1,3-butadiene	87-68-3	mg/L	0.040	U
Hexachlorobenzene	118-74-1	mg/L	0.040	U
Hexachloroethane	67-72-1	mg/L	0.040	U
Nitrobenzene	98-95-3	mg/L	0.040	U
Pentachlorophenol	87-86-5	mg/L	0.20	U
	110-86-1			



# Appendix N - Site Inspection Laboratory Analytical Results - IDW Water USAEC PFAS Preliminary Assessment/Site Inspection Fort Belvoir, Virginia

### Notes:

1. **Bolded** values indicate the result was detected greater than the limit of detection

### Acronyms/Abbreviations:

CAS = Chemical Abstracts Service number

FTBL = Fort Belvoir

ID = identification

IDW = investigation-derived waste

mg/l = milligrams per liter (parts per million)

ng/L = nanograms per liter (parts per trillion)

PFAS = per- and polyfluoroalkyl substances

Qual = qualifier

SVOC = semivolatile organic compounds

VOC = volatile organic compounds

### Qualifier

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but the result was not detected above the method detection limit.



Analyte	CAS	Sample/Parent ID FTBL-IDW-SO-100120		100120
		Sample Date	10/01/2020	
		Sample Type	N	
		Units	Result	Qual
PFASs				
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	27619-97-2	mg/kg	0.0020	U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	39108-34-4	mg/kg	0.0020	U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	mg/kg	0.0020	U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	mg/kg	0.0020	U
Perfluorobutane sulfonic acid (PFBS)	375-73-5	mg/kg	0.0010	U
Perfluorobutanoic acid (PFBA)	375-22-4	mg/kg	0.0010	U
Perfluorodecanoic acid (PFDA)	335-76-2	mg/kg	0.0010	U
Perfluorododecanoic acid (PFDoA)	307-55-1	mg/kg	0.0010	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	mg/kg	0.0010	U
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	mg/kg	0.0010	U
Perfluorohexanoic acid (PFHxA)	307-24-4	mg/kg	0.0010	U
Perfluorononanoic acid (PFNA)	375-95-1	mg/kg	0.0010	U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	mg/kg	0.0022	<del>                                     </del>
Perfluorooctanoic acid (PFOA)	335-67-1	mg/kg	0.0010	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	mg/kg	0.0010	U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	mg/kg	0.0010	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	mg/kg	0.0010	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	mg/kg	0.0010	U
Metal	2000 04 0	ilig/kg	0.0010	
Arsenic	7440-38-2	mg/l	0.15	U
Barium	7440-39-3	mg/l	0.13	
Cadmium	7440-43-9	mg/l	0.050	U
Chromium	7440-43-9	mg/l	0.00	U
Lead	7439-92-1	mg/l	0.10	U
Mercury	7439-97-6	mg/l	0.0020	U
Selenium	7782-49-2	mg/l	0.20	U
Silver	7440-22-4	mg/l	0.10	U
General Chemistry	7 1 10 22 1	mg/i	0.10	
Percent Solids		%	88.1	
VOC		,,,	33.1	<u> </u>
1,1-Dichloroethene	75-35-4	mg/l	0.050	U
1,2-Dichloroethane	107-06-2	mg/l	0.050	U
2-Butanone (MEK)	78-93-3	mg/l	0.10	U
Benzene	71-43-2	mg/l	0.050	U
Carbon Tetrachloride	56-23-5	mg/l	0.050	U
Chlorobenzene	108-90-7	mg/l	0.050	U
Chloroform	67-66-3	mg/l	0.050	U
Tetrachloroethene	127-18-4	mg/l	0.050	U
Trichloroethene	79-01-6	mg/l	0.050	U
Vinyl chloride	75-01-4	mg/l	0.010	U
SVOC				
1,4-Dichlorobenzene	106-46-7	mg/l	0.040	U
2,4,5-Trichlorophenol	95-95-4	mg/l	0.040	U
2,4,6-Trichlorophenol	88-06-2	mg/l	0.040	U
2,4-Dinitrotoluene	121-14-2	mg/l	0.080	U
2-Methylphenol	95-48-7	mg/l	0.040	U
4-Methylphenol	106-44-5	mg/l	0.040	U
Hexachloro-1,3-butadiene	87-68-3	mg/l	0.040	U
Hexachlorobenzene	118-74-1	mg/l	0.040	U
Hexachloroethane	67-72-1	mg/l	0.040	U
Nitrobenzene	98-95-3	mg/l	0.040	U
Pentachlorophenol	87-86-5	mg/l	0.20	U
Pyridine	110-86-1	mg/l	0.040	U





### Notes:

1. Bolded values indicate the result was detected greater than the limit of detection

### Acronyms/Abbreviations:

% = percent

CAS = Chemical Abstracts Service number

FTBL = Fort Belvoir

ID = identification

IDW = investigation-derived waste

mg/kg = milligrams per kilogram (parts per million)

ng/L = nanograms per liter (parts per trillion)

PFAS = per- and polyfluoroalkyl substances

Qual = qualifier

SVOC = semivolatile organic compounds

VOC = volatile organic compounds

### Qualifier

U = The analyte was analyzed for but the result was not detected above the method detection limit.

# **APPENDIX O**

**Waste Manifest** 

Please print or type. 4. Manifest Tracking Number 2. Page 1 of 3. Emergency Response Phone 1. Generator ID Number UNIFORM HAZARDOUS 1-800-255-3924 VA7213720082 WASTE MANIFEST Generator's Site Address (if different than mailing address) 5. Generator's Name and Mailing Address Att. PHYLEATA RHODES US ARMY GARRISON BELVOIR 9820 FLAGLER ROAD FORT BELVIOR, VA 22080 (HQ) US ARMY GARRISON BELVOIR 9430 JACKSON LOOP, SUITE 107 FORTBELVOIR VA 22060 ( FORTBELVOIR VA 22000 Generator's Phone: 7 0 2 6. Transporter 1 Company Name U.S. EPA ID Number MDR000527705 BROADVIEW WASTE SOLUTIONS, INC IJ.S. EPA ID Number 7. Transporter 2 Company Name U.S. EPA ID Number 8. Designated Facility Name and Site Address CYCLE CHEM, INC 550 INDUSTRIAL DRIVE LEWISBERRY PA 17339 PAD067098822 Facility's Phone: 747 938-4700 10. Containers 12. Unit 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, 11. Total 13. Waste Codes and Packing Group (if any)) No Quantity Wt. Nol. Type HM NON REGULATED MATERIAL (PFAS WATER) NONE GENERATOR MO 48 60 IONE NON REGULATED SOLIDS DW P 200 and Additional Information 353-9111 CONTRACT#MIS3364989 Pro fee 1 728895 Disposal medical: Incineration GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and tabeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true. Year PHY LENGA 16. International Simpments Import to U.S. Export from U.S. Port of entry/exit: Date leaving U.S.; Transporter signature (for exports only): 17, Transporter Acknowledgment of Receipt of Materials Month Day Year 18. Discrepancy Type 18a, Discrepancy Indication Space Partial Rejection Full Rejection Residue Quantity Manifest Reference Number: U.S. EPA ID Number 18b. Alternate Facility (or Generator) Facility's Phone: Month Day DESIGNATED 18c. Signature of Alternate Facility (or Generator) 19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems) allity Owner or Operator. Certification of receipt of hazardous materials covered by the manifest excelling as noted in Item 18a Printed/Type DESIGNATED FACILITY TO EPA'S e-MANIFEST SYSTEM EPA Form 8700-92 (Rev. 12-17) Previous editions are obsolete.